CREATIVITY AS A CRUCIAL PROCESS IN THE DEVELOPMENT OF THE YOUNG

CHILD

by

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DECLARATION

I declare that, "Creativity as a crucial process in the development of the young child" is my own work, that it has not been submitted for any degree or examination in any other university, and that all the sources I have used or quoted have been indicated and acknowledged by complete references.

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Miss N van Jaarsveldt   22 February 2011

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ABSTRACT

CREATIVITY AS A CRUCIAL PROCESS IN THE DEVELOPMENT OF THE YOUNG CHILD

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SUMMARY

This study was conducted in order to assess the effects of creative stimulation in early childhood. The quantitative quasi-experimental study was set out to test a target group of 8 children in grade R, ranging in age from five to six years, to determine the importance of stimulation and intervention of creativity from a young age. A pre-test, evaluated the initial level of each child's creative skills in fluency, flexibility and originality. This was followed by selecting one class as the experimental group and another class, from the same demographical location, as the control group. The experimental group underwent a six-week intervention programme which focused on the primary concepts in each area of fluency, flexibility and originality. Both groups continued with their normal school learning programmes. The results indicate that the impact of stimulation on young children was significant and that there was a great difference in the abilities and understanding of concepts in those children whohad been stimulated.

Keywords: creativity, imagination, problem solving, education, process, child development, divergent thinking, convergent thinking, quantitative research design, the human brain.

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CHAPTER 1

BACKGROUND AND ORIENTATION OF THE STUDY

1.1 INTRODUCTION

Human development consists of social, emotional, physical and cognitive aspects. It is a continuous process and very complex (Hellbrügge and von Wimpffen 2002:11). Duffy (2006:05) states that human beings desire to be creative and that it has been present throughout history in all communities. Creativity is the process of creating something that is both original and worthwhile (Sternberg 2009:429).

Being creative is not necessarily creating or reinventing something new, it can also mean improving something that already exists. There are some important factors such as motivation, persistence, knowledge and social support that form part of creativity (Woolflock 2007:307). It is important to acknowledge the fact that creativity is indeed necessary in human social, emotional and cognitive development.

1.2 BACKGROUND OF THE STUDY

The education system in South Africa is attempting to solve problems at a late stage, which should have been addressed early. This study focuses on the creative development skills of preschool children. According to King Mildrum (2000:33) all children could benefit from creativity.

Pre-primary school children are between the ages of two and six years. As mentioned in Louw, Louw and van Ede (2003:240) this is especially the stage where the most social, emotional and cognitive development occurs because of the brain's plasticity during this period of brain development.

Furthermore Louw *et al* (2003:238) states that during the early years (2-6years) the child builds on his previous two years. Rapid development takes place in all the developmental areas of the young child.

This study was conducted to determine the current state of the development of creative thinking skills in the pre-primary school educational system.

The study differentiates between "creativity as an aptitude," for example the process of creating new and original solutions and "the arts/creative arts," where the focus is on creating a product, for example a painting or a sculpture.

Aptitude can be defined as a natural tendency or an inherent ability or skill to create as opposed to creativity that is seen as using the imagination to produce original and unusual ideas.

(http://oxforddictionary.com/view/entry;http://en.wikipedia.org/wikioxford; http://thefreedictionary.com/aptitude).

According to Woolflock (2007:538) aptitude tests are used to measure ability and to predict how well a student will learn unfamiliar material in the future. Aptitude is therefore the same as having skills. In creativity such skills can be referred to as creative skills. Creative skills or creative abilities such as fluency, originality, flexibility and elaboration can be used to enhance creativity. According to Sternberg *et al* (2009:35) creative skills are very important to solve real life problems.

The end result that is created or reinvented through creativity should however be useful or meaningful (Rickards et al 2009:248). Creativity should not produce strange and different end results that are not valuable or useful. Woolflock (2007:307) states that extensive knowledge in a particular field is the basis for creativity.

Beetlestone (1998:10-11) is of the opinion that creativity improves a person's understanding, which will enhance development. According to Beetlestone a creative approach enhances literacy and numeracy which means more creative content will be developed.

Creativity cannot be seen as an art product, but rather as the process that is followed to create the end result. The focus should be more on the process than on the end result in order to create a satisfactory and meaningful solution.

When a problem needs to be solved and the creative process is implemented, the end result will be a creative and functional solution to solving the problem. The end result has to ultimately contribute to the improvement or new usefulness of the solution. This is achieved by using creative thinking and problem solving skills.

Some of the current problems that the researcher experienced in the field of creativity are the lack of awareness regarding this field, the lack of teaching expertise, as well as the lack of a creative implementation programme in schools. Although children's skills are not well developed it is important to develop their creative skills.

Creativity has been recognised as a very important factor that contributes to individual performance in various domains of work, and more attention has been devoted by researchers and practitioners to increasing creative performance (Sung and Choi 2009:943). Society needs more creative people who can deliver a product (Louw *et al* 2003:345), because new combinations of creative skills and abilities are increasingly in demand (Mc William 2008:263).

This study also aims to identify other weaknesses and problem areas in the above field that can lead to further appropriate investigation and research. One of the major questions researched in this study is: How can young children's creativity and creative thinking skills be improved in our current pre-primary or preschool educational system?

Before creative thinking skills can be improved the necessity for such improvement should be indicated. According to Davis (2004:100) and as illustrated in table 1.1, creative abilities that are improved by enhanced creative thinking are the following:

Table 1.1 Creative abilities

Creative Abilities	
Fluency	Able to predict outcomes, consequences
Flexibility	Analysis
Originality	Synthesis
Elaboration	Evaluation
Transformation	Logical Thinking
Sensitivity to Problems	Able to regress
Able to define problems	Intuition
Visualization, imagination	Concentration
Analogical/Metaphorical Thinking	

(Davis 2004:100)

The above-mentioned abilities are especially important to creativity (Davis 2004:100) and are necessary for optimal creative development. To enhance development, skills need to be taught by using a good model of what to expect. Time is needed to develop skills and provide the opportunity to reflect on what was learnt (Ellis and Lawrence 2009:7).

It seems to the researcher that the above-mentioned skills are deliberately ignored due to a lack of appropriate models of creativity as well as inappropriate teacher training.

The following scenario then arises: the child is educated with no appropriate training in creative skills. When a problem arises the child cannot solve it efficiently, due to his/her lack of creative skills. This lack of creative skills then furthers the cycle of incompetent problem solving and incomplete training. If the development of creative abilities (see table 1.1) was dealt with in the early years of the child's development, the problem would have been minimal and reparable.

If there were specific awareness programmes regarding creative thinking skills to support teachers-in-training, the result would be well trained preschool teachers who would ensure the development of creativity in preschool children.

1.3 AWARENESS OF THE PROBLEM

The researcher became aware of the problem in her reception year class during the implementation of activities that required problem solving namely originality, flexibility and elaboration. She then traced the children's educational portfolio's only to find that their previous teachers were not aware of the necessity for developing the children's creative thinking skills.

Teachers used set examples and pre-completed worksheets and this explained the children's lack of problem solving skills during, for example, box construction or fantasyplay activities.

The children that do not have the skills to create innovative objects and activities will not be able to produce appropriate products in the end. This displays a lack of questioning and of trying to find answers.

The fact that children are not able to explore and gain knowledge by themselves also influences their vocabulary and language development (Beetlestone 1998:10; 11). Creative development and thinking skills can be seen as prerequisites before optimal development can occur.

1.4 PROBLEM STATEMENT

The problem which causes children to struggle to perform creatively in schools is attributable to teachers that are not trained to implement creative skills at preschools. Teachers at preschool level who do not encourage or implement creative skills may support poor creativity. Another factor that may lead to poor creativity is a non - stimulating environment.

Creative learning forms an immense part of a human being's development and needs to be cultivated. By developing creativity one is recognizing and nurturing a valuable skill (creativity), even in the child who is usually seen as difficult. In the implementation of creative learning skills the teacher and the environment should focus on the young child's social, emotional and cognitive development.

Children that are not stimulated enough may stagnate in their actions and thoughts. Teachers who are also not stimulated might experience the same stagnation.

The problem the researcher wishes to investigate is: *What can be done to develop young children's creative thinking skills within the school programme?*

1.5 DEMARCATION, SCOPE AND LIMITATIONS OF THE STUDY

Creativity is complex and according to Beeltestone (1998:10) will enhance children's understanding. Figure 1.1 illustrates the complexity of the human brain which is an interlinked system and of which true abilities cannot be estimated. It would therefore also be pessimistic to accept boundaries for creative development.

Figure 1.1 Microscopic area of the brain
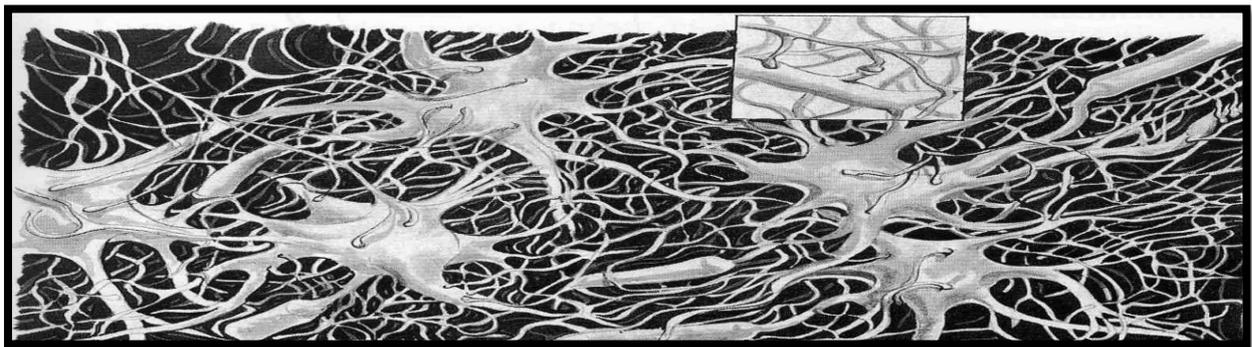
Microscopic area of the brain (Buzan and Buzan 2007:31, Starbuck 2006:37)

1.5.1 Demarcation and scope

The study was conducted using the TTCT test (Torrance Test for Creative Thinking) to evaluate the growth of children's creative thinking. A creative thinking programme was implemented in the reception phase class in one school for over 6 weeks and a control group was established at the same time at another school.

These groups had the following background in common: language of instruction (English), the reception year classroom, age, government curriculum and a classroom environment of mixed gender and diverse cultures.

The reason for this is that the experimental school was quite small and the whole grade R group was taken as the experimental group so as not to exclude any learners from the intervention programme. The study focused on the following: creative abilities: originality, flexibility, elaboration and fluency.

The study's primary objective was to determine whether children's creative thinking skills are being developed by the implementation of a creative intervention plan.

1.5.2 Limitations of the study

Currently creativity and creative thinking is not formally or explicitly included in the South African educational system. Creative ideas are often regarded as challenging the status quo (Sung and Choi 2009:944). This by itself imposes limitations with regard to teacher training and practical manuals required to further this development and limits research on creativity in the early years.

This study does not deal with cultural diversity, background and religion with regard to creative thinking and although an anti-bias policy was followed throughout the study, it did not deal with the role of creativity in cultural diversity which can serve as a topic for future research.

Creativity is still a novel concept, although internationally the concept is being pursued. Especially the concepts "creativity" and "creative thinking" are presently misunderstood in South Africa and in many other countries in the world.

According to Sweller (2009:11) there is a gap between connecting relevant research to creativity in a rapidly changing world. In order to provide students with the appropriate skills in the 21th century, the refocusing and understanding of contemporary society's educational needs are important (Schreck 2009:77).

1.6 AIM OF THE RESEARCH

Creativity and creative skills such as problem solving and critical questioning are some of the amazing abilities that human beings can develop. Thomas Edison (as quoted in Neethling and Rutherford 2001:3) is of the opinion that

"If we all did the things we are capable of doing we would literally astound ourselves."

The objectives of this study were to investigate the intervention of creative thinking in the life of a young child and to identify possible problem areas in the field. The intervention aims to enhance children's problem solving skills by stimulating their creativity.

1.7 RESEARCH METHOD

A quantitative research approach was followed during this study. The researcher used the Torrance Test for Creative Thinking or TTCT test devised by Torrance (1994:38) to obtain the research data.

A non-equivalent pre- and post-test quasi-experimental control group design was used and can be seen schematically in figure 1.3. A serves as the pilot group, B as the control group, X as the intervention programme over 6 weeks and the O as the pre-post-tests.

The most serious threat to the internal validity of this research design is the selection of the participating subjects (McMillan 2006:274), but this will be discussed fully in chapter 3.

Figure 1.2 Research design

Non-equivalent groups pre - and post-test control group design
GroupPre-testTreatmentPost-test

A → O → X → O

B → O ————————→ O

————————————————————→
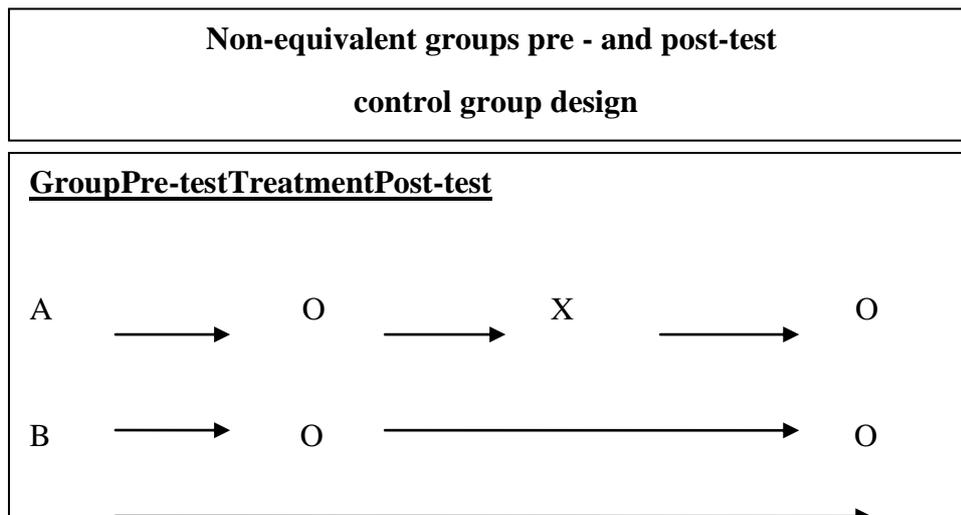
(McMillan and Schumacher 2006:274)

1.8 ELUCIDATION OF CONCEPTS

During the study the concepts discussed and clarified below will be referred to.

Creativity

Creativity is not easily defined and is a broad concept, indicating personal characteristics, and the mental processes of phenomena that we judge to be real on the basis of the facts that are available to us, for example the emergence of new and original ideas and products (Ryhammar and Brolin 1999:259).

Imagination

Imagination is the ability of the mind to be creative or resourceful. It can be described as the faculty or action of forming new ideas, images and concepts of external objects not present to the senses
 (http://oxforddictionaries.com/view/entry/m_en_gb0400790#m_en_gb0400790).

Problem solving

It is a mental process that includes problem finding and shaping. Furthermore, it is considered to be the most complex of all intellectual functions. Problem solving has been defined as a higher-order cognitive process that requires the modulation and control of more routine or fundamental skills

 (http://en.wikipedia.org/wiki/Problem_solving).

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Education

Education is the process of training people's minds and expanding their abilities so that they can acquire knowledge and develop skills (Hawkins 1998:145).

Process

It is a series of actions for making or doing something (Hawkins 1998:347).

Child development

A child's total development is complex and interlinked, and consists of cognitive, perceptual, physical, language, social and emotional development (Duffy 2006:50, Faber and van Staden 1997:3).

Divergent thinking

Divergent thinking is thinking about more than one alternative to solve a problem. Divergent thinking is described as thinking that is off the beaten track (Harris *et al.*1992:392).

Convergent thinking

Convergent thinking provides only single answers and specific outcomes to problems. It is known as vertical thinking (Isenberg and Jalongo 1993:5, Mayesky 2002:5).

Quantitative research design

This field is described by McMillan *et al.* (2006:23) as a positivist philosophy of knowing that emphasises objectivity and quantification of phenomena. It also maximises objectivity by using numbers, statistics, structure and control.

The human brain

The brain is the organ in our bodies that directly controls our thoughts, emotions and motivations (Sternberg 2006:531).

For the purpose of the study the concepts creativity and creative thinking will be discussed more in depth.

1.8.1 Creativity

Creativity is not only about creating new ideas; it is also a skill that helps to deal with new situations or problems that we have never been confronted with before (Sternberg et al 2009:35).

Creativity can be seen as a very broad concept as there is no single definition to exactly describe the meaning of the word (Hargreaves 2008:228). However the most related concept to creativity is novelty. The root of the word "*creativity*" and "*create*" comes from the Latin word *"creatus".* This means, to *"make"*, "*produce*", or literally "*to grow*" (Botha 1999:26; Piirto 1992:7).

A creative person is able to develop or create something new and relevant (Isenberg and Jalongo 1993:5; Mayesky 2002:4; Piirto 1992:7;Torrance in Mayesky 2002:4, Talor and Getzels 1975:2). Piirto (1992:7) states that the concept "*creativity*" is a nineteenth and twentieth century concept.

People tend to assume that human creativity is something unique (Sweller 2009:11) that is possessed only by a certain percentage of the population, but people are able to solve problems no matter how elementary. Problem solving is an attribute of creativity.

Problem solving is commonly misinterpreted, misused, and applied contradictorily. Creativity is also seen as a "*process*" or a "*product*" (Davis 2006:14; Duffy 2006:19; Murry in Talor and Getzels 1775:3; Torrance 1994:7). Lango (2010:57) states that creativity can be enhanced by a combination of observations, wonderment and life-long learning. Creativity is an on -going phenomenon.

1.8.1.1 The Creative Process

According to Mayesky (2002:4) the creative process is divided into two parts, firstly "the plan, idea, and answer" (discovering), and secondly "working out and providing" (the process). The process that takes place from childhood to adolescence may be seen as a creative journey and is illustrated in table 1.2.

Table 1.2: Stages in the creative process

Preparation or Brainstorming	
Incubation	↓
Illumination	↓
Verification or Communication	↓
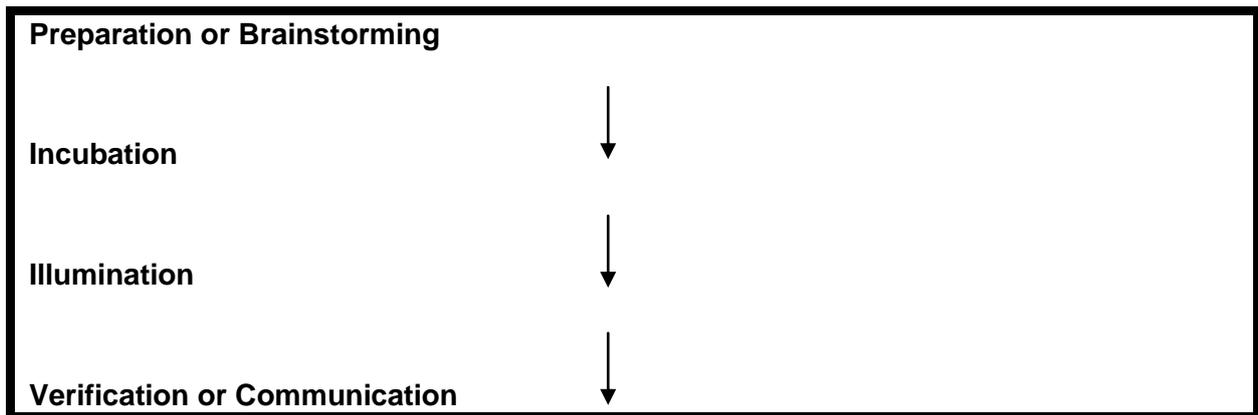
Adapted from Isenberg and Jalongo (1993:11)

According to Cochrane and Cockett (2007:80) an example of creativity as a lifetime's journey can be from singing nursery rhymes to performing live at the Apollo. Creativity is a process that is continuously changing and creating new opportunities.

1.8.1.2. Convergent thinking

Convergent thinking, on the other hand, provides a closed single answer to a problem, or one specific outcome at the end. It is also known as vertical thinking (Isenberg and Jalongo 1993:5; Mayesky 2002:5).The following table (Table 1.6) in Isenberg and Jalongo (1993:10) illustrates convergent thinking:

Table 1.3: Modes of thinking - Convergent thinking

CONVERGENT /VERTICAL
Analytical-
detail is valued; answers are deducted
Selective -
one correct path;   the irrelevant is rejected
Predictable-
a logical sequence is followed; this leads to good answers

Adapted from Isenberg and Jalongo (1993:10)

1.8.1.3 Divergent thinking

Divergent thinking is seen as an open and endless way of solving a problem, seeking many different solutions. It is also known as lateral thinking (Isenberg and Jalongo 1993:10; Mayesky 2002:4). A divergent thinker looks at many different ways at the same time (Black 1995:3; 8). The following table (Table 1.4) in Isenberg and Jalongo (1993:10) illustrates divergent thinking.

Table 1.4: Modes of Thinking - Divergent Thinking

A creative person possesses the creative abilities as shown in Table 1.1. These abilities help a person to generate many more ideas and are part of divergent thinking, which provides an open answer, i.e. different solutions to a problem. It is also known as lateral thinking (Isenberg and Jalongo 1993:10; Mayesky 2002:4).

Table 1.4: Modes of Thinking - Divergent Thinking

DIVERGENT /LATERAL ***Generative*** – information is valued for its ability to stimulate ideas; answers are inferred ***Explorative*** – many possible paths; irrelevancies are seen as potential sources of inspiration ***Unpredictable*** – intuition is relied on, as much as on logic, necessary for satisfactory answers

Adapted from Isenberg and Jalongo (1993:10)

1.8.2 Creative thinking

The criteria for the abilities constituting creative thinking comprise the following: flexibility, originality, fluency and elaboration. However, they are not the only creative abilities. (Davis 2004:249; Isenberg and Jalongo 1993:10; Piirto 1992:12). Each of these concepts will be discussed below.

1.8.2.1 Flexibility

Flexibility focuses on generating different types of ideas (Black 1995:7; 62). It is also seen as the ability to think in a non-traditional way. This may be compared to a mind map where there are many different approaches and perspectives to a problem.

This ability however, is critical for flexible decision making (Davis 2004:101, Isenberg and Jalongo 1993:5; Gordon and Browne 2008:566; Neethling and Rutherford 2001:46).

1.8.2.2 Originality

Originality is exactly what it says, a plan or solution that does not yet exist and which is new (Neethling and Rutherford 2001:39). Davis (2004:101) defines originality as: "uniqueness, non-conformity in thought and action." Originality is to be continuously looking for uniqueness (Black 1995:7; 62).

According to Dr. Bonnie Cramond of the Torrance Center for Creativity and Talent Development UGA (http://www.indiana.edu/~bobweb/cretv_6.html 05 July 2009) the following figure is an example of how originality is scored during the TTCT:

Figure 1.3 Example of originality

ORIGINALITY

- A count of the number of statistically infrequent ideas

- Based upon what the stimuli was used as.

- Bonus points are given for combinations.

Not original response

Originality

Bonus for combination

Bike

wheels

1.8.2.3 Fluency

Fluency is the ability to produce many verbal and non-verbal ideas to verbal and non-verbal questions and problems.

Fluency strives towards producing many ideas (Black 1995:7; 62). It is almost a continuous idea generating process that can be illustrated as water flowing out of a tap.

By being fluent one is exercising new and meaningful perspectives that amount to flexibility (Gordon and Browne 2008:566; Davis 2004:101; Neethling and Rutherford 2001:38; Isenberg and Jalongo 1993:5).

1.8.2.4 Elaboration

Buzan and Buzan (2007:87) states that …"once the human brain realises that it can associate anything with anything else, it will almost instantaneously find associations, especially when given the trigger of an additional stimulus".

Elaboration also means adding details, building on an idea and implementing an idea (Davis 2004:101,332; Neethling and Rutherford 2001:45, Black 1995:7; 62).

According to Dr. Bonnie Cramond of the Torrance Center for Creativity and Talent Development UGA (http://www.indiana.edu/~bobweb/cretv_6.html) the following figure is an example of elaboration scored during the TTCT:

Figure 1.4 Example of elaboration
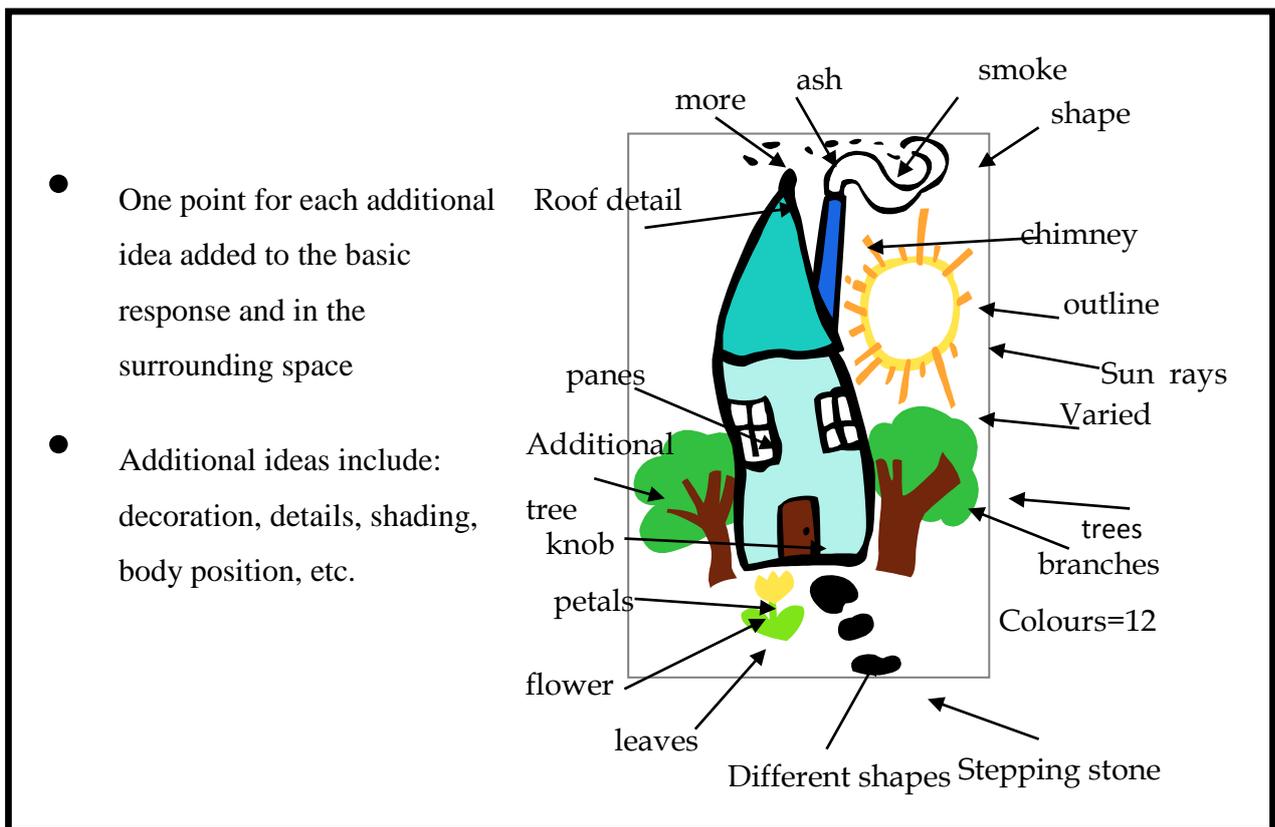
(http://www.indiana.edu/~bobweb/cretv_6.html)

1.9 PROGRAMME OF INVESTIGATION

Chapter one: Background and orientation of the study

The first chapter is an orientation of the study which focuses on creativity in the reception year. In this chapter the problem is identified and discussed. This chapter also deals with the main concepts that occur in the study and gives an indication of possible limitations.

Chapter two: The process of brain development and creativity

Chapter two of the study highlights the importance of creativity, gives a brief background on brain development and creativity and the different modes of thinking are discussed. An in depth explanation is given for the concepts mentioned and the importance of creativity during child development is highlighted.

The emphasis is on the young child's creative development. It reviews the stages of creativity and its contribution to the pre-primary school curriculum. Also discussed is the importance of parents' involvement when creative stimulation is planned and implemented in a friendly and stimulating space as well as the social development in the receptive phase of environment pre-primary school.

Chapter three: Research design

Chapter three discusses how the participants (sample group) were selected. It deals with the non-equivalent pre-test, post-test quasi-experimental control group research design that was followed to conduct the study. Ethical measures and the validity of the study are also discussed.

Chapter four: Analysis and discussion of data

This chapter is an in depth analysis of the data that was collected during the implementation period. It analyses and summarises the findings for future interpretation.

Chapter five: Summary and Recommendations

Chapter five is the final summary of the findings and reflects on the concepts that are discussed in literature. Recommendations regarding creative skills in the reception year are made.

1.10 CONCLUSION

Chapter one is an introduction to the discussion of the research topic. The chapter briefly highlights and explains some important concepts regarding creativity. It also explains that the study was done in a qualitative manner.

The researcher identified the research question while she was teaching and identified problem areas in the field of creativity.

This study aims to broaden the perspective of educators and parents regarding creative thinking in the pre-primary school environment.

CHAPTER 2

BRAIN DEVELOPMENT AND CREATIVITY

2.1 INTRODUCTION

The human brain is the centre of the human nervous system and is a highly complex organ (http://www.news-medical.net/health/The-Human-Brain 21 January 11:57). It is important to fully understand the development of the brain before the essence of true learning can be understood.

The human brain can be seen as the main control point of the human body. All functions, decisions, experiences and knowledge are controlled and stored in the brain. Without a brain the human body cannot function to its full potential. Research into how the brain works can help educators develop ways of assisting children (Colbert online).

Creativity is an amazing and valuable human trait (Honig 2001:44). It is not easily defined, for it is a complex concept (Jolongo 2003:221). Mitchell (2006:6) defines creativity as taking on new challenges, solving interesting problems and synthesizing the big picture. He also states that it is a combination of motivation, openness or flexibility, curiosity, autonomy and divergent thinking. Botha (in Antionites 2003:198) has the following view on creativity:

"Defining and understanding the concepts of creativity has always posed a challenge. Its measurement has eluded our schooling and was therefore neglected, as a most integral skill needed for our future survival. Creative assessment is not necessarily an attribute of individuals, but of social systems making judgment calls about trends, individuals and, as can be expected, the creative product itself. It is a combination of complex functions, capacities and tendencies from which the social world can extract and create value from these novel products."

The contributions to everyday problem solving may not be spectacular, yet it is a significant, stunning creative thought that does not simply appear (Jalongo 2003:221).

Creativity has usually been defined in terms of either a process or a product and at times it has also been defined in terms of some kind of environmental personality issue (Torrance 1994:7). According to Duffy (2006:16) defining creativity actually limits creativity.

Before the value of creativity can be understood during the development of a child in the reception year, it is important to understand creative processes and brain development. If the creative process is not understood and kept in mind during the implementation of creative programmes it will lead to creative maladjustment and this could affect the child's learning process. To think creatively, a person should be able to use prior experiences and link it to new information so as to find new meaning in a situation.

It is important to be aware of the difference between the creativity of mature people and that of young children (Isenberg and Jalongo 1993:6). The following analogy may be used: we could view creativity as a series of building blocks. This analogy may be applied to all ages and areas of creative development.

This chapter explains and discusses the creative process as well as the development of the brain. It also focuses on the development of the young child. The creative process is shown in Chapter one table 1.2 (stages in the creative process).

2.2 THE PHYSICAL DEVELOPMENT OF THE BRAIN

The brain's development starts before birth and continues developing until adulthood (Dimond et al 1998:105). Brain development in the womb or the foetus's brain is not complete although a baby is born with around one million neurons (http://www.buzzle.com/articles/brain-development-in-early-childhood.html).

Brain growth is rapid during the first two years after which it starts slowing down. The first five years present the perfect opportunity to develop a more complex wiring of the brain before pruning begins, and this leaves the child with a unique brain foundation (Drew and Rankin 2004:40).

The neurons then carry on growing and there is a small increase in genial cells (Harris and Liebert 1992:273; (http://www.buzzle.com/articles/brain-development-in-early-childhood.html). The human brain has various compartments and each compartment is responsible for carrying out certain tasks (Starbuck 2006:4).

The development of the human brain reaches about 80% of its capacity by adulthood. At birth the brain has almost all the neurons it will ever have. It has also been found that there are times during brain development where as many as 250 000 neurons are added to the brain (http://faculty.washington.edu/chudler/dev.html).

This can be seen as a large capacity for learning waiting to be used. With this large capacity of information storage in the brain it is difficult to understand why not all people can reach their full potential during their years of studying and learning in the education system.

According to Leaf (2005:11) a lack of knowledge with regards to the effect of the education system on the brain can be seen as one of the main reasons why 95% of the population worldwide does not actually know how to study and think for themselves.

It should be kept in mind that brain cells need to create links early in their existence, when they are physically close together, to ensure successful connections across the brain throughout life (http://redorbit.com/news/health21). The above emphasizes the importance of brain development during the early years of human development as well as the importance of well - educated and informed people stimulating the young human brain.

The brain receives and processes information continuously through a number of cells called neurons (http://www.buzzle.com/articles/brain-development-in-early-childhood.html).The following information describes how the brain structures as shown in figure 2.1. The brainstem controls breathing, heart rate, and other autonomic processes.

The neocortex is the centre of higher-order thinking, learning, and memory and is the outer layer of the cerebral hemispheres(http://en.wikipedia.org/wiki/Neocortex).

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The cerebellum is responsible for the body's balance, posture, and the co -ordination of movement (http://www.news-medical.net/health/The-Human-Brain).

Figure 2.1 The human brain
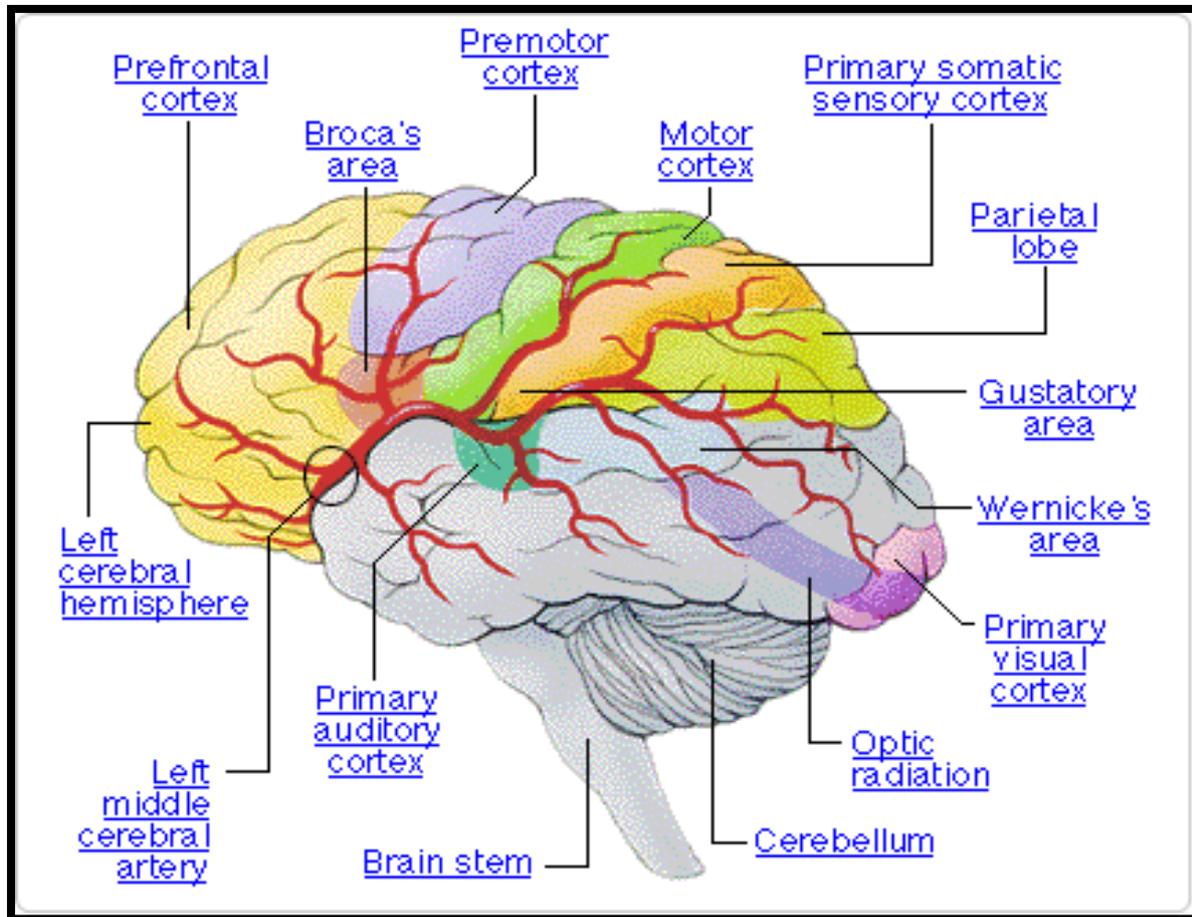
(Illustration provided by: Leslie Laurien, MSMI: http://www.ama-assn.org)

The first few years are seen as the most important time in young children's development (Lubawy2008:12; http://www.buzzle.com/articles/brain-development-in-early-childhood.html).

During this time the neuron pathways (Figure 2.2) of the developing brain are thickened by the number of experiences and the complexity of the experiences young children receive (http://www.jumpstarttulsa.com/brain_development.htm; Starbuck 2006:36-37; http://www.buzzle.com/articles/brain-development-in-early-childhood.html).

These experiences and exposures create more dendrite pathways that thicken if they are continually followed. An enriched environment will stimulate a young child's mind (Dimond *et al* 1998:104).

A lack of stimulation or negative stimulation can make such growth and development impossible or extremely difficult (Colbert; online) therefore, the more you learn the more the neural pathways will develop.

The function of the neurons as seen in figure 2.2 is to transfer information between the cells. It is also called wiring of the brain (Lubawy 2008:14). Furthermore it has been stated that although the brain has some generic wiring at birth, the most brain development occurs during early childhood (http://www.buzzle.com/articles/brain-development-in-early-childhood.html; Drew and Rankin 2004:40)

Figure 2.2 Enlarged image of a neuron in the brain.
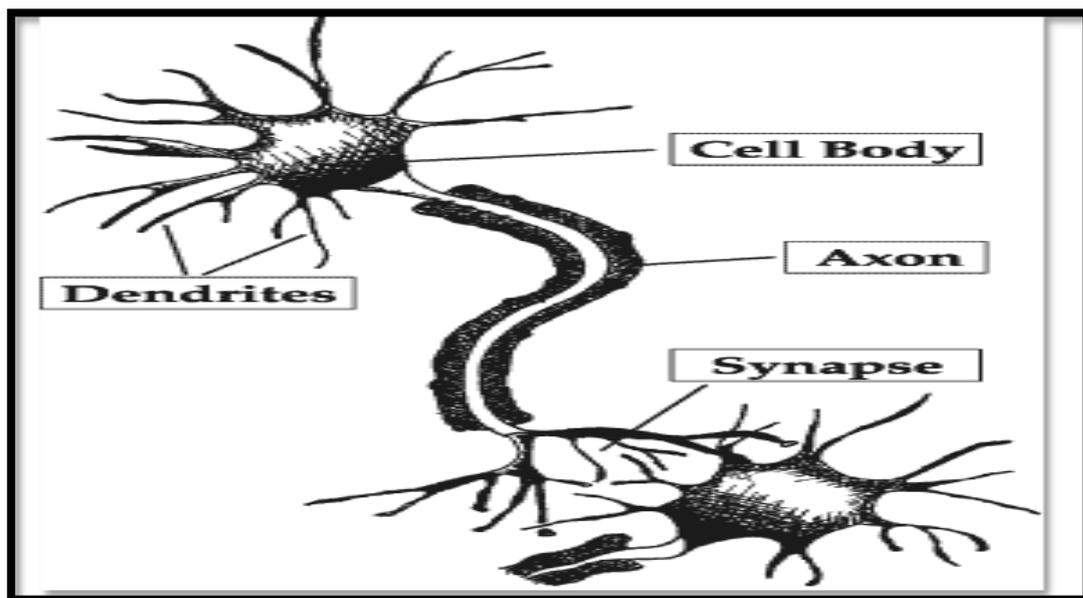
(Starbuck 2006:37)

2.2.1 Integration of the two hemispheres

According to Harris and Liebert (1992:273, 274) it is important to understand that the two hemispheres of the brain do not function independently but are integrated and dependant on each other.

As stated by Ruggerio (1998:4) the brain is a dual organ where nerve fibres connect the two hemispheres.

The brain uses both sides simultaneously. The two halves need to form a neural connection (Starbuck 2006:5). Although the brain seems symmetrical the two hemispheres are not identical figure 2.3.

In Table 2.2 the descriptions given by Hariss *et al* (1992:274) and Schreck (2009:71) of the different functions of the two hemispheres are summarized. The summary is a good indication of how different the two symmetrical hemispheres are.

Figure 2.3 Two hemispheres of the brain
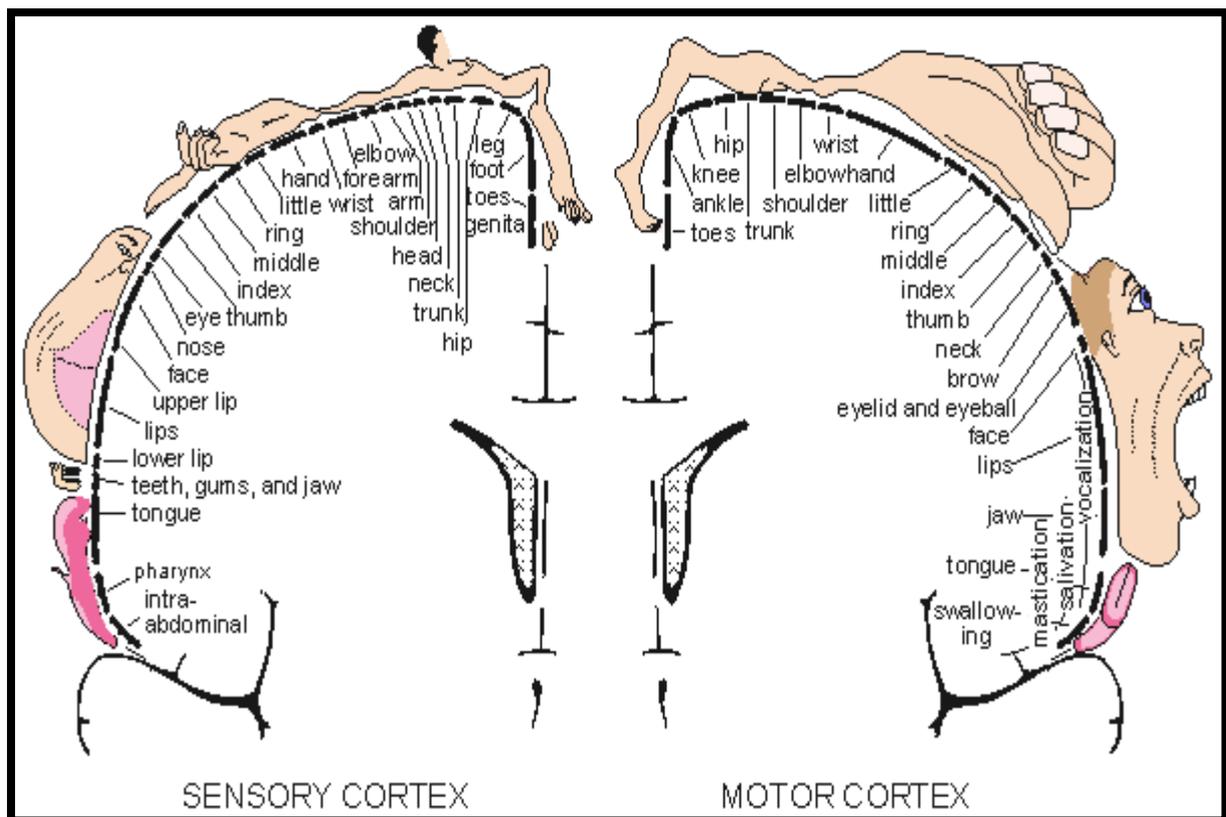
(Malmivuo *et al* 1995: [5])

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The above figure 2.3 illustrates the different functions of the body that is controlled by either the left or right hemisphere for example touch is situated in the left hemisphere and swallowing in the right hemisphere.

Table 2.1 Left and right hemispheres in the brain

Left hemisphere	Right hemisphere
Focuses on the order in which things happen	Focuses on the unified whole
Ability to speak	Specializes in non- verbal activities e.g. spatial ability, perception of patterns and melodies
Manages the right hand and foot	Manages the left hand and foot
Producing and understanding speech, reading and writing	Expressing and recognition of emotions

(Harris and Liebert 1992:174; Schreck 2009:71)

According to Isenberg and Jalongo (1993:9) people examine their own thinking when they reconsider their thoughts; this process is referred to as metacognition.

Modes of thinking form part of the whole brain and can be defined as follow: It is the structure and functions of the mind that suggest there are two different sides to the brain and that the brain controls these two different "modes" of thinking (table 2.1).

It also is suggested that each of us prefers using the one mode of thinking above the other (http://www.funderstanding.com/content/right-brain-vs-left-brain).

Table 2.2 Functions of the left and right hemispheres in brain.

Left Brain Functions

uses logic
detailed orientation
facts rule
words & language
past & present
math & science
can comprehend
knowing (facts)
acknowledges
order & pattern perception
knows object name
reality based
forms strategies
practical
conservative (cautious)
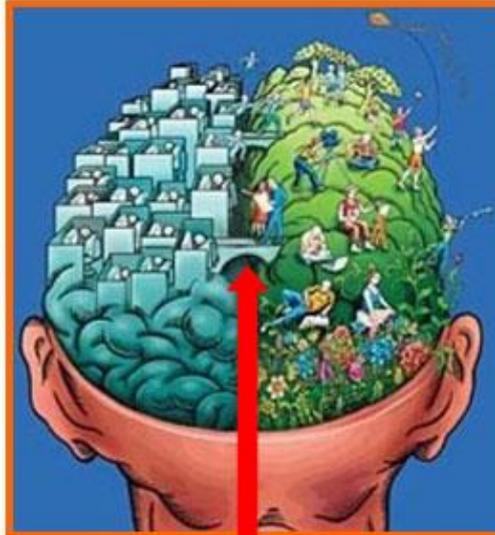
Right Brain Functions

uses feeling
'big picture' oriented
imagination rules
symbols & image
present & future
philosophy & religion
can 'get it !' (i.e. meaning)
believes (intuition)
appreciates
spatial perception
knows object function
fantasy based
presents possibilities
impetuous (impulsive)
risk taking (gut feeling)

The left and right hemispheres play an equally important role during a child's growing stage. At times, the functions of both hemispheres overlap and complement each other as shown in this photo where information 'crosses the bridge' from one hemisphere to another. BC believes that equal emphasis should be given to both hemispheres.

(http://www.brainchild-indonesia.com/bcl/course.php)

Creativity is an important component of the human brain's thinking process. According to Lowenfeld and Brittian (1982:78) intelligence tests stress convergent thinking, i.e. where the focus, namely the correct response, has already been determined. Convergent thinking is required by schools to determine success (Isenberg and Jolongo 1993:9).

The opposite, i.e. divergent thinking, where a problem has no single correct answer, tests and measures creativity, but is neglected by schools. Every person has a preferred way of thinking.

It is however important to use combined preferences to stimulate effective and meaningful learning (Schreck 2009:73).

2.3 CHILDREN'S HOLISTIC AND CREATIVE DEVELOPMENT

Firstly, creativity is a broad and novel concept and can therefore easily be interpreted in different ways and is described by Beetlestone (1998:81) as a form of creativity. It is a human need to be creative.

Creativity produces change and change produces creativity (Black 1995:23). Creativity has been shown throughout the ages by people such as Leonardo da Vinci, Albert Einstein and Amadeus Mozart, to name but a few. All of these people had the need to create, explore, invent and were stimulated by their underlying creativity and imagination.

Secondly, defining and understanding the concept "creativity" has always posed a challenge to humankind (Botha 1999:8). There has never been a single accepted explanation of creativity. This challenge in itself curtails a profound understanding of the importance and interaction of creativity and imagination.

Lowenfeld and Brittian (1982:76) states that every child is born with creative abilities. Creativity involves more than drawing or being an artist. It entails complex thinking skills and reasoning strategies that can be taught and acquired. It is a mode of thinking and of adapting the known to the unknown.

According to Torrance (1994:23) if teachers could only be more aware of identifying the dimensions of intellectual functioning in which instructional methods can be varied, we shall be closer to our dream of an educational system that will give children a chance to achieve their maximum potential. Therefore, if creativity and imagination are human traits it is of the utmost importance that both these need to be developed.

The following statement on potential captures the essence of the child's development in the early years:

"It has become accepted generally that a child's early years are extremely important in terms of developing his or her full potential as a happy and successful human being" (Faber and Van Staden 1997:1).

Before understanding the link between creative development and a child's development, one must understand the process of development.

The aspects of a child's development are interlinked and comprise their social, emotional and cognitive development. The development of a child is a continuous process. As the child grows his/her expression of creativity develops (Anonymous 2003:42).

A child's total development consists of the following aspects, which also forms part of a child's creative development (Duffy 2006:50; Faber and Van Staden 1997:3):

- Cognitive/intellectual development
- Perceptual development
- Physical development
- Language development
- Social and emotional development

Faber and Van Staden (1997:2) illustrate a child's development as follows:

Figure 2.4 Holistic representation of child development aspects.
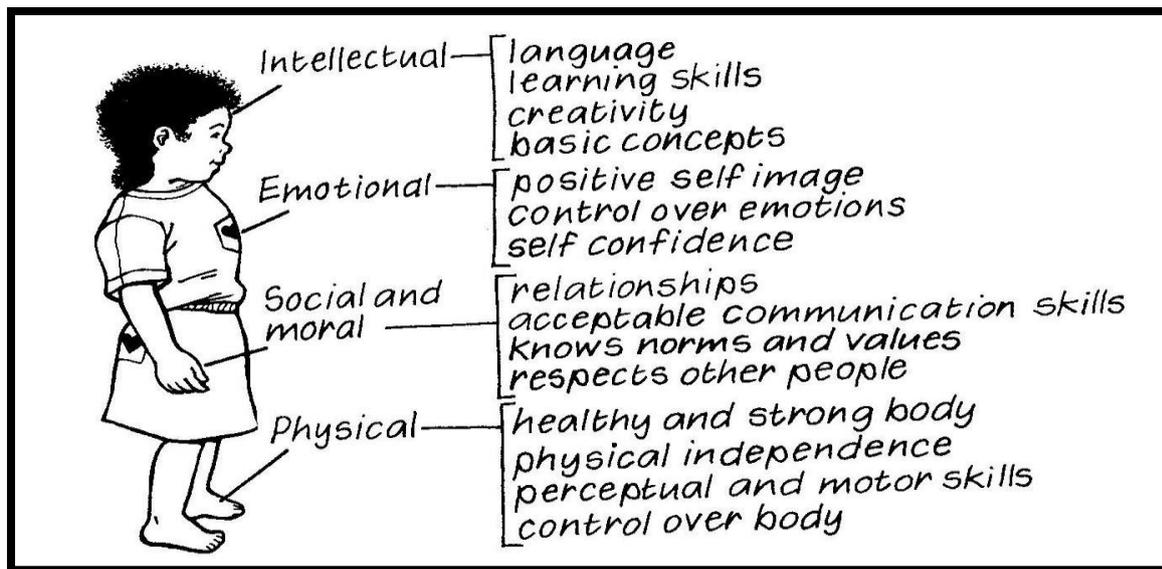
(Faber and Van Staden 1997:02)

A child develops holistically and also needs to be stimulated as a whole. The development of creativity forms part of this whole developmental process. As mentioned in paragraph 3.1 a person needs prior knowledge and experience to build new creative knowledge.

In the early years adult intervention is needed to acquire such prior knowledge and experience in order to ensure creative growth.

Creative activities such as dancing, music, art, fantasy play, exploration and gross motor movement exercises do not only enhance children's creativity, but also form part of their total development (Bruce 2007:92-111).

Longo (2010:57) mentions that every inquiry enhances creativity by providing an on-going combination of observations, and life-long learning. Thinking about the future can also have a positive influence on creativity (Baron 2006:60).

2.3.1 Creativity during early childhood

During early childhood it is important to establish good fundamentals to enhance creative thinking. Children have a strong focus on imaginative and fantasy play and this forms part of their creative development. Pieterse (2006:68) is of the opinion that adults must take time to make children's lives interesting, because then children would want to learn more.

Creativity helps a child to develop his/her own personality. To understand the idea that creativity is related to cognition, Vaygotsky's laws of imagination should be understood (Echoff and Urbach 2008:180). De Witt (2008:139) adds that creativity and aesthetic awareness in the early years develop through play.

This brings us to the essence of the enhancement of creativity during early childhood by educators, who should emphasise the process rather than the end product, as this will aid in developing a child's creativity (De Witt 2008:141; Jalongo 2003:223; Anonymous 2003;42). When teachers promote this process the child is acquiring skills that will be used for life.

Children need to acquire skills in order to be creative (Pieterse 2006:68). Sadly this is one of the most neglected processes of early childhood. Constant emphasis should be placed on the end products otherwise it could result in children not acquiring skills such as problem solving or creative thinking, because they are not involved in the process.

The development of creative skills enhances self-discovery, through trial and error, which promotes critical and creative thinking. These skills are needed for good problem solving. Problem solving is the ability to use critical thinking to turn obstacles into bridges to greater learning (Anonymous 2003:26). The fun of problem solving is that it can be incorporated in all the areas of the curriculum (Anonymous 2003:26).

It can also be incorporated in the child's acquisition of life skills, for example, a young child needs to solve the problem of how to open a candy wrapper to get to what is inside. Another example is when a child is bored with a toy: creative thinking skills are needed to "change" the toy into something that would be nice to play with.

There are many creative abilities one can acquire, as mentioned in 1.2 Table 1.1. The development of critical thinking skills is an asset. However, if a child also develops an artistic, individual and possibly anti-social personality it might be regarded as "outside the norm" or "weird".

In conclusion it is important to bear in mind the complexity of a child's development: socially, emotionally and cognitively. Children can be very vulnerable and they need the appropriate stimulation to be able to grow to their full potential.

2.3.2 Stages in the creative process

The stages in the creative process are not always fixed and this allows a person to move freely between stages. The creative process is also a process where thoughts roam freely and divergent thinking is used.

During this process the individual uses prior knowledge and skills. Mayesky (2002:4) divides the creative process into two main categories:

1. discovering the idea
2. working out the idea (process)

The stages of the process consist of preparation, incubation, illumination and verification (Isenberg and Jalongo 1993:11; Wallas in Davis 2004:121,122). These stages will be elucidated below.

The main objectives during these stages are to formulate original findings or products. The first stage i.e. preparation, is where a person experiments in a playful manner with an idea and materials. During this stage Isenberg *et al* (1993:11) mention that individuals are "engaged" with the materials, objects or problems which she describes as the way in which individuals apply their knowledge.

According to Chambers-Macmillan (1996:104) "engaged" is also described as "to catch and to hold attention". This is exactly what happens when the individual experiments with the new concept and materials. He or she becomes engaged and their attention is fixed on the concept or materials.

2.3.3 Criteria for creativity

Guilford and Jackson *et al.* (in Gordon and Browne 2008:566; Neethling and Rutherford 2001:46, Isenberg and Jalongo 1993:6) describe four basic criteria for creativity:

- Creative behaviour is original.
- Creative behaviour is appropriate and relevant.
- Creative behaviour is fluent (new and meaningful idea generating).
- Creative behaviour is flexible (non-traditional problem solving).

All of the above validates the criteria and assessment of creativity and sets a standard for evaluating young children's creative thinking.

Divergent thinking (as discussed in chapter 1) is the ability to consciously generate new ideas that branch out and result in many possible solutions to a given problem. These solutions or responses are then scored according to the following criteria:

1. Originality: the statistical infrequency of responses.
2. Fluency: the number of responses.
3. Flexibility: the degree of differences in responses
4. Elaboration: the amount of detail in the responses
(http://www.indiana.edu/~bobweb/cretv_6.html).

Although there are a wide range of tests that are related to the current study of creativity, for the purpose of the study, the Torrance Test of Creative Thinking (TTCT) was used to assess the learner's creative thinking. This specific test involves verbal as well as figurative measures of creativity.

2.4 IMAGINATION

Understanding imagination as both a cognitive and affective endeavour is crucial for educators to promote creative and imaginative thinking in informal learning environments (Eckhoff and Urbach 2008:179).

Imagination is a picture formed by abstract thoughts. Imagination can be defined as one's perception that is turned into images detached from oneself, and is not a restricted, but an internalised, integrated experience, contemplation and pretence. Our imagination is linked to sensory experiences such as touching, feeling, and hearing.

The stimuli that we gather through these senses are then translated into our imagination (Duffy 2006:24; Jalongo 2003:181). According to Beetlestone (1998:76, 77) imagination is a driving force behind creativity and its use can lead children to unusual connections. She also states that it can be seen as a tool that young children should acquire in order to promote social development amongst themselves by creating their own ideas and not spoiling others' games and ideas.

Both imagination and fantasy are interlinked with a person's creativity and the amount of rich experiences they have had. Although children are not imaginative active imaginations can definitely not be compared to those of adults, who may have the advantage when it comes to sorting and retrieving information and making appropriate judgements (Jalongo 2003:218).

Problem solving allows children to use their imagination, to try out their ideas and to think about a variety of possibilities. However, teachers can only develop their learners' creativity if they increase the variety of strategies they are using (Beetlestone 1998:17; 90).

Although imagination has an unsure place in today's educational climate, it is crucial to education and it is important to integrate imagination into the existing knowledge of child development and cognition (Eckhoff and Urbach 2008:179).

By exploring possibilities a creative breakthrough can be made, but creativity is needed to attempt these new possibilities and according to Ogle (2007:18) imagination, insight and intuition are fundamental to the development of human creativity.

2.4.1 The importance of creativity and imagination

Creativity and imagination have a wide range of importance that is not always understood. Creativity and imagination encompass crucial areas such as the ability to represent what is seen and experienced (representation), resourcefulness and the need to respond to an ever-changing environment.

Using imaginative thinking is important to one's innovation and success in our 21st century economy (Eckhoff and Urbach 2008:179). Fields such as visual literacy are also addressed in this study. Visual literacy is a complex and creative problem solving process that consists of encoding and decoding.

Creativity is the essence that helps learners to find a deeper meaning in learning as it links together aspects of their views of the real world. Creativity changes one's perspectives, for example, by problem solving. With creativity alternative solutions are found.

Bruce (2007:10) says that people who are unconnected to their own creativity are unhappy, sad, lonely, unpleasant and unfulfilled. People need to be creative in order to be integrated and complete human beings.

Although creativity and intelligence are equally important, the most productive people in society are not always the most intelligent. It is necessary to be smart enough to deal with one's own creativity (Lowenfeld and Brittian 1982:78). More intelligent children have different preferences regarding creativity, e.g. in remembering factual information, than less intelligent children.

The latter adapt differently to coping with their creativity, for example, they will link information to their bodies to remember it better. However, thinking preferences also contribute a great deal to creativity, especially with regard to decision making and problem solving.

According to Jalongo (2003:219) it is unacceptable for resources so valuable to society (such as creative thought and expression) and vital to the individual, to be misunderstood, squandered or squelched. Jalongo maintains that by limiting opportunities for creative expression to children who have to "deserve" or "earn" it through "appropriate" behaviour, can be seen as destructive.

Mitchell (2006:6) and Duffy (2006:6) give the following important reasons why people need creativity to enable them to respond to a rapidly changing world:

- dealing with known and unknown knowledge in different situations
- synthesis of information
- connecting prior knowledge with new skills
- experimenting and using new and novel information in a new way
- dealing with change and problem solving
- modifying and monitoring one's own world
- being flexible and making use of divergent thinking
- empathizing with others, by understanding diverse thinking preferences

Imagination is just as important as creativity, because it consolidates and visualizes the creative process and ideas in the subconscious. It is not isolated from our daily experiences as it involves our daily activities and is a complex process that depends on experience (Eckhoff and Urbach 2008:181).

Fryer (1996:15) states that most educators also identify creativity as a thinking or problem solving activity. This means that solutions need to be found to solve new problems.

The emerging problem, however, is that if no one is taught to think differently or be made aware of divergent thinking, problems will not be solved efficiently therefore the problem will remain.

Teachers can promote language through literature and mathematics and science through creative exploration (Drew and Rankin 2004:43). Language skills are highlighted in any problem solving situation, because children need to be able to discuss, brainstorm and communicate ideas as part of the process of using higher order thinking (Anonymous 2003:26).

There are different ways that children can express their experiences to enhance creativity (Duffy 2006:8; Honig 2001:45) such as:

- drawing a picture
- talking about their experiences in their own way
- role playing in situations
- building by means of blocks and representation
- physical expressing of emotions through dance and movement
- painting
- composing a piece of music

There are different forms of representation and they are all important to children to be able to learn how to solve problems and gain insight when dealing with new and unknown situations.

McKellar (in Duffy 2006:11) is against reproduction as an exercise stating that creativity is not mass production or an adult fixed model of what or how something should be done. Reproduction has uncreative and predictable results. Children can all create when the skills that they need for doing so are mastered. Teachers need to demonstrate the skill that is required to complete a project.

Creativity is stimulated by a variety of situations, materials and options in a judgmentally free environment. It is a combination of different things used to create something new and unique (original).Whenever an example is used, it should be for inspiration and not for exact reproduction. It is important to design creative educational spaces for children in order to guide them to be more creative and to teach them creative thinking skills to help develop their creativity. Early childhood curricula often respond to ideas about childhood, overlooking real holistic children (Mc Clure 2011:135). Gordon and Browne (2008:567) states that creative people who are aware of their own creativity and who are confident people are able to draw what they see, feel and think (and know they are inspired).To conclude, creativity is part of human development.

This chapter highlights the major components of children's development and also places great emphasis on a stimulating environment. The child's development is an interlinked and complex process and it has a need for creativity. The skills that are learned through creativity, such as critical thinking skills, are very necessary in life.

It is clear that creativity is important from a young age. Adults have a major role to play in fostering creative development in children. If adults can develop an understanding of creativity, the child's learning process will be more comprehensive.

2.5 CREATIVITY IN THE CURRICULUM

The educational system has the same obligation as the medical profession, to do no harm, and children need to experience a wide range of interesting activities in order to discover their particular creative assets.(Jalongo 2008:220).

Teaching creativity can improve the quality of education by making learning more meaningful and it opens more exciting ways of approaching the curriculum (Beetlestone 1998:1). Children use themselves as resources when they play outside as part of the everyday curriculum programme. It is advisable to understand which role educators have to play in the curriculum.

If creative behaviour is well channelled it enriches life. Furthermore, by understanding the different ways of thinking the importance of helping learners in a free and flexible way will be understood by educators (Beetlestone 1998:81).

Educators bear a major responsibility as advocates for children's creative thoughts and expressions (Jalongo 2008:222). The influence of the school with the right mentor and environment is crucial for creative and scientific development (Piirto 1992:208).

Duffy (2006:57) states that if children are given a narrow approach to creativity and imagination the results will be superficial and invalid. According to Jalongo (2008:220) creative thinking is an asset to be cultivated. She also mentions that a study was conducted where nearly half of the participating educators regarded divergent thinking as not being an element of creative thinking.

Consequently when the creative skills in the curriculum are understood by educators it is crucial to plan and implement an appropriate curriculum that includes creative skills.

2.5.1 Anti-bias approach

Mitchell (2004:46) states that inclusion of children with disabilities (cognitive, physical and sensory) and specific learning needs in the regular classroom challenges all early childhood educators to provide an appropriate curriculum for children with differing abilities.

An anti-bias approach assists children regardless of their race, culture, class or ethnicity. All the components of race, culture, class and ethnicity should be taken into consideration when an amended curriculum is planned. These factors also have an influence on children's creative development. For example, children who live in an extended family situation adapt easier to change.

Crim (2006:26) is of the opinion that it is important to facilitate positive creative development in children.

According to Dombro, Colker and Didge (2000:7) figure 2.5 illustrates the interlinked system of a curriculum, as well as the necessary components for constructing a curriculum for each individual learner.

Figure 2.5 Interlinked system between the individual and the curriculum.
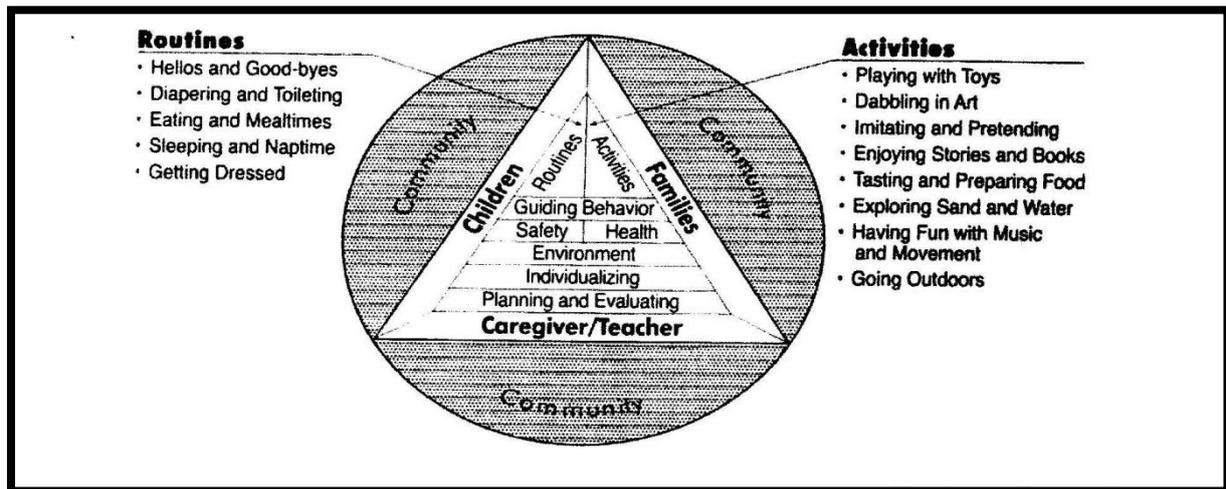
Children gain insight when they play in diverse and open environments. Creativity opens a new world to children, in which they can explore different cultures, race and class outside their immediate family situation. This also limits stereotypical situations, e.g. "only girls can dress up or boys play with cars".

People with good creative skills have a more appropriate anti-bias approach in life. However, creative skills are life skills that are neglected in our current society. By valuing children's gender, Bloom and Sosnaik (in Duffy 2006:61) (who conducted a longitudinal study on creative people), found that early experiences which de-emphasized traditional roles were significant.

As soon as the child's experiences are limited, his/her development is automatically limited. The following statement was made by a six year old male..."but teacher, I want to sit with the girls, me and my mommy always sit with the girls...I also want to be a girl". It is not acceptable to force this child to play the role of a boy in this situation.

Children need to experience different kinds of gender roles. They should not be limited to cultural and traditional roles. Society should emphasise the need of accepting children with special needs. One group of learners that is usually restricted by the school curriculum are gifted children.

Landsberg, Kruger and Nel (2008:472) warn: "there is a difference between an intelligent capable human being (as is the majority of the population) and a high potential that is called giftedness".

Gifted children have a high potential and excel faster with regard to their mental abilities. Table 2.3 is a summary of the characteristics of gifted children.

Table 2.3Characteristics of gifted children.

Summary of the characteristics most frequently seen in young gifted children:
- Unusual alterness during infancy   - Long attention span   - High activity level   - Less need for sleep   - Advanced development through milestones   - Keen powers of observation   - Extreme curiosity   - Excellent memory   - Early and excellent vocabulary development   - Rapid learning ability   - Abstract reasoning   - Sensitivity   - Perfectionisim   - Advanced ability to play with puzzles, mazes or numbers

(Landsberg, Kruger and Nel 2008:472)

A creative curriculum would be essential for gifted children, because they have the ability to excel with adequate stimulation. Early childhood educators must have the knowledge and skills to meet a range of needs.

Gifted children have thinking patterns that differ from children with an average or low intellect. Their approach to situations differs tremendously from those of other, less intelligent children. That is why Landsberg, Kruger and Nel (2008:473) distinguish two sides to the situation as illustrated in Table 2.4 below.

With regard to the positive side of the table it is clear that gifted children are born with a creative set of characteristics. The challenge is to develop and use these characteristics. Children of lesser intelligence need to acquire these characteristics, in part, as skills through creative activities. The curriculum needs to be adapted to accommodate all children with special needs, so that they can learn so as to benefit and make developmental progress (Mitchell 2004:47).

During an interview it was pointed out to Sak (2004:221) that there were several factors that could be considered as resources in the field of creativity, such as imagination, curiosity, emotional intensity, insight and personality. If the focus is on creative development, gifted children were given an opportunity to use their talent (King Mildrum 2000:36).

With regard to the negative aspects as listed in Table 2.4., it is the goal of creative stimulation to minimize the negative and maximize the positive characteristics. School programs that only identify and support high academic achievement potentially miss or can even hinder creative development (Crim 2006:27).

The level of creativity implemented by the teacher will also improve the child's skills to adapt to situations.

By developing creative thinking skills, children will be able to generate their energy productively. When they are confronted by a problematic situation they will be able to use divergent thinking before reacting impulsively, or being frustrated when things are not going their way (Landsberg, Kruger and Nel (2008:473).

Table 2.4 Positive and negative aspects of gifted children.

POSITIVE ASPECTS	NEGATIVE ASPECTS
Learning comes easily	Develops carelessness; is lazy; omits details; resists guidance
Has abstract reasoning abilities	Tends to pseudo-intellectualise; makes excuses; loses contact with reality
Has a questioning attitude and critical thinking skills	Is impatient and critical of others; being "different" creates peer problems
Has the ability to work independently; has unique ideas	Can become an elitist, misfit or a nonconformist
Possesses a keen sense of humour	Can be sarcastic to the point of cruelty
Has good memory; is strong in analysing and synthesizing	Dislikes routine or drill; is unwilling to get down to tasks; easily becomes bored
Displays good task commitment; is goal directed	Is stubborn; often refuses to change direction
Has variety of interests	Interests can take a single, narrow and inflexible path; is uninterested in all else
Is eager and alert; has high energy levels	Is frustrated when things do not go their own way
Is sensitive and empathic	Has a fragile ego; displays extreme sensitivity to criticism

(Landsberg, Kruger and Nel 2008:473)

2.5.2 Working with adults and parents

Creativity like any other ability needs encouragement and guidance (Jalongo 2008:223).

It is important as a parent not to underestimate children's contributions to creativity, but see how they are expressing their creativity (Crim 2006:27). When working with parents it is important firstly to educate them with regard to creativity. It is helpful to determine parents' views on creativity and then construct a plan of action.

As soon as parents understand the value of creativity they assist the learning process. Getting the parent involved in the creative growth process of their children will cause them to gain valuable insights regarding their children.

The focus of creative teaching needs to be on the learner and not so much on the teacher for then the parent will also understand the children's behaviour (Jalongo 2008:224). Knowledge and awareness are keys to improving the education and care of children in early childhood services (Lubawy 2008:12).

A primary role of the adult is to create a stimulating environment where creativity can be developed. The adult ensures that creativity is retained. The following scenario is an example that was experienced by the researcher of a child playing a fantasy game, where an adult was approached to join in, but did not respond appropriately:

Adult: "What are you doing?"

Child: "I am flying with my teddy bear. We are going to the moon. Do you want to join us?"

Adult: "Don't be silly you can't fly!"

Child: "Yes I can, I have magic powers"

Adult: "That is enough now. Go and clean your room!"

The above scenario was perfect for creative development. The creative context was already implemented. As the result of the parent's lack of knowledge about developing creative skills, the opportunity was lost and a routine convergent thinking activity substituted instead.

Believing in a child's right to creative thought and expression brings transformation (Jalongo 2008:226).

Consequently Jalongo states that if educators seek to prepare children for the future attention must be devoted to creative thought. The role of adult involvement should focus on changing attitudes and perspectives on creativity.

Adults/parents should be made aware of the benefits of creativity for their children. Adults should also be taught how to create a motivating and creative environment for their children where they are free to explore, discover and learn about the world around them.

If children feel safe with what they are doing it is amazing what they are able to achieve. They do not need colouring books, dot to dot illustrations, tracing patterns, cut-and-paste exercises, duplicated worksheets or photocopies to learn (Gordon and Browne 2008:570). Rather, they need opportunities and a fair chance to discover and to create.

The adult should remember that before creativity can be enhanced, the emphasis should be on the environment. The environment should be stimulating and open-ended materials must be provided. Adults should be more aware of the psychological and physical restrictions of the environment that they are creating for their children.

Lowenfeld and Brittian (in Gordon and Brown 2008:567) place emphasis on a stimulating environment. The authors mention that the environment places restrictions on the child's own natural curiosity and exploratory behaviour if it is not stimulating. This results in children not being inquisitive. They should be encouraged to ask: "Why?" Children lack critical questioning skills, and the gains of such skills are neglected during their development. .Adults should know that there is a clear distinction between creativity and intelligence and that these two abilities should not to be confused with each other.

An individual can be more intelligent than creative or more creative than intelligent (Mickhalka 1998:22). Everyone has the ability to be creative in their own way. Apart from one's creativity the determining factor regarding one's actual ability to create will be the amount of stimulation one receives.

By adding more activities such as stories, music and explorations outdoors we ensure that children will acquire well-developed skills. Later in a child's life it is crucial to have a profound understanding of concepts, for example, in mathematics and science. A deeper understanding requires problem solving skills that can be taught in a creative environment.

Children learn how to apply their skills of thinking reasoning and problem solving in a rich environment. In such an environment children will have materials, opportunities and time to create, to make their own decisions, explore and they will also gain insights into group and individual inputs.

Burner (in Duffy 2006:66) asserts that there are three ways of processing information that will add depth to children's development:

1. The enactive mode: this is where the child learns through doing things. An example of this would be the use of body movements to represent the concepts "high" and "low".
2. The iconic mode: this is where the child no longer uses an action, but replaces it with a visual representation, for example paints high and low on the wall.
3. The symbolic mode: this is where the child uses traditional representations to illustrate the same concepts as above, for example a child sings different notes to represent "high" and "low".

In the above the same concepts, namely "high" and "low" were illustrated. However, the depth added and understanding gained as a result of these concepts will be more creative and much more profound than with a more superficial explanation in a normal class scenario. This in-depth approach is essential for creative development.

2.6 CONCLUSION

Brain development is an important part of a child's holistic development. As mentioned above, thinking consists of two modes namely divergent and convergent thinking.

Unfortunately only one is regarded as correct and important in the current education system, namely convergent thinking. Creative thinking is tested with the TTCT test which emphasizes fluency, originality, elaboration and flexibility, although these are not the only creative abilities.

It is evident from this chapter that the importance and development of creativity and imagination are complex and of great importance to human development, but it is still neglected in the present education system.

To conclude, creativity is part of human development. This chapter highlights major components of children's development and also places great emphasis on a stimulating environment. The child's development is an interlinked and complex process and it has a need for creativity.

The skills that are learned through creativity, such as critical thinking skills, are very necessary in the current fast changing society. Clearly creativity is important in the developmental process from a young age. Adults have a major role to play in fostering creative development in children.

The important factor is a collaborative design process between designers and educators involving a shared vision of a child's development and creative inquiry that drives the identification and production of appropriate learning spaces (Frith and Whitehouse 2009:95). Once adults have developed an understanding of creativity the child's learning process will be more comprehensive. Parents' roles in the development of their child's creativity should be discussed with them. These roles include parents using creative language, implementing new ideas, being flexible and leading a creative example.

CHAPTER 3

RESEARCH DESIGN

3.1. INTRODUCTION

The following chapter explains how the research programme was implemented and conducted. It is important that the research design is discussed to ensure the validity of the research.

The research design gives clarity to the whole study. It was the intent of the researcher to establish whether there is an improvement amongst the reception year children's creativity skills after participating in a creative intervention program. The researcher also aimed to differentiate between the progression of creative skills of reception year children who participate in a creative program in relation to those children who are not creatively stimulated.

It was anticipated that the study would provide answers to the following research questions:

1. Can a creative intervention program have an impact on young learners?
2. How can young children's creativity and creative thinking skills be improved in the current pre-primary education system?
3. What is the impact of creative thinking on the life of a young child?
4. What are the possible problem areas in the field of creative thinking skills implementation in the reception year classes?

There are important creative skills that children need to acquire from an early age in order to adapt to a fast changing society. During this study the researcher aimed to measure the level of creativity in a Grade R class and track their creative development over a period of six weeks by conducting post tests and implementing creative intervention programs. A longitudinal research approach was followed to collect the data.

The quantitative method that was used measured verbal and figurative creative skills that were scored according to set criteria in two similar Grade R classes, namely the test group and the control group.

The test group participated in a six week intervention program that focused on specific verbal and figurative creative skills. After the six weeks both groups completed a similar post-test based on the same skills that were tested in the pre-test.

This chapter further elucidates, in detail, the research design limitations, gathering of data and analysis of the research data, together with the ethical considerations the researcher dealt with.

3.2. RESEARCH DESIGN

Firstly a general topic was selected, namely, creativity in the foundation phase. A literature review on the topic of creativity was undertaken. Secondly, a specific research hypothesis was formulated: After student participation in a creative program then higher thinking skills; and better skills more teacher satisfaction. Thirdly the researcher decided on and implemented a quantitative research design. A conceptual framework based on the TTCT (Torrance Test for Creative Thinking) was used to develop the intervention program. Fourthly the researcher selected one class as the test group for the pre-test and post-test. The researcher selected a class from another school to act as the control group. In the fifth place the researcher did a pre-test. The Torrance Test for Creative Thinking (TTCT) was done with both the test group and the control groups of children (see Annexure 1 for figurative and verbal sub tests). The researcher implemented a creative programme based on the TTCT test. Finally the data was presented, analysed and interpreted. Findings were summarised and recommendations made.

During the study a non-equivalent pre-test and two post-test quasi-experimental control group design was used. A quasi-experimental design was chosen to determine cause and effect.

Experimental designs are useful in addressing evaluation questions about the effectiveness and impact of programmes (Gribbon et al. 1997:14).

According to McMillan and Schumacher (2006:24) there is a direct manipulation of conditions, however no random assignments of subjects. Furthermore the classes that are used should be intact, already organised and some classes should be treated as control groups.

Non-equivalent pre-test and post-test control group designs are very prevalent and useful in education (McMillan et al. 2006:273). Also mentioned was that one of the biggest threats of this design may be internal validity. McMillan and Schumacher (2006:273) highlights that quasi – experimental designs provide reasonable control over most sources of invalidity and are usually stronger than the pre-experimental designs. Figure 3.1 schematically explains the research design process that the researcher followed.

Figure 3.1 Schematic representation of the research design
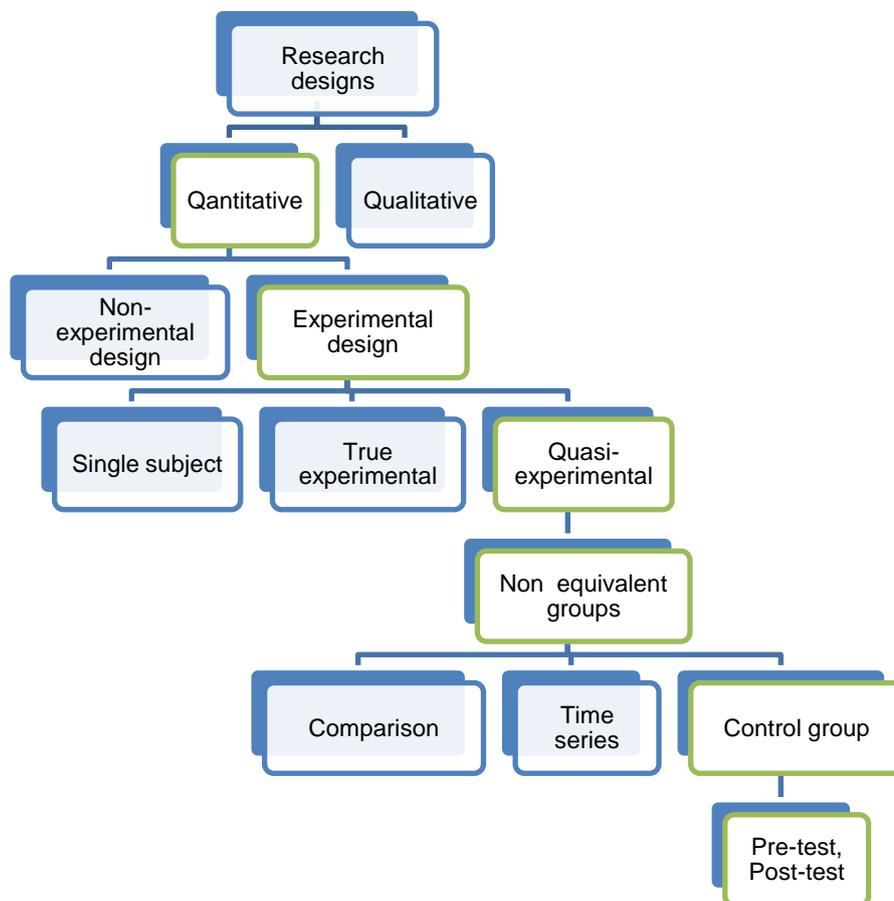
Some of the advantages of the quasi-experimental design are firstly not making use of randomised interventions (Gribbons 1997:14) and it is commonly used in assessing educational programs. Secondly, it is more feasible in time to use set and intact subjects. Thirdly, it is more ethical to use the quasi-experimental design than a randomised experimental study.

According to Harris *et al* (2006:17) quasi-experiments are studies that aim to evaluate interventions but that do not use randomisation. These experiments aim to demonstrate causality between an intervention and an outcome. However, because the two groups are non-equivalent, selection bias may exist. Harris *et al* (2006:18) describes selection bias as, when selection results in differences in unit characteristics between conditions that may be related to outcome differences.

Experimental designs increase a researcher's confidence in that the observed outcomes are the result of a given programme or innovation instead of a function of extraneous variables or events (Gribbons 1997:14).

Some of the problems that occurred were that the test group reacted more positively while exposed to treatment while educators and control group subjects had less motivation and interests.

Gribbons (1997:14) mentions, that if groups differ at the onset of the study (when participating in the pre - and post-tests) the differences that occur in the test scores at the conclusion are difficult to interpret.

3.3 METHODOLOGY

3.3.1. Research Instruments

The TTCT test is set according to prescribed criteria as discussed in 2.3.2, as mentioned by Dr. Bonnie Cramond of the Torrance Center for Creativity and Talent Development UGA (http://www.indiana.edu/~bobweb/cretv_6.html).

The following is applicable to the Torrance Tests of Creative Thinking, and can be seen as some of the limitations to the study:

1. The tests measure "creative thinking abilities," i.e. intellectual abilities that are used in creative achievements and not IQ tests.
2. They do not measure motivation, skill, or any other of the many components that may impact on an individual's ultimate creative productivity (as for example, the complete capacity of the human brain).
3. The verbal and figurative forms together make up the complete battery of the TTCT.
4. Performance on the verbal and figurative measures show very little correlation (r=.06).

The TTCT complete battery, verbal and figurative, evokes and measures many types of creative thinking, including:

- curiosity
- hypothetical thinking
- imagination
- emotional expressiveness
- humour
- boundary breaking (http://www.indiana.edu/~bobweb/cretv_6.html)

The TTCT includes several verbal sub tests (Houtz 2003:09):

- asking questions
- guessing causes
- guessing consequences
- product improvement
- unusual uses
- just suppose

Figurative subtests

- picture construction
- picture completion
- circles
- parallel lines

The researcher strived to ensure that all results were as reliable as possible. Reliability refers to the consistency of measurements (McMillan and Schumacher 2006:183).

During this study standardised testing was used to collect data. Standardised testing provides uniform procedures for administering and scoring. Furthermore the same questions were asked each time the test was used, with a set of directions that specified how the test should be administered.

To enhance reliability standard conditions of data collection were established, all subjects were given the same directions, all had the same time frame in which they had to answer questions and at the same time during the day. During the post-test the test group was more easily motivated to answer the test questions than the control group that had no programme instruction. The administrator that conducted the study holds a B.Ed. Honours degree in Inclusive Education.

Subjects used material such as paper, coloured pencils and crayons to complete the figurative sub-tests. During the verbal sub-tests the subjects dictated their opinions and presented their creations to the administrator. All questions were answered without interference from the director. The time allowed to complete the test was five minutes per sub-test.

Conditions during the pre - and post-tests were similar for both the test and control groups. Both groups were from the same economic and cultural background, were all 5-6 years and in grade R.

Some of the threats to the internal validity are elucidated. The researcher used these questions to objectively monitor the research approach to enhance factors of validity in the findings.

1. History: Did some other current event effect the change in the dependent variable?

No, because both groups experienced similar current events.

2. Maturation: Were changes in the dependant variable due to normal development?

No, because both groups experienced the same developmental process.

3. Statistical regression: Did the subjects come from high or low performing schools?

Both groups were from high performing schools with a low understanding of a creative curriculum.

4. Selection: Were subjects self-selected into experimental and control groups, which could affect the dependant variable?

No, both groups were selected according to similar age, gender and grade.

5. Experimental mortality: Did some subjects drop out? Did this affect the results?

No, all subjects participated throughout the research; therefore there was no effect on the research data collection.

6. Testing: Did the pre-test affect the scores on the post-test?

Yes, to a certain extent the learners felt more familiar with concepts that were used throughout the program.

7. Instrumentation: Did the measurement method change during the research?

No, the measurement method stayed constant.

8. Design contamination: Did the control group find out about the intervention programme plan? Did either of the groups have a reason to want to make the research succeed or fail?

None noted (http://www.csulb.edu/~msating/ppa696/696 quasi.html).

Some of the threats to External Validity are elucidated bellow.

The researcher used the following questions to enhance external validity as an attempt in meeting the required requirements for the research project. (http://www.csulb.edu/~msating/ppa696/696 quasi.html):

1. Unique program features: None noted

2. Effects of selection: None noted

3. Effects of setting: The control group pre- and post-tests were done in a location in Pretoria. The intervention program and the pre- and post-tests for the test group were done in a similar location in Pretoria.

4. Effects of history: None noted

5. Effects of testing: Both groups displayed a better understanding for the TTCT subtests during the pre-test, although the test group was influenced by the intervention program.

6. Reactive effects of experimental arrangements: The need to replicate the findings in other location and time periods.

3.3.2 Data

Observing creativity as it occurs naturally is extremely difficult, particularly when key contributions are only recognised later when they trigger new insights in others and are built upon (Hargado 2006:488; 489). The researcher took this statement in consideration while choosing the sample groups.

The sample group for this study consisted of 8 subjects, aged six years (4 boys and 4 girls) who will be referred to as T1; T2; T3; T4 for the test group and C1; C2; C3; C4 for the control group. Each subject had to answer four figurative subtests. The total amount of figurative questions generated was 32. The total amount of verbal questions generated was 24.

Participants in the study were specifically nonrandomised selections. According to Choi *et al* (2009:123) the method above can be described as a repeated method design. The sample groups were chosen in two different schools with small grade R classes for four reasons.

Firstly a more accurate pre-test result and analysis, secondly a more accurate post-test result and analysis could be done, and validity and reliability could be enhanced. During the research period valuable data was obtained. The only weakness was that the figurative data could easily be misinterpreted without accurate explanations of what was drawn. The data that was gathered during the intervention plan showed clear progression. Keep in mind that the skills implemented during the six weeks were all novice skills to the participants.

All data was collected in a concrete way. This increased the validity and reliability of the study. One of the most important strengths of the data was that it made a clear differentiation between creative thinking and creative skills before and after the intervention program.

3.3.3 Analysis

The following statistical techniques were used to analyse the standard tests:

a. The Mean (McMillan et al 2006:479).

b. Dependant samples t-Test (McMillan et al 2006:492).

c. Cronbach's alpha (http://en.wikipedia.org/wiki/Cronbach's_alpha)*.*

The mean is the arithmetical average of a set of scores. Furthermore the mean is the most frequently used measure of central tendency because every score is used in computing it (McMillan 2006:159).

In order to calculate the standard deviation the mean has to firstly be calculated. A dependant sample t-Test was done to calculate the probability of rejecting the null hypothesis (McMillan 2006:299). The null hypothesis states that there is no difference between the population means of two groups (McMillan 2006:291). In this instance the null hypothesis is defined as: the effect of a creative intervention programme has the same effect as normal preschool programs.

According to McMillan *et al* (2006:291) the reason why the null hypothesis is used with inferential statistics is that one can never prove something to be true, one only fails to disprove it. Reliability is very important when working with variables and is related to validity.

This research project used Cronbach's alpha to calculate the reliability of the data. Cronbach's alpha is commonly used as a measure of the internal consistency of reliability (http://enwikipedia.org/wiki/Cronbach's alpha). It can also be described as a measure of the squared correlation between the observed scores and the true scores (http://www2.sas.com/proceedings/sugi26/p246-26.pdf).

Test-Retest reliability will be tested during the study. This particular reliability tested is used to assess the consistency of a measure from one point in time to another (http://www.socialresearchmethods.net/kb/reltypes.php).

These methods are efficient and well known throughout the literature for data analysis and reliability testing.

3.4 LIMITATIONS

During the programme it was necessary to take the following concerns and limitations into consideration (Houtz 2003:69):

1. Independence of creative thinking in relation to other cognitive variables.

2. Strengths of the evidence regarding the long term predictive validity especially in relation to indicators of adult creative productivity.

3. Appropriateness of using scores from the TTCT to make global categorisations e.g. labelling children as creative, gifted or talented.

4. Selection of subjects for specific programs according to the scores.

5. Concentration span of subjects during the test situation.

6. Language and cultural differences towards some of the topics represented in the subtests (verbal and figurative).

7. The researcher being biased.

8. Reliability of the statistical techniques namely:

1. *Single variable descriptive statistics (mean and standard deviation) give insight into the pre and post-intervention scores.*
2. *The reliability of the scores for the pre-test and post-test procedures were determined by the calculation of Cronbach's coefficient of alpha (McMillan et al., 2006:54, 185 – 186).*
3. *T-tests were carried out in order to determine the level of significance in the control and experimental group ($p ≤ 0.02$).*

The level of significance of the study was determined by the p-level of level of probability (McMillan *et al.*, 2006:292)**.**

3.5 ETHICAL CONSIDERATIONS

Confidentiality was taken into consideration before the study was implemented. All participants were kept anonymous and data were treated as confidential. None of the participants were forced to participate.

3.5.1 Ethical measures – anonymity

According to McMillan *et al* (2006:142) educational research deals with human beings and therefore it is necessary to understand the ethical and legal responsibilities of conducting research.

All information gathered should be coded to ensure anonymity of the subjects involved in the study. All the information gathered remains confidential, with the identity of the subjects only known to the researcher. During the introduction all participants and their parents gave verbal, as well as, written consent to participate in the study.

Ethical requirements, as described in McMillan (2006:142; 143; 144), were fulfilled for the purpose of this study, such as informed consent, confidentiality and privacy.

3.5.2 Informed consent

Obtaining informed consent implies that the researcher ensured that the participants understood the research investigation and what was expected of them. All participants were fully informed and willingly gave their consent to participate in the study (see Appendix H).

The researcher assured participants that data would be treated with anonymity and confidentiality at all times. Any advantages or disadvantages that could arise during the execution of the investigation were explained to the participants prior to the investigation.

Caring and fairness towards the participants were ensured by protecting their identity, by removing all names and working with coded samples. Open discussion promotes fairness to the participants and to the research inquiry according to McMillan *et al* (2006:355).

3.5.3 Confidentiality and privacy.

Privacy refers to a contract between people that limits others from accessing private information (McMillan *et al* 2006:335). It can also be seen as keeping information confidential (Chambers-McMillan 1996:85) that is not to tell anyone.

As a result, all names of the test group participants during the six week intervention programme are not given in this study. In other words, the researcher kept details of the participants confidential.

3.6 MODEL USED WHILE CONDUCTING THE STUDY

A creative pre-test was conducted before the implementation of the intervention program. Both the pre- and post –tests were based on the TTCT. A six week intervention program was used while conducting the research. The researcher implemented a four day cycle program that relapsed after the fourth day. Every fourth day the subjects will begin with the same stimuli as they did on day one and continue until the cycle again reaches the fourth day. Each day included a verbal and figurative activity. These activities were specifically chosen to stimulate creative thinking skills.

The cycle continued for the remainder of six weeks. A post - test was then conducted with regards to the creative thinking skills that were stimulated. Table 3.1 shows the verbal and figurative activities used during the six weeks.

Table 3.1: The creative intervention program

Verbal one	Verbal two	Verbal three	Verbal four
Improving a product	Different uses for an object	What if? question	Ask questions about a picture
Figurative one	Figurative two	Figurative three	Figurative four
Add to given stimuli to create something new and meaningful	Elaborate on the picture	Use the stimuli shapes given	Add to given stimuli to create something new and meaningful
Goal to improve	Goal to improve	Goal to improve	Goal to improve
Flexibility Fluency Originality	Flexibility Fluency Originality	Flexibility Fluency Originality	Flexibility Fluency Originality

3.7 CONCLUSION

To test whether Grade R learners had acquired adequate creative skills, a creative programme was designed and will be implemented. The test focused on primary creative concepts namely: originality, flexibility and fluency.

A standardised pre-test was conducted on a group of 8 subjects, four of the subjects were studied for a further six weeks. During the six weeks the main focus was on the creative skills as mentioned above. After the six week program was completed a standardised post - test was carried out on the original 8 subjects.

The effectiveness of the test group that participated in the intervention programme will be assessed. The effectiveness of the program was tested to determine if the results were a success or a failure.

This chapter provides an overview on the research methodology used for this study. In the following chapter, a more in-depth description will be given of the plan for analysing the collected data, as well as the research results obtained from the analysis.

In conclusion, while there was the potential for harm to be done during the research period, responsible attempts were made to counteract it.

CHAPTER 4

ANALYSIS AND DISCUSSION OF THE DATA

4.1 INTRODUCTION

This chapter presents the results of the study conducted to gain a comprehensive understanding of the effects that creative skills (fluency, flexibility and originality) have on the development of young children, in order to develop suitable strategies that could be used to enhance their creativity. This study was done by means of literature, as well as an empirical investigation.

The secondary aims of the study were to:

- develop and evaluate a program of creative abilities namely fluency, flexibility and originality; to enhance the ability of grade R learners in order to provide a better understanding of the creative abilities of these learners; as well as the benefits and the rate of individual development of their divergent thinking skills.
- assess the validity of the program of creative skill development.
- establish the reliability of the application of the program to cognitive development.

The following analysis of the data was applied:

4. Single variable descriptive statistics (mean and standard deviation) which gives insight into the pre- and post-intervention scores.
5. The reliability of the scores for the pre-and post-test procedures were determined by the calculation of Cronbach's coefficient of alpha (McMillan *et al.,* 2006:54, 185 – 186*).*
6. T-tests were carried out in order to determine the level of significance in both the control and experimental groups ($p \leq 0.02$).
7. The level of significance of the study was determined by the p-level of the level of probability (McMillan *et al.*, 2006:292).

Figure 4.1 can be used as a holistic guideline of chapter four in order to follow the analysis of the research.

Figure 4.1: Schematic representation of chapter four.
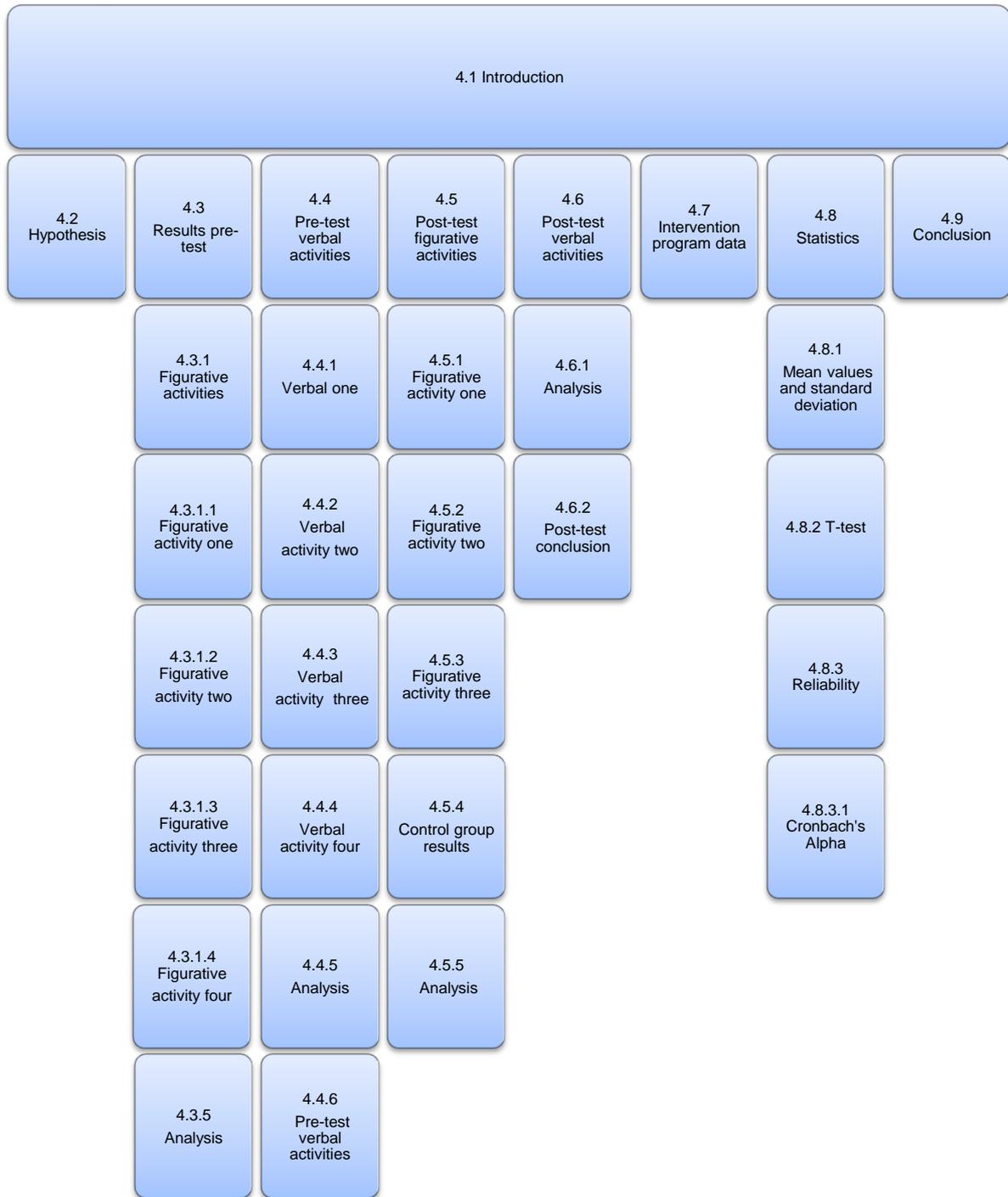
4.2 Hypothesis

The following hypothesis was developed and will be tested by using the T-test: after students have participated in a creative intervention program, higher thinking skills will be developed**.**

4.3 Figurative pre-tests

During the figurative activities the subjects were asked to apply their creative skills while using the drawn stimuli provided to them such as a house, a picture of a frog, adding on to straight lines and circles. Each stimuli was used to measure originality, fluency or flexibility.

4.3.1 Figurative activity one

This activity was given to the children in both the test as well as the control groups to test fluency. Basically it was to see the number of ideas they could come up with in a given time. The ideas should be added to the stimuli provided.

Activity one: Complete the following picture adding as much detail as you can. You have 3 minutes.

Figure 4.2 Figurative activity one stimuli
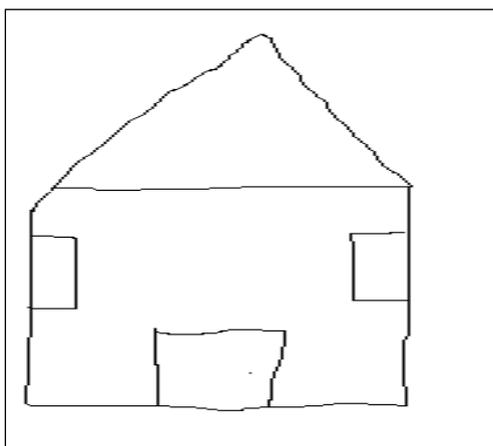
Of the four test group children, two learners, T3 and T4 were able to draw outside the lines. Only T3 added relevant lines to his picture.

The T2 was only able to generate ideas for two minutes. T1 struggled to project her thoughts into the drawing and made loose scribbles and numbers.

T2 constructed the complete interior of a house, but still had limited ideas and was done before the time had expired. He did not elaborate on the lines outside the house.

The control group did not have similar results. C1, C2 and C4 only scratched on and coloured in the given stimuli. C3 made an attempt to elaborate on the picture. All the participants from the control group were done before the time had expired.

In conclusion, during activity one both groups did not make full use of the time given to them. Both groups struggled to generate appropriate ideas, and the elaboration on the pictures was minimal.

4.3.2 Figurative activity two

Figurative activity two was given to the children to measure their creative strengths. Activity two: Add lines to the incomplete figures below to make pictures out of them. Try to tell complete stories with your pictures. Give your pictures titles. You have 3 minutes.

Figure 4.3 Figurative activity two stimuli
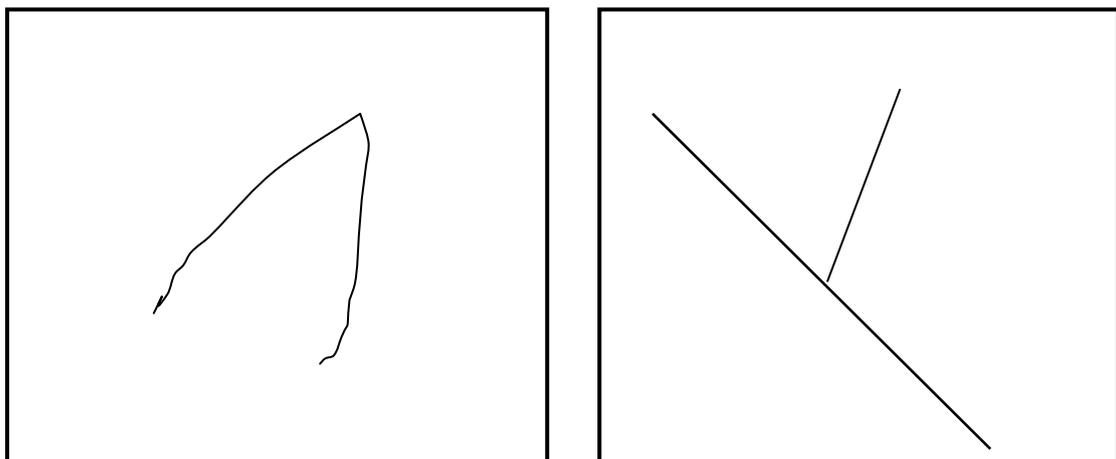
None of the learners were able to use the stimuli. The entire test group drew around the stimuli. Only T3 was able to draw a figure that can be identified as a man, but did not use the stimuli appropriately. T3 only traced over the stimuli.T1, T2 and T4 gave their drawings titles, but made unrecognizable scribbles.

In the control group, two learners C1 and C2 had the same results as the learners of the test group. They did not use the stimuli and traced over the stimuli. However, C3 and C4 were able to use the stimuli and gave titles to their drawings.

The results of activity two were not satisfactory for either of the two groups. The stimuli were ignored and not used appropriately. The learners were not able to apply creative skills such as emotional expressiveness, storytelling, humour or fantasy, to name a few.

4.3.3 Figurative activity three

Figurative activity three was given to the children to also measure their creative strengths. This activity measures the same skills as activity two, but in a different way. Activity 3: Complete the following in a purposeful way. You have 3 minutes.

Figure 4.4 Figurative activity three stimuli

_____   _____   _____   _____

_____   _____   _____   _____

Three of the four, namely T1, T3 and T4 used the stimuli appropriately. They drew pictures using the stimuli and were able to give them titles but not within the given time.

T3 was the only one to use all the stimuli in the given time. T2 ignored the stimuli and drew his own representation of animals. None of the control group participants were able to complete the stimuli appropriately.

Only scribbles were made by the control group participants. C1, C2 and C4 traced the stimuli. Although C3 used the stimuli to make new pictures, the learner was not able to name her representations.

In conclusion, in activity three the test group was able to make more relevant representations with the stimuli than they were able to make in activity two. The control group did not use their stimuli and worked around it.

4.3.4 Figurative activity four

Figurative activity four was also given to the children to measure their creative strengths. This activity measured the same skill as activity two and three. The stimuli used were repeated figures. The following stimuli were given to the children:

Activity 4: Add details to the shapes below to make pictures out of them. Make the circle a part of the picture you make. Try to think of pictures no one else will think of. Add details to tell complete stories with your pictures. Give your pictures titles. You have 3 minutes.

Figure 4.5 Figurative activity four stimuli
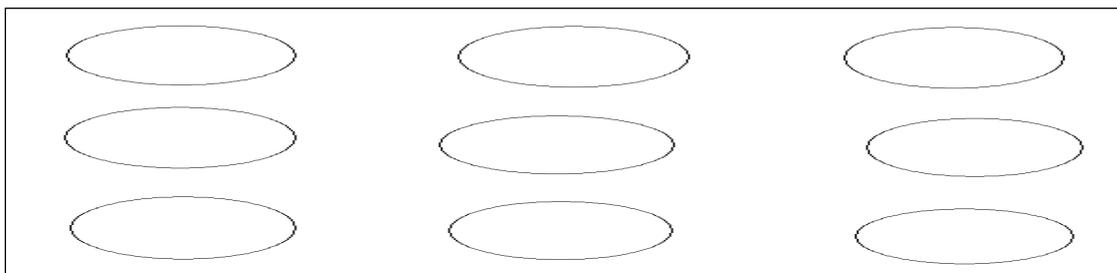
T1 was able to tell a story with her circles and included some emotions. The drawings were not original, because they all looked the same. However, she was able to fill the circles in a meaningful way.

T2 said after two minutes:" I don't know what to draw!" He was done after two minutes without a meaningful result and did not want to continue.

T3 was able to fill the circles in the given time, but did not have applicable ideas.

T4 scored very well with regard to fantasy. She did not use the stimuli, but did incorporate them into a story. The learner said: "I made wild animals while the girl was walking, the circles are talking to the wild animals".

C1 was very much influenced by the media and continuously mentioned the character "Ben 10". He had no original ideas and made a lot of scribbles.

C2 made the same faces in all the circles and named them cookie faces. He then ignored the stimuli and drew elsewhere. He does however, score on synthesis for drawing a line around the faces, indicating unity.

C3 this learner had very good abstract titles for her drawings, e.g. a girl that is crazy. She was able to fill all the circles even though they are not all that original.

C4 did not respond to the activity at all. She was only able to trace the stimuli and create identical representations. When she was asked to name her representations she randomly named the stimuli.

4.3.5 Analysis

Figure 4.6 provides evidence of the test group figurative pre-test scores. The highest score obtained by all the test group participants was for fluency (M=34.57; S.D=17.75). Originality (M=10.5; S.D=4.33) and flexibility (M=40; S.D=3.46) both had low scores.

This indicates that the participants were able to generate many ideas, but only a few of these were original or flexible ideas.

Figure 4.6 Figurative pre-test group results

Figural pre-test test group results

	Fuency	Originality	Fluency	Flexibility	Originatity	Fluency	Flexibility	Originality	Fluency	Flexibility
T1	8	1	0	0	0	3	3	1	6	1
T2	8	0	0	0	0	4	0	0	9	0
T3	15	2	2	0	3	7	3	0	8	4
T4	7	2	0	0	0	4	2	0	1	0
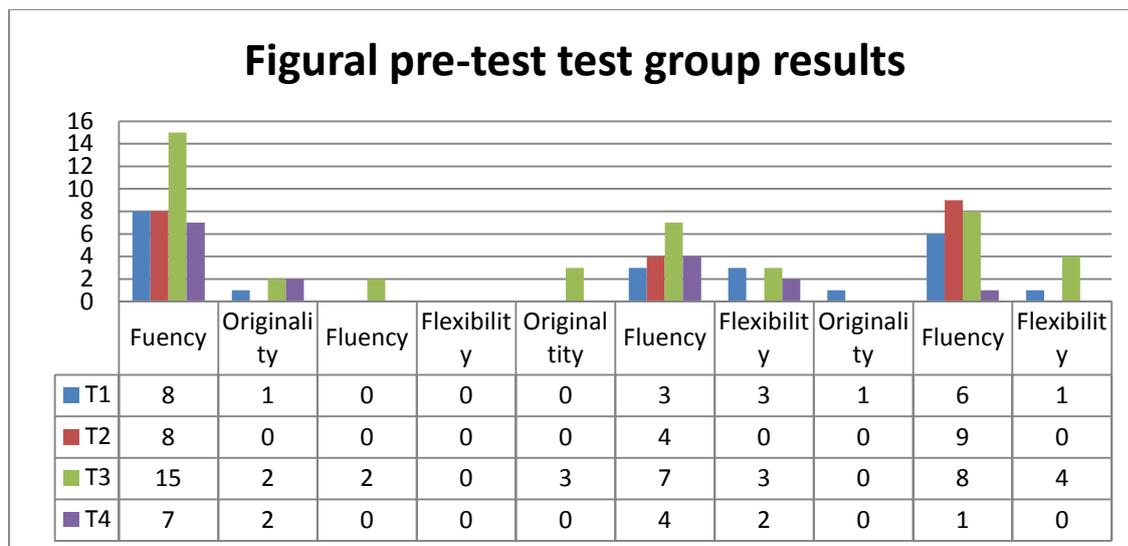
In other words the participants in the test group had difficulty in generating original and flexible ideas from the stimuli provided in the figurative pre-test (control group had similar results, see Appendix A).

4.4 PRE-TEST VERBAL ACTIVITIES

The responses during the verbal activities were recorded in a non-biased manner by the researcher.

4.4.1 Verbal activity one

During activity one the participants were required to ask as many questions about the picture as they could to gain information about it. The participants asked the questions and dictated the data to the researcher.

According to the TTCT test the learners would be scored on fluency, flexibility and elaboration. The picture figure 4.7 was used.

Verbal activity one: Ask as many questions as you can about the picture. You have 3 minutes

Figure 4.7 Verbal activity one stimuli
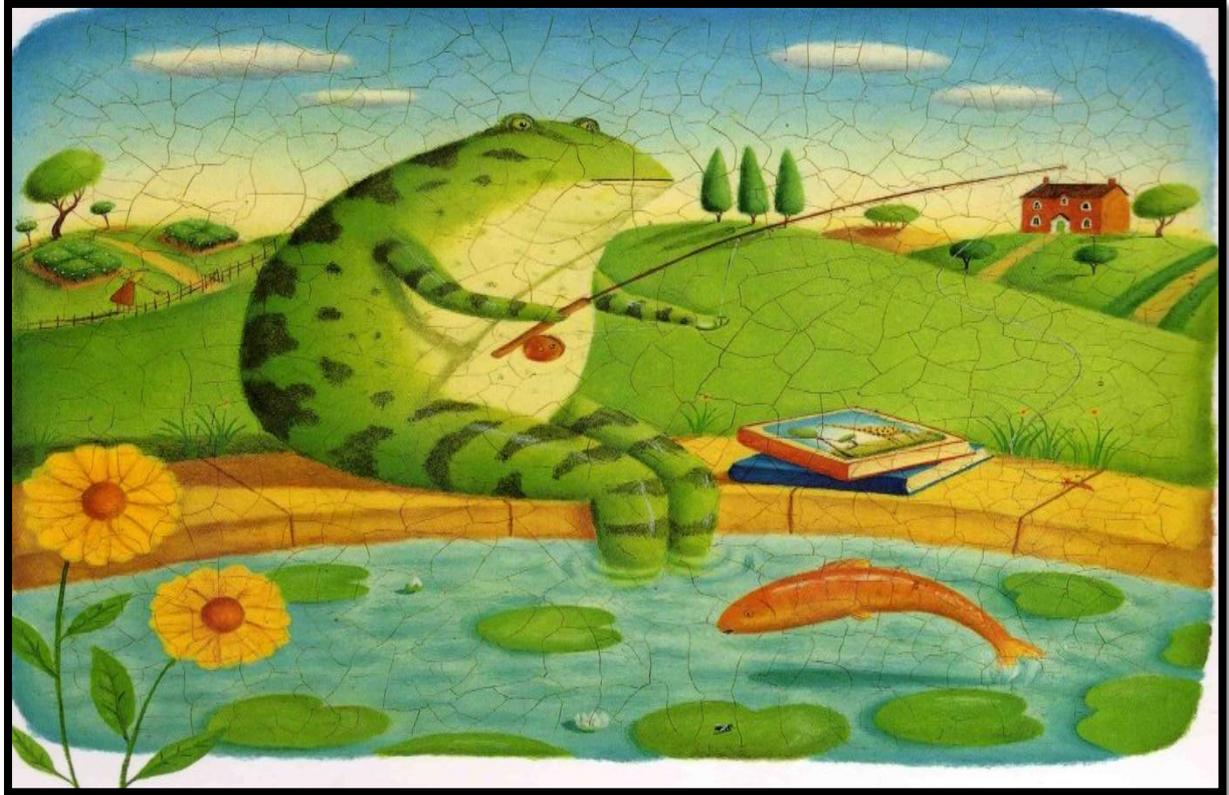
Table 4.1 indicates the scores of activity one. From the results in table 4.1it can be seen that the lowest total score for the test group was on originality with a score of 2, secondly on flexibility with a score of 12 and lastly on fluency with 18.

The results indicated that learners were able to ask only a few questions and most of the questions were irrelevant. They were also unable to generate a variety of original ideas.

Table 4.1 Test group pre-and post-test total results

	Number of questions asked	Fluency: number of relevant ideas	Originality: number of unusual ideas	Flexibility: number of different categories	*Total*
T1	4	4	0	2	10
T2	10	8	2	6	26
T3	0	0	0	0	0
T4	7	6	0	4	17
	Number of questions asked	Fluency: number of relevant ideas	Originality: number of unusual ideas	Flexibility: number of different categories	*Total*
C1	0	0	0	0	0
C2	1	1	0	1	3
C3	8	7	3	3	21
C4	1	1	0	1	3

T3 struggled with activity one and was not able to produce relevant results. It seems as if language might have been an influencing factor.

4.4.2 Verbal activity two

During activity two the learners were asked to improve a product. The researcher asked the questions and then wrote down what the children said. According to the TTCT test learners would be scored on fluency, flexibility and elaboration.

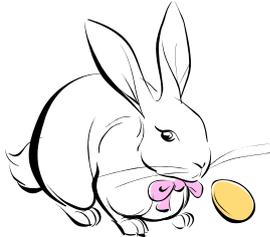The following figure (4.8) was used during verbal activity two: Attempt to improve the stuffed toy rabbit so that it will be more fun to play with. You have 3 minutes.

Figure 4.8 Verbal activity two stimuli

Some of the limitations to this activity were that the learners did not initially understand what was expected from them and some of them had a limited vocabulary.

The test group participants struggled to improve the product in three minutes. They were able to generate 36 ideas. However, the ideas they generated were not of a wide variety. They could not implement any fluent, original or flexible ideas. T3 was able to generate the most ideas.

4.4.3 Verbal activity three

This activity was to see how the children would respond to generating original ideas. It also tested how fluently they could generate these ideas. Activity three: How many different uses can you think of for a washing peg? List as many as you can. You have 3 minutes.

In the test group T1 and T3 were able to generate two original ideas respectively. The whole group said that the washing peg should be used for washing and for hanging up clothes. They were unable to be flexible in their thinking.

The participants in the control group had similar results. C3 had the most ideas although all of them were related in some way to clothes hanging and closing of objects with the peg. C1 said that one is not allowed to use the peg for anything else except for hanging clothes, because it would break.

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In conclusion during this activity the participants displayed a stereotypical approach to the washing peg. The peg is used for hanging up clothes and that is all it could be used for. They had a narrow view in terms of flexibility, originality and fluency of ideas regarding the use of the washing peg.

4.4.4 Verbal activity four

Activity four is known as "just suppose" or "what if". The participants were asked a question and they had to elaborate on the question. An example of the questions is the following. Activity four: Just suppose that people could train worms. What are some of the things that might happen as a result? You have 3 minutes.

T1 was willing to teach the worms new things and generated 8 ideas.

T2 was willing to teach the worms new things and generated 13 ideas.

T3 was willing to teach the worms new things and generated 3 ideas.

T4 was willing to teach the worms new things and generated 11 ideas.

The control group results were as follows:

C1 no response.

C2 was willing to teach the worms new things and generated 3 ideas.

C3 was willing to teach the worms new things and generated 15 ideas.

C4 no response.

In conclusion, the above findings were very similar in the way all the participants had limited ideas and were not able to use creative verbal skills.

Figure 4.9 indicates that the test group participants performed better in verbal activity two. They were more fluent and generated 13 more original questions than in verbal activity three.

4.4.5 Analysis

Figure 4.9 Verbal pre-test group results

Verbal pretest-test group results

	Originality (V1)	Flexibilitly (V1)	Fluency (V1)	Originality (V2)	Fluency (V2)	Orginality (V3)	Fluency (V3)	Flexibility (V4)
T1	2	0	4	3	10	2	0	8
T2	6	2	10	5	6	0	0	13
T3	0	0	0	5	13	2	0	3
T4	4	0	7	4	7	0	0	1
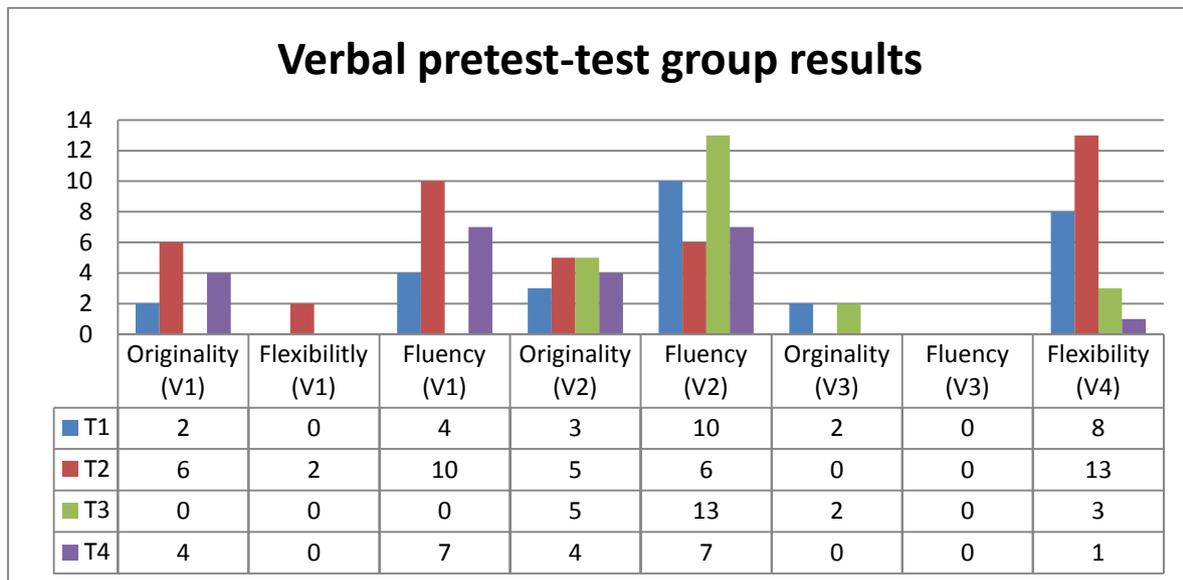
Figure 4.9 is a summary of all the verbal pre-test results that was obtained by the test group. It seems as if T3 began to understand what was expected. T2 had an overall acceleration in fluency, flexibility and originality.

4.4.6 Pre-tests conclusion

From the results obtained from the figurative and verbal pre-tests there was evidence of a lack of idea generating as well as questioning skills. There were limited original and flexible responses in both the figurative and verbal test results.

4.5 Post-tests figurative activities

The researcher presented the post-test objectively. Participants in both groups had the same materials and instructions presented to them and an anti- bias approach was followed.

4.5.1 Figurative activity one

During the pre-test a similar figurative activity was given to the children in both the test groups as well as the control group to test elaboration and to see what amount of ideas they could add to a picture in the given time.

Table (4.2) is a summary of the subjects' scores on fluency during the post-test. The results in table 4.2 indicated a positive growth in both the test group and the control group.

Table 4.2 Pre-test and post-test fluency results

Test group- fluency		Test group- fluency		Control group- fluency		Control group- fluency	
Pre-test results		Post-test results		Pre-test results		Post-test results	
T1	8	T1	22	C1	2	C1	7
T2	8	T2	19	C2	1	C2	11
T3	15	T3	9	C3	10	C3	17
T4	7	T4	21	C4	1	C4	0
Total:	38	Total:	72	Total:	14	Total:	35

T3 showed a score of 6 ideas less in the total score than in the pre-test. The pre-test may have had an influence on his results.

The test group was able to grow with an overall of 34 more fluency ideas than during the pre-test. The control group displayed a growth by 21 more fluency ideas than in the pre-test.

4.5.2 Figurative activity two

During activity two the results of the implementation of the creative program were evident.

T1 (Figure 4.10) created a fantasy penguin that was walking on rocks. Therefore the participant was able to link the stimuli and used it appropriately. Her idea was original and colourful. Most important was the logic seen in the picture. The parts named during and after the drawing are clearly visible. T1 made use of flexible and original thinking skills while generating the ideas. The penguin was labelled with legs, hair, bag and it was busy walking and was not only a static representation.

Figure 4.10 Drawing of a penguin

T2 (figure 4.11) made limited use of colour. However, T2 was able to be very original and he indicated his titles clearly.

The stimuli were used effectively. It is evident that T2 applied creative skills to give meaning to the abstract stimuli. T2 also gave appropriate headings for the two drawings.

The drawings in figure 4.11 were original and fluent, however not flexible. This is because both drawings share similar attributes for example both can fly and both have wings.

Figure 4.11 Drawing of a bird and airplane
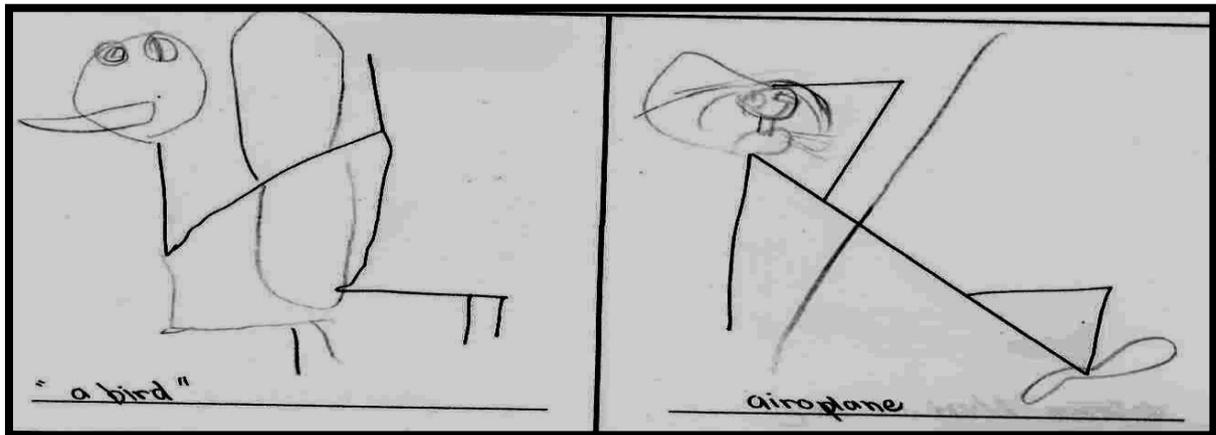
T3 (figure 4.12) was not completely able to convey his thoughts onto paper. He identified the stimuli as an apparatus from a gym where people build muscles. T3 did not respond in the same way to the test as he had responded to the creative program.

Figure 4.12 Drawing of a gym
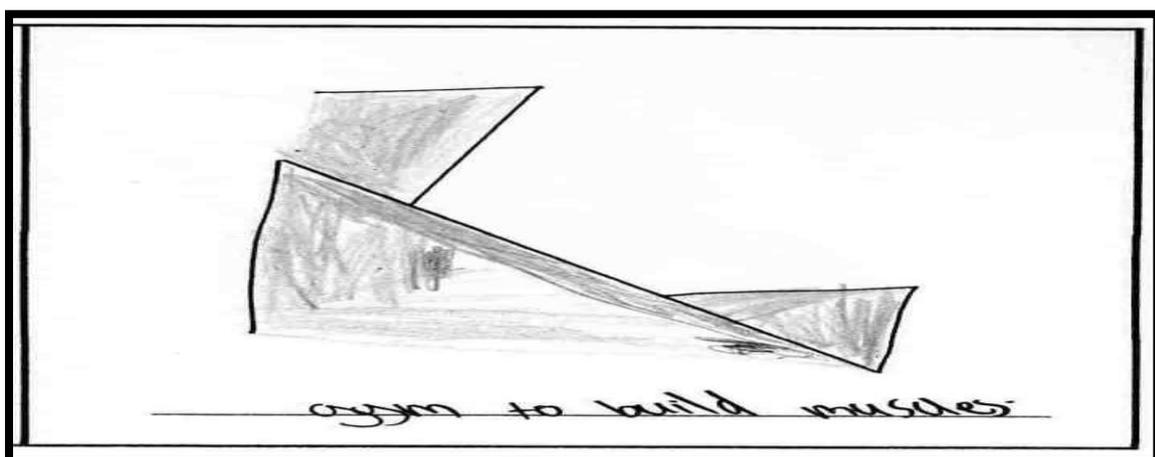
In figure 4.13, T4 saw the stimuli in a different perspective.

T4 made a boat of the stimuli. It is original and indicated movement where the boat went into the sand. T4 named the scribbles on the side of the boat as the written name of the boat.

Figure 4.13 Drawing of a boat
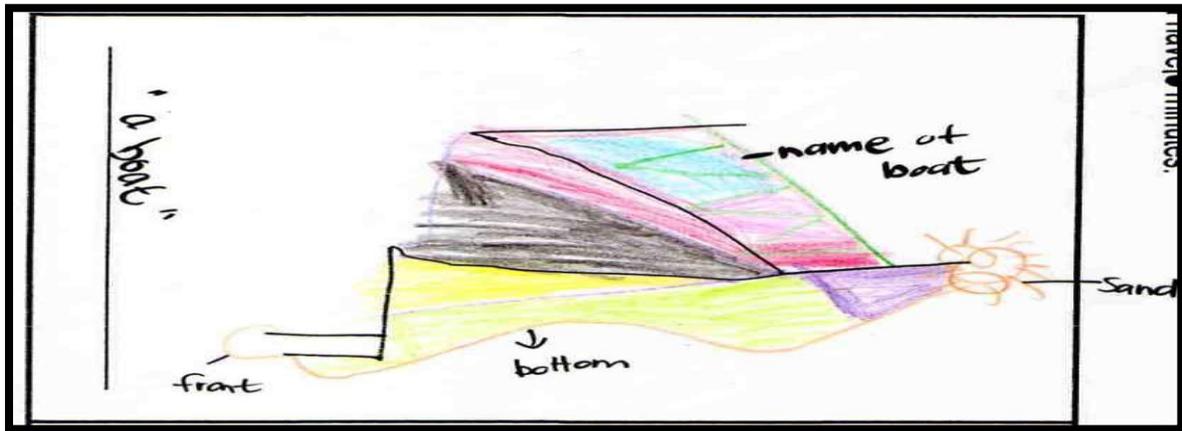
Keep in mind, that scribbles representing a drawing are not regarded as relevant ideas. There must be a clear and visual logic behind the lines on the paper. It is also important to bear in mind that the stimuli should be used and incorporated into the creation.

C1 (Figure 4.14) had irrelevant headings to his drawings. However, C1 created a story in his second stimuli. In the first picture a man is sliding down a slide and then his ice-cream fell on the floor. In the second picture there was a fire that was burning down the house. The triangle in the picture fell on the man and killed him.

Figure 4.14 Drawing of Batman and Ben Ten
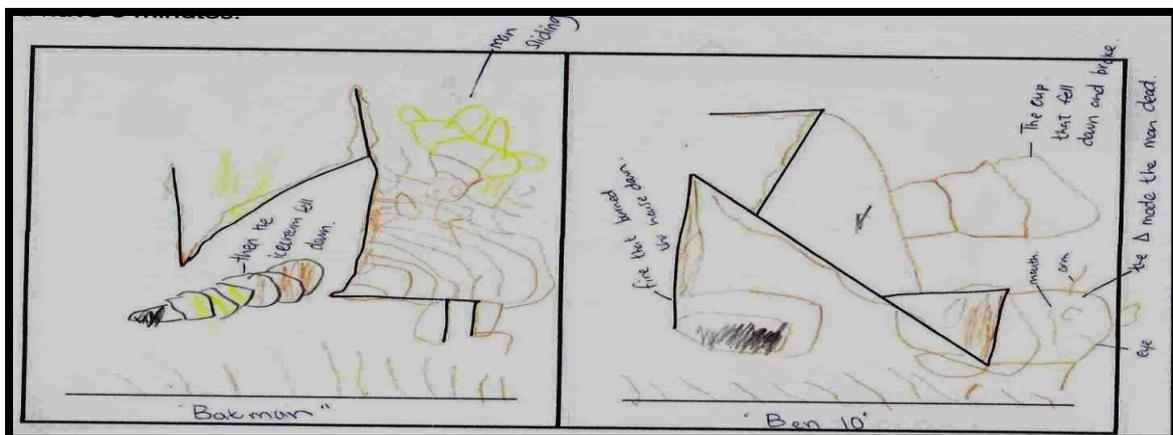
This was very well interpreted by C1.Although his ideas were fresh and original, his drawings were unclear, but these could be improved with stimulation. C2 (Figure 4.15) made drawings about people, one being himself and the other his brother and a baby.

C2 was not interested in the stimuli and did not want to name his picture. Although he made a link between the two blocks he did not continue in the time given for the activity.

Figure 4.15 Drawings of people and family
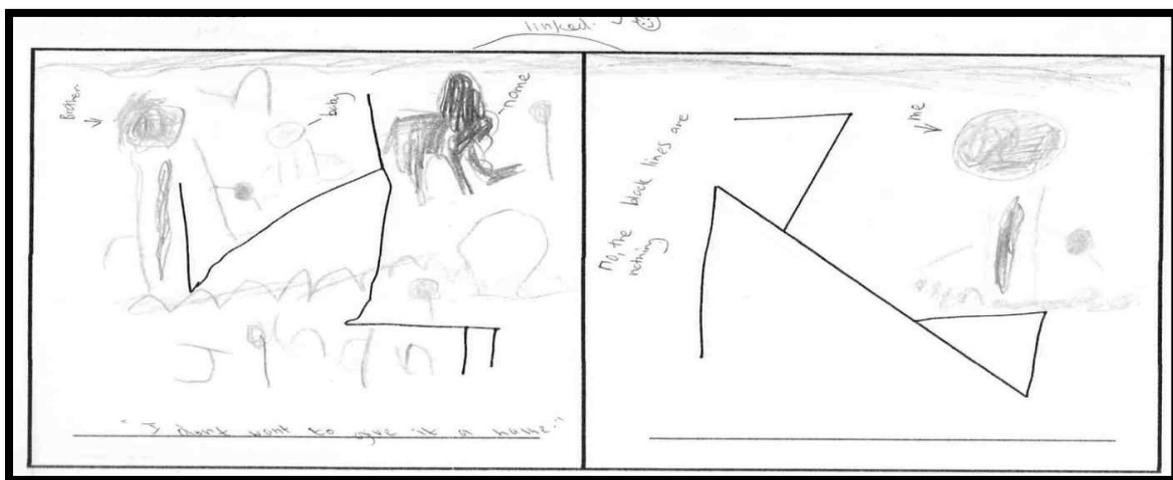
C3 (Figure 4.16) made lots of scribbles that are regarded as invalid. The stimuli were ignored and irrelevant headings were used such as "a loop of a circle" was given to the drawing.

Figure 4.16 Invalid scribbles A
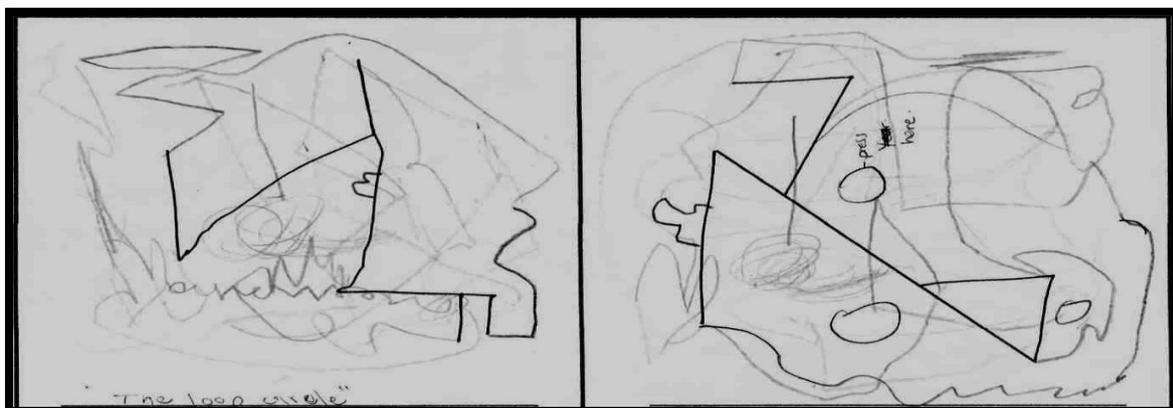
C4 (Figure 4.17) began her task with the random colouring of the stimuli. There is no logic to be seen in her drawings and they were regarded as invalid. The stimuli were ignored and no headings were given to the drawings.

Figure 4.17 Invalid scribbles B

4.5.3 Figurative activity three

During the following activity it could be seen that the test group had more relevant ideas than the control group. The test group was able to look at the stimuli and create something new and relevant. Two examples are given below:

Figure 4.18 Example of T1's originality
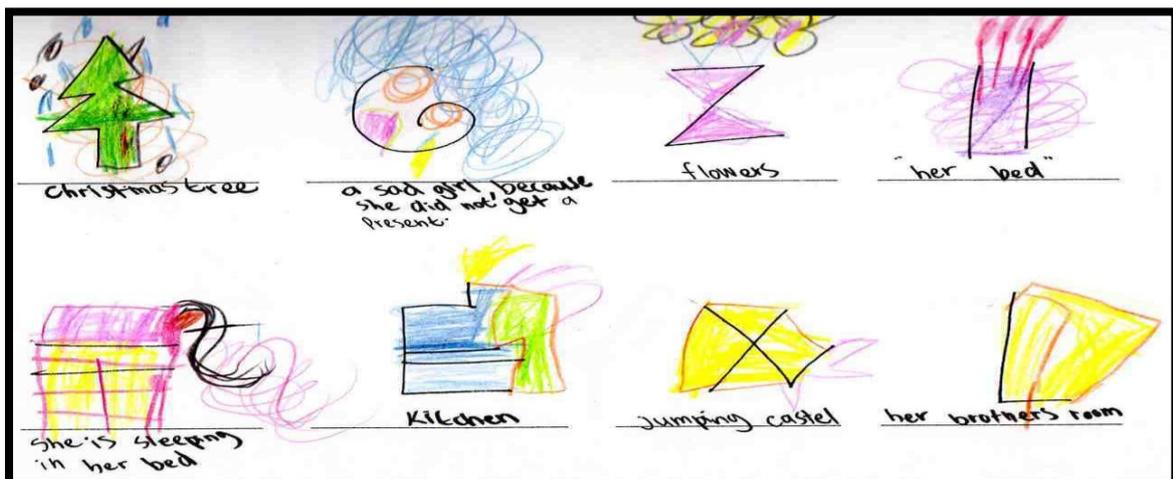
Figure 4.18 was made by T1 who was able to link all the stimuli in the form of a story. This required an integration of all the creative skills that had been dealt with so far.

The ideas were original except for the Christmas tree. T1 showed fluency and flexibility in the representation.

Figure 4.19 Example of T2's originality
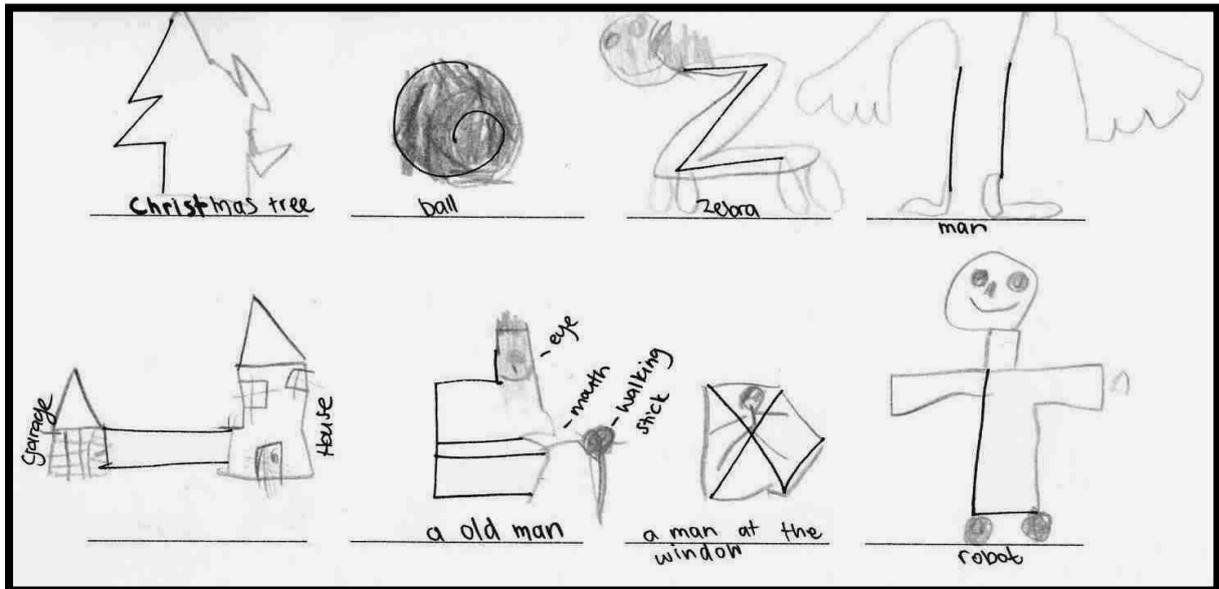
In figure 4.19 T2 drew a Christmas tree using the same stimuli as the above and lost marks for the lack of originality in using this stimuli.

Apart from this his ideas were outstanding and original, for example look at the link between the two stimuli called garage and house. T2 definitely applied creative skills in his representations.

4.5.4 Control group results

The representations in figures 4.20 and 4.21 indicated that the participants were not able to apply any creative skills. C2 (figure 4.21) ignored the stimuli and C1 (figure 4.20) only traced the stimuli. Therefore no valid representations had been made.

Figure 4.20 Example of invalid originality C1
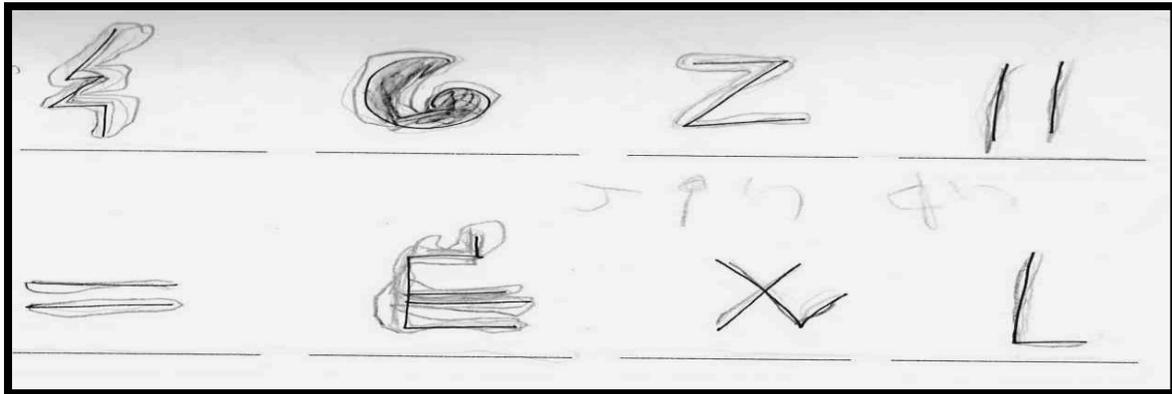
Figure 4.21 Example of invalid originality C2
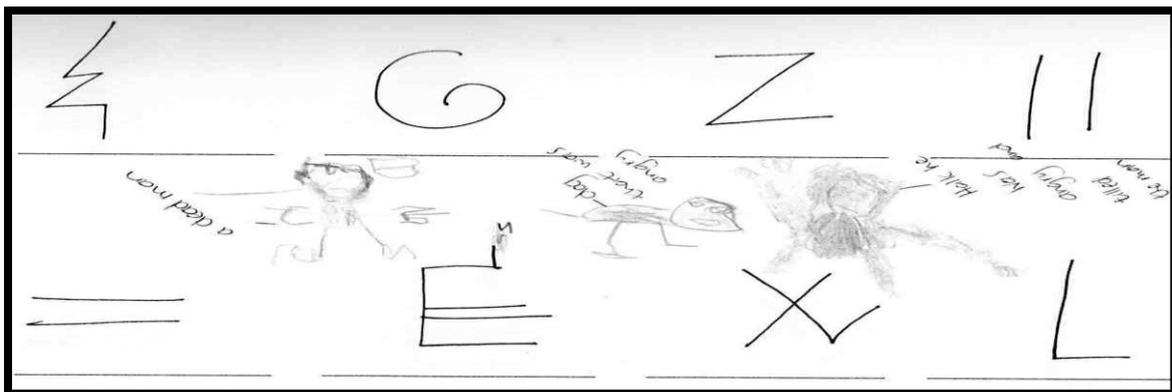
4.5.5 Analysis

Tremendous growth can be seen in the test group post-test results. Fluency still dominated the scores although more balanced scores of originality and flexibility were generated.

The test group was influenced by the creative intervention program and had accumulated positive skills. It seems as if T3 struggled with the activities in comparison with T1, T2 and T4.

It was evident that the participants made more use of the figurative stimuli that were provided for control group growth results (refer to Appendix B).

Figure 4.22 Figurative post-test test group results

Figural post-test test group results

	Fluency	Originality	Fluency	Flexibility	Originality	Fluency	Flexibility	Originality	Fluency	Flexibility
T1	12	4	11	2	5	8	3	0	12	12
T2	12	4	11	2	5	8	4	0	12	3
T3	9	1	2	1	0	8	7	0	4	2
T4	21	1	5	1	3	6	3	1	8	8
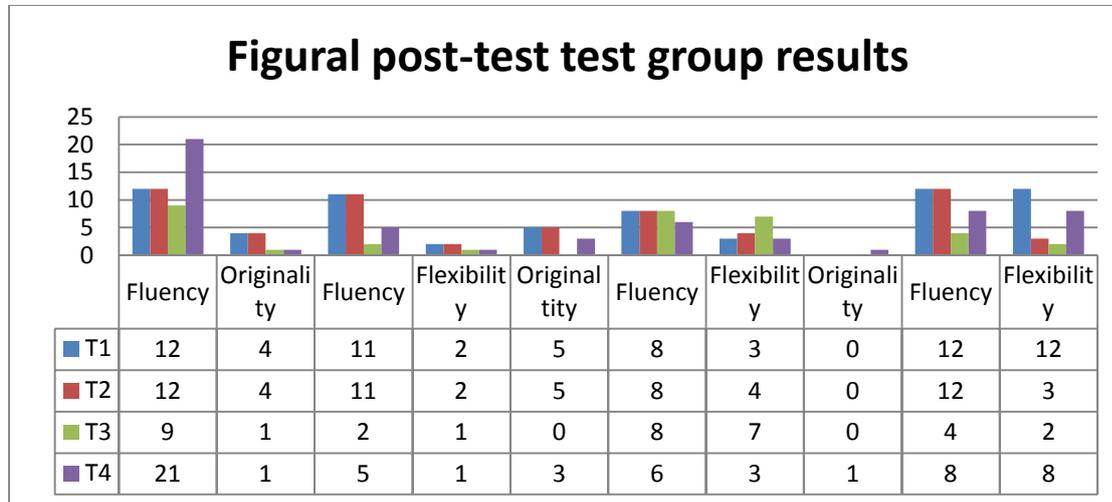
In figure 4.22 it can be seen that there was more consistency in the results generated throughout in fluency, flexibility and originality.

4.6 Post-test verbal activities

The test group was able to generate ideas in the time given to them. All the activities were completed productively by the test group. Original and fluent ideas were generated.

During the activities, the group made use of flexible thinking. The results of the post-tests had improved positively in relation to the pre-tests. The test group also managed to produce enough ideas in the given time.

The control group were easily bored with the verbal activities and did not participate as expected. They struggled to generate relevant ideas for the given time. Their thoughts were limited and divergent thinking was not applied.

4.6.1 Analysis

The verbal post-test results (figure 4.23) indicated overall growth for the test group participants.

It seemed as if they could now express themselves more adequately when compared to the pre-tests. The control group results can be seen in Appendix C.

Figure 4.23 Verbal post-test test group results

Verbal post-test test group results

	Originality	Flexibilitly	Fluency	Originality	Fluency	Orginality	Fluency	Flexibility
T1	5	4	8	5	11	3	4	3
T2	9	6	14	7	8	5	3	5
T3	2	4	4	7	15	7	6	7
T4	5	5	9	8	8	4	2	4
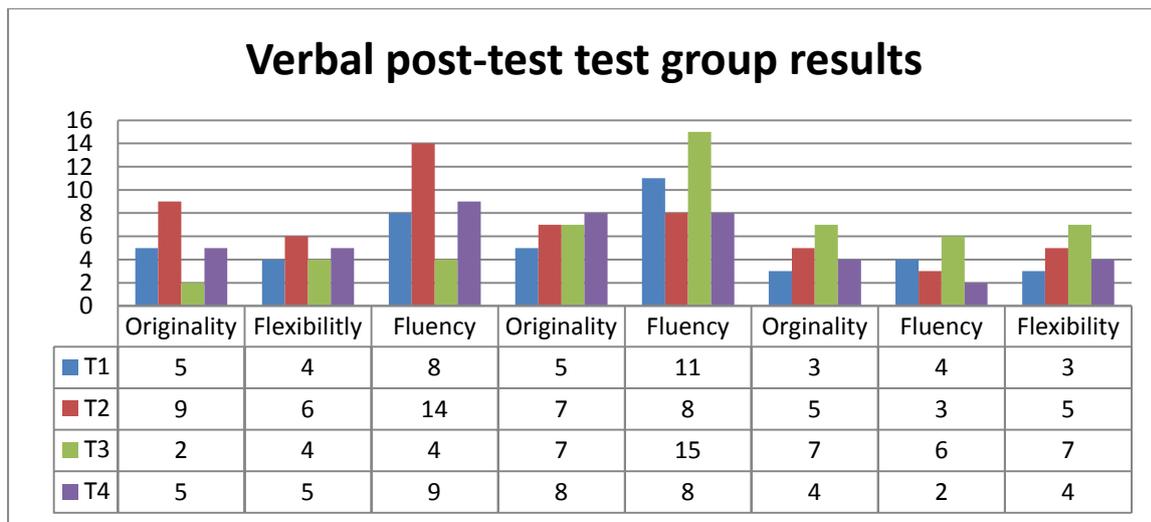
During the post-test the fluency results inclined tremendously. It was evident from the results (figure 4.23) that T3 gained creative skills from the intervention program. T3's results showed positive improvement.

4.6.2 Post-tests conclusion

The test group improved during the six week intervention program. Although fluency declined by 1%, the test group was able to generate 2% more originality results and 5% more flexibility results. This is seen as a positive improvement in the results.

Figure 4.24 and 4.25 compare the test groups pre-and post-test means.

Figure 4.24 Pre-test means
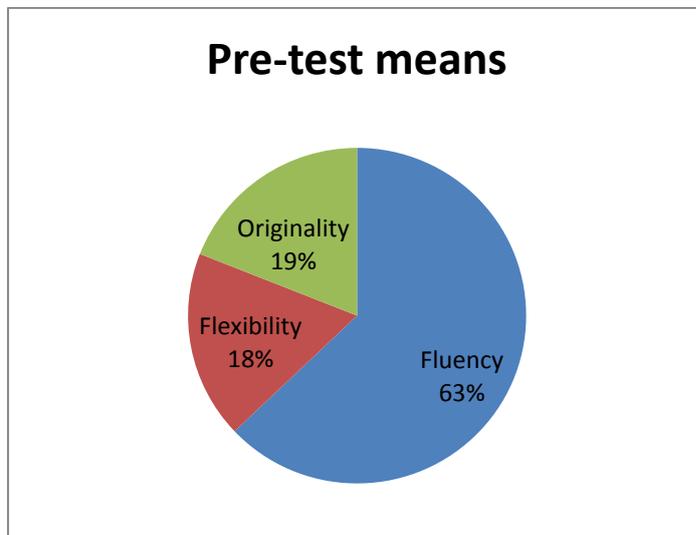
Pre-test means

The pre-test means indicate that fluency dominated the results with 63%. The participants had only a few original and fluency ideas.

Figure 4.25 Post-test means

Post -test means
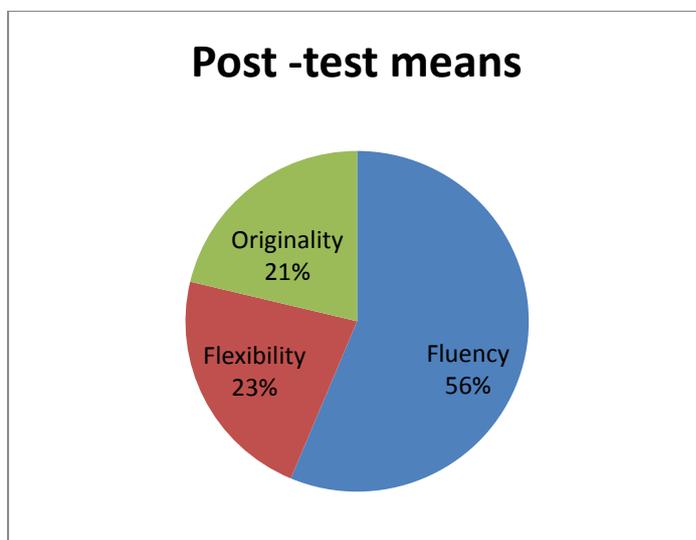
The post-test results generated more original and flexible results and were able to generate these ideas fluently. The incline in percentages for originality and flexibility indicates that there were divergent thinking skills involved.

4.7 Intervention program data

The test group data indicated the progression of the group with regards to figurative activities one and two. The following figure 4.26 was compiled by the researcher to ensure validity with regard to the test group's progression.

Figure 4.13 illustrates the diversity of the test group and how the whole class was able to enhance their creative thinking skills. All the children were given two stimuli and had to create an original representation.

Some of the representations that were made were a bird, a scuba diver in the water and a person wearing goggles.

Figure 4.26 Examples of test group drawings of diverse thinking

During another activity (figure 4.27) the learners created a ladybird, a person eating ice-cream and a frog. Their ideas were flexible and original.

As a result there was no need for photocopied material to stimulate the participants to be creative and to apply their prior knowledge.

Figure 4.27 Examples of flexible and original ideas

The images in figure 4.28 are all unique and they are images with a lot of colour. The bubbles next to the girl's head in the blue water gives the viewer a feel of movement.

The aspects, fluency, flexibility and originality, all forms part of the creative strengths mentioned in the study so far.

Figure 4.28 Diverse interpretations of a circle stimulus

One of the most extraordinary representations created during this study was work done by a pair of participants: the two girls were working on the carpet when they created figure 4.29. They told the researcher that the triangle holds the people who still have to go around in the Ferris wheel.

Figure 4.29 Drawing of a fun Ferris wheel

4.8. STATISTICS

4.8.1 Mean values and standard deviation

Standard deviation (S.D) is an indicator of the degree of variation in the scores (McMillan *et al.* 2006: p163; http://www.toolingu.com/definition-800220-35806-mean.html, 19/02/2011).

The standard deviation is calculated by determining the distance between each score and the mean (M), and then determining the average distance of the scores from the mean (McMillan *et al.,* 2006: p163). Graphic results can be seen in Appendix G.

In table 4.3 it is evident that there is not much deviation between the scores and the means.

Table 4.3 Pre-test and post-test test group means

Pre-test Test group	X	M	S.D	N
Fluency	139	34.75	17.75	4
Flexibility	40	10	3.46	4
Originality	42	10.5	4.33	4
Post-test Test group	X	M	SD	N
Fluency	171	60.25	32.47	4
Flexibility	96	24	6.26	4
Originality	91	22.75	10.82	4

The biggest deviation between the means could be seen where the pre-test is compared to the post-test results. It indicates that there is a difference between the standard deviations, because of the incline in the means during the pre-test.

4.8.2 T-test

T-tests for dependent groups were conducted to determine the level of statistical significance for the difference between the test groups pre-test and post-test mean scores (control group T-test group scores see appendix E).

The total t-statistic for the test group pre-test was 6.41 with 2 *df*, and was significant where p < .002 (0.2% level of significance). This suggests that the study is considerably significant and that the results would be evident in 98.9% of the cases. The null hypothesis was rejected at the 0.2% level of significance.

Figure 4.4 T-test test group scores

	X1	**X2**	**M - differences**	**Sum of square differences**
Fluency	171	139	32	1024
Flexibility	96	40	56	3136
Originality	91	42	49	2401

(t = 6.41; p □ 0.02)

The t-value for the test group's post-test was for discrimination with a t-statistic of 1.91, and 2 *df*. It was significant where p < .002 (0.2% level of significance). This suggests that the study was very significant, and that the same results would be evident in 98% of the cases. In this case hypothesis; after students have participated in a creative intervention program, higher thinking skills will be developed**.**

4.8.3 Reliability

Reliability refers to the consistency in the uniformity of an experiment. It suggests that the same results could be produced by different researchers under similar conditions (McMillan et al., 2006:130, 188, 198).

If the instrument does not show much error, then it is reliable. If the instrument shows a considerable amount of error, it is seen as being unreliable.

The instrument used to assess the subjects' creative development focused on three primary aspects, namely fluency, flexibility and originality, with each consisting of subsections. The internal reliability and consistency of this instrument was tested using Cronbach's alpha coefficient. This can range from 00.00 (if no variance is consistent) to 1.00 (if all variances are consistent) with all the values between 00.0 and 1.00 being possible. If Cronbach's alpha for a set of scores turns out to be 0.90, it can be interpreted as meaning that the test is 90% reliable, and by extrapolation that it is 10% unreliable (www.http://jalt.org/test/bro13.htm)

4.8.3.1 Cronbach's Alpha

Overall, a consistent reliability was achieved, with an alpha of 0.98 in the pre-test and 0.99 in the post-test for the test group. This was deemed as being a desirable result, proving the reliability of the instrument.

It was clear that the results in the post-test prove better consistency than those in the pre-test. These scores indicated that the pre-test data could be seen as 98% reliable and 2% unreliable. The post-test data could be seen as 99% reliable and 1% unreliable.

4.9 CONCLUSION

The aim of data analysis was for the researcher to determine whether the data provided the information needed to achieve the goals and aims of the study (Hofstee, 2010:184). Single variable descriptive statistics (mean and standard deviation) gave insight into the pre- and post-test intervention scores. To assess the internal consistency and the reliability of the scores for the pre-test and post-tests, alpha coefficients for each test was computed. Statistical analyses were conducted to assess the criteria and to construct validity. The internal reliability of the instrument was evaluated via Cronbach's alpha, using the test group's pre-test and post-test scores. Concluding remarks will be discussed in Chapter 5.

CHAPTER 5

SUMMARY AND RECOMMENDATIONS

5.1 Introduction

Reflection on the hypothesis: after students have participated in a creative intervention program, higher thinking skills will be developed**.**

It was evident, that after the implementation of the intervention program the thinking skills of the subjects had improved. They were able to generate many more ideas that were flexible and original. In order for participants to solve the problems efficiently they needed creative skills.

Therefore, if learners are able to solve problems and generate more ideas independently teachers would find their teaching easier and more rewarding.

The results of the test-group, clearly showed the following after implementing an intervention programme to enhance creativity within young learners:

1. Positive growth after the implementation of the creative program.
2. Improvement in the creative abilities in originality, fluency and flexibility.
3. They had developed their divergent thinking skills and were now able to generate relevant ideas from a concept.
4. Acquired questioning skills that helped them ask for more information so as to solve a problem.

In contrast the control group's results clearly showed the following after receiving no intervention program to enhance their creativity.

The control group results:

1. Minimal growth in relation to the test group.
2. Indicated a lack of creative skills.
3. Did not have enough creative stimulation in their current educational system.
4. Had limited questioning skills.
5. Was not able to apply divergent thinking skills and had less relevant ideas than expected.

5.2 Conclusions and recommendations

This research touched on a variety of interesting and unsolved areas in the field of creativity in the reception year, for example, the role played by cultural diversity in the development of creative skills; creativity in the present formal curriculum; and the opportunities for creative learning in reception year learners. Topics such as these require further investigation and research in order to better understand the field of creativity in the reception year.

According to Mc William, the following should be done in the classroom to generate more creative learners, (2008:263):

- Less time spent in giving instructions and more time being a useful co-worker in the thick of the action.
- Less time spent on being the custodial risk minimiser and more time on being the experimenter and risk taker.
- Less time spent being a forensic classroom auditor and more time on being a designer, editor and assembler.
- Less time spent being a counsellor and "best buddy" and more time on being a collaborative critic and authentic evaluator (McWilliam 2008:264)
- Placing greater emphasis on an experimental culture of learning.
- Increasingly demanding combinations of "creative" skills and abilities and understanding the capacity to learn and reproduce appropriate social behaviours, are no longer the key to success.

The following discussion looks briefly at the environment the researcher recommends is needed for creativity in the reception year.

5.2.1 The environment

A stimulating environment needs to be created for children, as children learn when they are in a rich environment. Creative skills such as originality should be implemented in their everyday lives. Children also need to solve problems to enhance their thinking skills.

The learning environment should allow children to explore and discover the world around them. Therefore, children should spend more time outdoors exploring their environment. Activities like gardening, pottery and free drawing enhance children's skills so that they can create in an original way.

5.2.2 The reception year

The reception year classroom needs to be a multi-creative programme in itself. Children should focus more on 3D materials and the implementation of fluency, originality and flexibility during activities. They should be taught that there is more than one way to acquire creative skills, and it is most certainly not by using photocopied worksheets or fixed outcome activities created by the educator.

Language and mathematics are learned through using the senses. By involving these senses to enhance learners' creative skills, learners will be able to apply skills such as flexibility more easily. It is also important for children to move while they are learning. Physical movements stimulate the brain and enhance opportunities for children to think more flexibly, fluently and originally.

According to Runco (2000:168) "...creative things are original, but also fitting, useful, somehow appropriate..." With these words in mind educators can create an environment for children to be creative.

Learners need to have time during the day to use their imaginations to create and explore. It is important to expose learners to activities where they play without toys using only equipment (such as pillows, blankets and poles) which they have to improvise with. This enables learners to think that real life problems are solved with ordinary solutions.

By harnessing nature, learners gain knowledge that cannot be obtained from books. Learners that breed silk worms or hatch eggs have to be creative and able to solve problems.

5.2.3 Encouragement of children's creative abilities

During the reception year children should be encouraged to ask more questions. The "what if" question should be implemented as an integrated activity. They should also be more exposed to fantasy play. In order to develop creative skills product improvement and the many uses of an object are important concepts for the reception year child.

According to Sak (2003:214) a teacher who wants to teach creative children needs to reflect three aspects namely, the right personality (for example openness), intellectual (for example creativity), and knowledge prerequisites (for example instructional knowledge.

5.2.4 Appropriate training models

For the above recommendation to be sustainable it is important to ensure that staff working with the children understands the value of creativity. More appropriate training would ensure more creative qualified staff in the system.

Practical manuals, workshops on creativity, as well as its value and implementation are needed. Also needed are practical, affordable apparatus that can be made available, at minimal cost, to all community sectors of our country.

5.3 SUGGESTIONS FOR FUTURE RESEARCH

A suggestion for further research is for instance: What is the impact of culture on creativity? Culture is one of the determining factors that have great impact on social, emotional cognitive and physical development in the young child. It may also have an impact on how the young child develops creative skills.

The benefits of a creative reception year in grade one is also suggested for further research. With regards to the necessity for creativity in the education system Mike Meyer gave the author the following written communication on 21 February 2011 in Pretoria. (Original notes are in possession of the author).

WHY IS IT IMPORTANT TO BE CREATIVE?

"What comes to mind is that an artist or writer would benefit by being creative. However, if a larger field is considered then any creative thinking contributes to the outcome of a discussion or negotiation.

In fact, in business it is estimated that 70% of the working time of a manager is used to negotiate and that creativeness is a major factor needed in the negotiation

Therefore creativeness is important in the work place. In the de Lange report it was stated that a major weakness in the education system is that management skills are sadly lacking. The question is has this position improved or is there still a need for improvement?

It would seem that there is a need for improvement. It is hoped that if the need for creativeness in education it would spill over to the whole education system and solve some of the management problems in the education system".

From the above communication the suggestion also arises for further research with regards to the limitations of non-creative teacher training.

5.4 SHORTCOMINGS OF THE RESEARCH

There were a few shortcomings regarding this research namely the financial implications, the availability of subjects to participate in the study and trained teachers to help implement a creative program.

These shortcomings could be minimised by training teachers in advance to help implement and collect the data, under the supervision of a creative program.

5.5 CONCLUDING REMARKS

By implementing a program to develop creativity, the educator strives to equip children with better skills that can benefit them in their education as well as in all other aspects of their lives. The reception year child is at the beginning of his/her educational career and needs all the creative stimulation he/she can get.

During this study the relevance of creative skills were discussed, as well as proven in the data analysis. Creativity is an on-going phenomenon. Once the child discovers his/her creative strengths, new and exciting opportunities are available. The child is then able to live a rich life of endless possibilities, with better thinking and creative skills, and better coping abilities.

The opportunities to enable the child to achieve the above are in the hands of adults and more specifically in that of teachers. Teachers are in the position to enhance children's creative skills as well as their own. This brings us back to the research hypothesis: after students have participated in a creative intervention program, higher thinking skills will be developed**.**

One way of enhancing teaching satisfaction is by enhancing student achievement. The researcher proposes that student achievement be promoted by enhancing the students' creative skills and abilities so that they may respond more appropriately to teaching. This can be achieved by implementing a creative programme, especially in the early childhood years, which would enable children to progress and develop their individual skills.

REFERENCES

Anonymous. 2003. Scholastic early childhood today. *Solve it outdoors*, 17(8): 26-27.

Anonymous. 2003. Scholastic parent and child. *Child development creative mile stones* 10(6): 42.

Antionites, A.J. 2003. *An action learning approach to entrepreneurial creativity, innovation and opportunity finding*. Pretoria: University of Pretoria.

Baron, R.A., Byrne, D. Branscombe, N.R. 2006. *Social Psychology*. United States of America: Pearson Education, Inc.

Beetlestone, F. 1998. *Creative children imaginative teaching*. Great Britain: St Edmundsburg Press Ltd.

Black, R. A. 1995. *Broken Crayons*. Athens: Creating Places Press.

Botha, V.A. 1999. *The assessment of creativity*. Pretoria: University of South Africa.

Bruce, T. 2007. *Cultivating creativity in babies, toddlers and young children*. London: Hodder Education.

Buzan, T. 2001. The *Power of Creative Intelligence*. London, Great Britain: Thorsons an imprint of Harper Collins Publishers.

Buzzan, T., Buzane, B. 2007. *The mind map book*. Harlow: Pearson.

Chambers-Macmillan. 1996. *South African Dictionary*. Manzini: Macmillan.

Cochrane, P. and Cockett, M. 2007. *Building a creative school: a dynamic approach to school development*. Westview: Trentham Books.

Crim, C. 2006. Parenting for High Potential. *Raising the creative child*. Washington Jun: 26-29.

Davis, A.G. 2004. *Creativity is forever*. Madisson: Hut Publishing.

De Witt, M. 2009. *The young child in context*. Pretoria: Van Schaik.

Diamond, M., Ph.D, Hopson, J. 1998. *Magic Trees of the Mind*. England: Dutton

Dombro, A.L., Colker, L.J. and Dodge, D.T. 2000. *The creative curriculum for infants and toddlers*. Washington: Teaching Strategies.

Drew, W. F., Rankin, J. 2004. YC Young Children. *Promoting Creativity for Life Using Open-Ended Materials*, Washington 59(4): 38-45.

Duffy, B. 2006. *Supporting creativity and imagination in the early years*. 2nd Ed. Bershire: Open University Press.

Eckhoff, A. Urbach, J. 2008. Early childhood education journal. *Understanding imaginative thinking during childhood: sociocultural conceptions of creativity and*

imaginative thought, New York 36(2): 179-185

Ellis, S., Lawrence, B. 2009. The *influence of the creative learning assessment (CLA) on children's learning and teacher's teaching*. Literacy, 43, 3 – 10.

Faber, R., Van Staden, C. 1997*. The reception year before school: a year of learning*. Sandton: Heineman Higher and Further Education.

Fehr, M.C., Fehr, D.E. 2010. *Teach Boldly*. New York, U SA: Peter Lang Publishing.

Frith, K., Whitehouse, D. 2009. History of Education Review. *Designing learning spaces that work: a case for the importance of history*, 38(2), 94-108. Available from: Oasis
UNISA: <http://0search.informit.com.au.oasis.unisa.ac.za/fullText;dn=180972;res=A EIPT ISSN: 0819-8691> [Accessed: 5 February 2011].

Fryer, M. 1996. *Creative teaching and learning*. London: Paul Chapman Publishing Ltd.

Goobich, J. 2009. School Arts. *There's more to color than red, yellow, and blue*. Needham 109(2): 16

Gordon, A.M., Browne, K.W. 2008. *Beginnings and beyond: Foundation in early childhood*. 7th edition. New York: Thomson Delmar Learning.

Gribbons, Barry and Herman, Joan (1997). True and quasi-experimental designs. *Practical Assessment, Research and Evaluation*, 5(14) <http://pareonline.net/getvn.asp?v=5andn=14> [Accessed: 10 February 2011]

Hargreaves, J. 2008. *Risk: the ethics of a creative curriculum*. Innovations in Education and Teaching International, 45: 227 – 234

Harris, J.R., Liebert, R.M. 1992. *Infant and child development from birth through middle childhood*. New Jersey, United States of America: Prentice – Hall, Inc.

Hellbrügge, T., Von Wimpffen, J.H. 2002. *The first 365 days in the life of a child*. Pretoria: CTP.

Hofstee, E. 2010. *Constructing a good dissertation.* Sandton: Interpak books (Pty).

Houtz, J.C. 2003. *The educational psychology of creativity*. NJ, United States of America: Hampton Press Inc.

http:// thefreedictionary.com/aptitude   [Accessed: 21 September 2010].

http://dictionary.cambridge.org/dictionary/british/product [Accessed: 21 September 2010].

http://en.wikipedia.org/wiki/Cronbach's_alpha [Accessed: 12 February 2011].

http://en.wikipedia.org/wiki/Neocortex [Accessed 26 February 2011].

http://en.wikipedia.org/wiki/Problem_solving [Accessed: 22 February 2011].

http://en.wikipedia.org/wiki/Problem_solving [Accessed: 22 February 2011].

http://en.wikipedia.org/wikioxford_English_Dictinary [Accessed: 21 September 2010].

http://faculty.washington.edu/chudler/dev.html [Accessed: 21 January 2011].

http://jalt.org/test/bro_13.htm [Accessed: 17 February 2011].

http://jumpstarttulsa.com/brain_development.htm [Accessed: 21 January 2011].

http://oxforddictionaries.com/view/entry/m_en_gb0400790#m_en_gb0400790 [Accessed: 22 February 2011].

http://oxforddictionary.com/view/entry [Accessed: 21 September 2010].

http://redorbit.com/news/health [Accessed: 21 January 2011].

http://www.ama-assn.org/ama/pub/physician-resources/patient-education-materials/atlas-of-human-body/brain-effects-stroke.shtml [Accessed: 26 February 2011].

http://www.brainchild-indonesia.com/bcl/course.php [Accessed 27 February 2011].

http://www.buzzle.com/articles/brain-development-in-the-early-childhood.html [Accessed: 5 February 2011].

http://www.csulb.edu/~wsating/ppa696/696 quasi.html [Accessed: 10 February 2011].

http://www.news-medical.net/health/The -Human-Brain [Accessed: 21 January 2011].

http://www.socialresearchmethods.net/kb/reltypes.php [Accessed: 12 February 2011].

http://www.toolingu.com/definition-800220-35806-mean.html [Accessed: 19 February 2011].

http://www2.sas.com/proceedings/sugi26/p246-26.pdf [Accessed: 12 February 2011].

Hutchinson, W.L. 1993. *Creative and productive thinking in the classroom*. Michigan: U.M.I. Dissertation Services.

Isenberg, P.J. and Jalongo, R.M. 1993. *Creative expressions and play in the early childhood curriculum*. New York: Macmillan Publishing.

Jalongo. R, M. 2003. Childhood Education. *The child's right to creative thought and expression*, Olney 79(4): 218-228.

Kaiser, J. 1995. *The roots of creativity*. The Netherlands: Eburon Publishers.

Kaufman, J.C., Baer, J. 2005*. Creativity across domain*. New Jersey, United States of America: Laurence ERLbaum Associates, Publishers.

Landsberg, E., Kruger, D., Nel, N. 2008. *Addressing barriers to learning*: a South African perspective. Pretoria: Van Schaik.

Leaf, C. 2005. Skakel jou brein aan. Kaapstad: Tafelberg uitgewers.

Lim, H.S., Choi, J.N. 2009. Social Behaviour and Personality. *Testing an alternative relationship between individual and contextual predictor of creative performance*, 37(1), 117-136.

Longo, C. 2010. *Fostering Creativity or Teaching to the Test?* Implications of State Testing on the belief of Science Instruction. The clearing House, 83, 54 – 57.

Louw, D.A., Van Ede., D.M. Louw, A.E. 2003. *Menslike ontwikkeling 3de uitgawe*. Kaapstad en Midrand SA: Kagiso Tersier.

Lubawy, J. 2008. Association for Computing Machinery. *Strong foundations mean strong constructions*, 13(3), 12-15. Available: <http://0search.informit.com.au.oasis.unisa.ac.za/fullText> [Accessed 05 February 11].

Malmivuo, J. Plonsey, R. 1995. Bioelectromagnitism: *principles and applications of bioelectric and biomagnetic fields.* New York: Oxford university press www.bem.fi/book/00/tx.htm [Accessed: 26 February 2011].

Mayesky, M. 2002. *Creative activities for young children*. 7th edition. New York Delmar Learning.

Mc William, E. 2008*. Unlearning how to teach*. Innovations in Education and Teaching International, 45(3): 263 – 269

McClure, M. 2011. Studies in Art Education. *Child as totem: redressing the myth of inherent creativity in early childhood*. Reston 52 (2): 127-141.

McMillan, J.H. Schumacher, S. 2006. Research in education 6th edition: evidence~based inquiry. USA: Pearson education Inc.

Meador, K.S. 1997. *Creative thinking and problem solving for young learners*. Englewood, Colorado, United States of America: Teacher Ideas Press.

Meyer, M. 2011. Written communication with N.van Jaarsveldt on 21 February. Pretoria. (Transcript in possession of N. Van Jaarsveldt, The ring 14, Lynorame 16, Lynwood, 0081, Pretoria).

Michalko, M. 1998. The Futurist. *Thinking like a genius: eight strategies used by the super creative, from Aristotle and Leonardo to Einstein and Edison*, Washington. 32(4): 21-25.

Milbrath, C. 1998. *Patterns of Artistic Development in Children*. Cambridge, United Kingdom: Press Syndicate of the University of Cambridge.

Mildrum, N.K. 2000. The education digest. *Creativity reigns in the regular classroom*, 66(1), 33-38.

Mitchell, A. 2006. YC young children. *Our future, our children's future*. Washington, 61 (6): 6-8.

Mitchell, L.C. 2003. YC young children. *Making the most of creativity in activities for young children with disabilities,* 59(4): 46-49.

Neethling, K., Rutherford, R. 2001. *Am I clever or am I stupid?* Vanderbijilpark: Carpe Diem.

Ogle, R. 2007. *Smart World, Breakthrough Creativity and the New Science of Ideas*. Boston, Massachusetts: Harvard Business School Press.

Pieterse, M. 2006. *Reg vir Groot Skool*. Welgemoed: Metz Press.

Piirto, J. 1992. *Understanding those who create*. Dayton: Ohio Psychology Press.

Rickards, T., Mark, A.R. Mager, S. 2009. *The Routledge companion to creativity*. New York: Routledge. Available from: < books.google.co.za> (Accessed: 26 January 2011)

Ruggiero, V. R. 1998. *The art of thinking*. United States: Addison-Wesley Educational Publishers Inc.

Runco, M.A. 2001. Roeper review. *Modes of thinking in young children/the talented*. Bloomfield hills, 23(3), 167-168.

Ryhammar, L., Brolin, C. 1999. Scandinavian journal of educational research. Creativity research: historical considerations and main lines of development, ProQuest psychology journals 43(3): 259-273.

Sak, U. 2004. Roeper review. *About creativity, giftedness, and teaching the creatively gifted in the classroom*. Bloomfield hills, 26(4), 216-222.

Schreck, M.K. 2009. *Transformers, creative teachers for the 21st century*. California, U.S.A: Corwin, A SAGE Company

Smith, G.J.W., Carlsson, I.M. 1990. *The creative process*. Connecticut: International Universities Press, Inc.

Starbuck, D. 2006. *Creative teaching getting it right*. London: Continuum International Publishing Group.

Sterling Honig, A. 2001. Scholastic early childhood today. *How to promote creative thinking*, New York 15(5): 34-40.

Sternberg, R.J., Jarvin, L., Grigorenro, E.L. 2009. *Teaching for wisdom, intelligence, creativity and success*. California, United States of America: Corwin, A SAGE Company

Sung, S.Y. Choi., J.N. 2009. Social behaviour and personality. *Do big five personality factors affect individual creativity?* The moderating role of extrinsic motivation, 37(1): 941 – 956.

Sweller, J. 2009. Educational Psychology Revaluation. *Cognitive bases of human creativity*, 21, 11 – 19.

Talor, I.A. and Getzels, J.W. 1975. *Perspectives in creativity*. Chicago: Aldine.

Torrance, E.P. 1994. *Creativity: just wanting to know*. Clubview: Benedic Books.

Treffinger, D. 2006. Parenting for high potential. *Talent, creativity, and Success*, Washington: Jun. 31.

University of Indiana. (n.d.) *The torrance tests of creative thinking theory, research, practice*. Available from: <http://www.indiana.edu/-bobweb/cretv 6.html> [Accessed 05 July 2011].

Woolfolk, A. 2007*. Educational psychology 10*[th]*edition*. Boston, United States of America: Pearson Education Inc.

LIST OF APPENDICES

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APPENDIX E: Control group T-test

APPENDIX F: Control group pre and post-test means
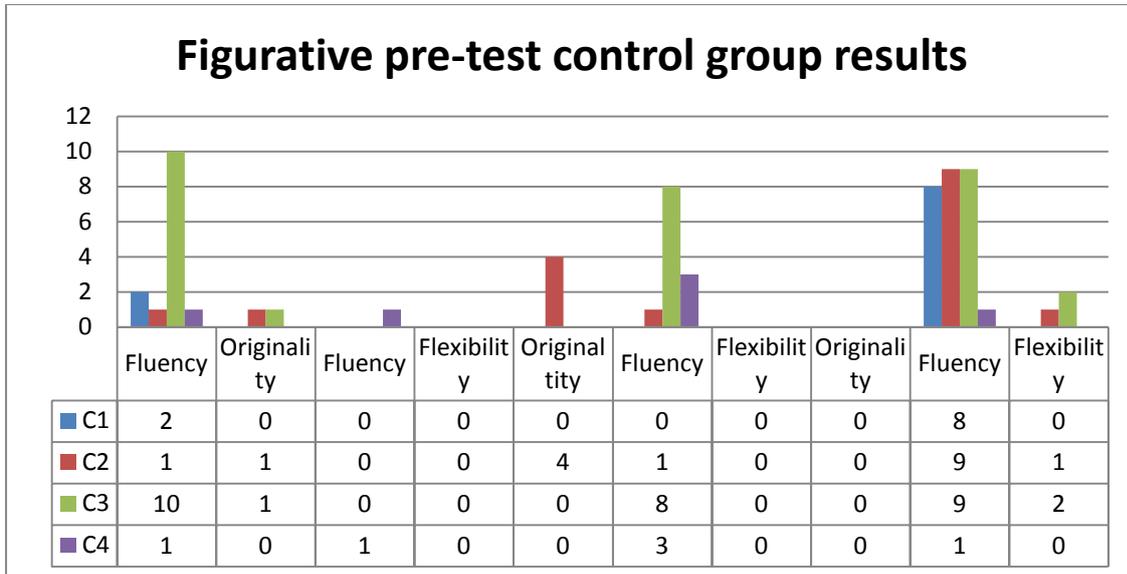
APPENDIX G: Graphic mean values and standard deviation

APPENDIX H: Subjects informed consent letter

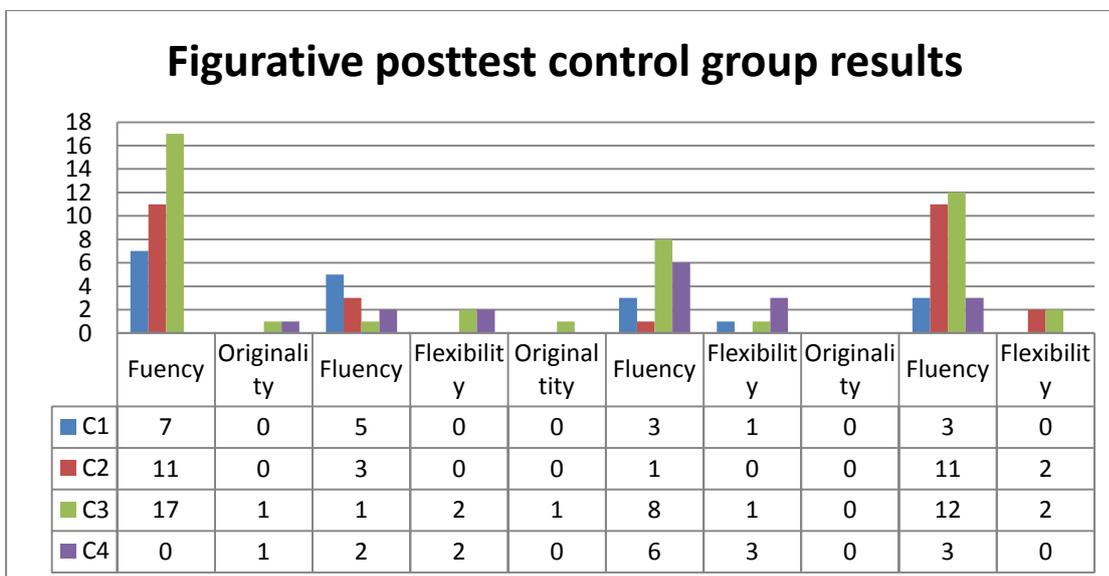**APPENDIX   I:** Example of the TTCT figurative pre and post-test

APPENDIX J: Example of the TTCT verbal pre and post-test
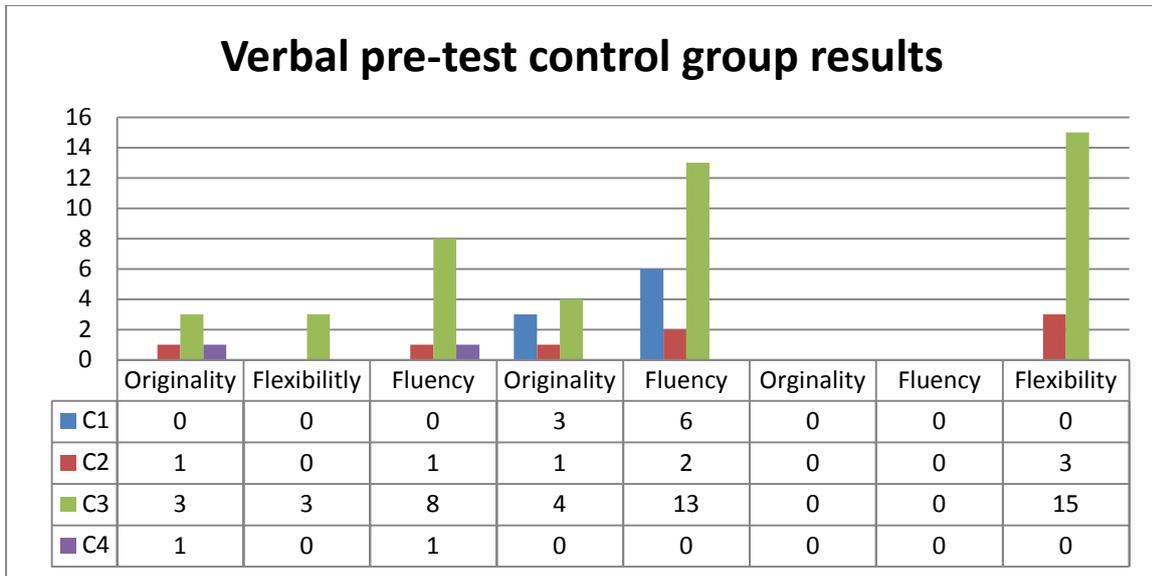
APPENDIX K: Confirmation of language editing
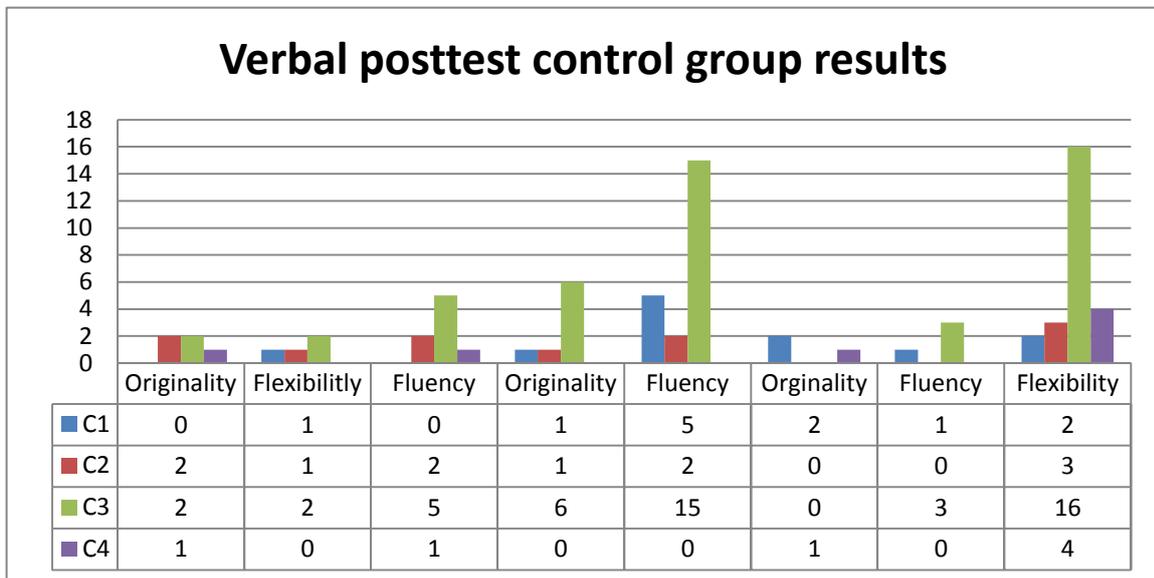
Figurative pre-test control group results

	Fluency	Originality	Fluency	Flexibility	Originatity	Fluency	Flexibility	Originality	Fluency	Flexibility
C1	2	0	0	0	0	0	0	0	8	0
C2	1	1	0	0	4	1	0	0	9	1
C3	10	1	0	0	0	8	0	0	9	2
C4	1	0	1	0	0	3	0	0	1	0

APPENDIX B: Figurative post-test control group results

Figurative posttest control group results

	Fuency	Originality	Fluency	Flexibility	Originatity	Fluency	Flexibility	Originality	Fluency	Flexibility
C1	7	0	5	0	0	3	1	0	3	0
C2	11	0	3	0	0	1	0	0	11	2
C3	17	1	1	2	1	8	1	0	12	2
C4	0	1	2	2	0	6	3	0	3	0

APENDIX C: Verbal pre-test control group results

Verbal pre-test control group results

	Originality	Flexibilitly	Fluency	Originality	Fluency	Orginality	Fluency	Flexibility
C1	0	0	0	3	6	0	0	0
C2	1	0	1	1	2	0	0	3
C3	3	3	8	4	13	0	0	15
C4	1	0	1	0	0	0	0	0

APPENDIX D: Verbal post-test control group results

Verbal posttest control group results

	Originality	Flexibilitly	Fluency	Originality	Fluency	Orginality	Fluency	Flexibility
C1	0	1	0	1	5	2	1	2
C2	2	1	2	1	2	0	0	3
C3	2	2	5	6	15	0	3	16
C4	1	0	1	0	0	1	0	4

APPENDIX E: Control group T-test

	X1	X2	M - differences	Sum of square differences
Fluency	118	79	39	1521
Flexibility	47	24	23	529
Originality	19	18	1	1

(t = 1.91; p$\square$ 0.02)

APPENDIX F: Control group pre - and post-test means

Pre-test Control group	x	M	SD	n
Fluency	79	19.75	9.09	4
Flexibility	24	6	1.15	4
Originality	18	4.5	0.28	4
Post -test Control group	**x**	**M**	**SD**	**n**
Fluency	118	29.5	14.72	4
Flexibility	47	11.75	4.47	4
Originality	19	4.75	0.42	4

APPENDIX G: Graphic mean values and standard deviation

Control group
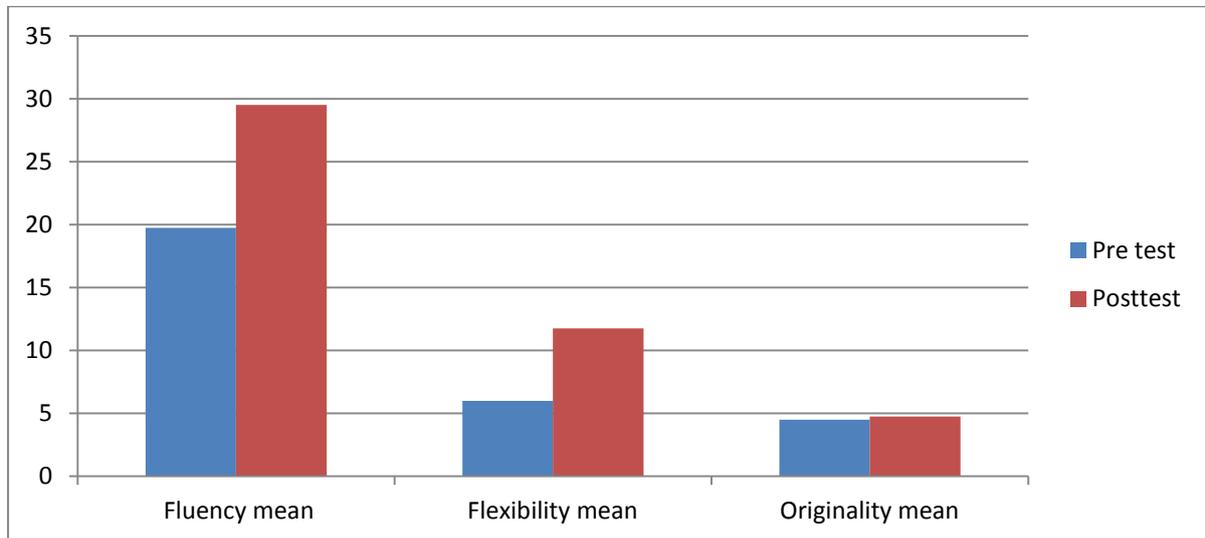
Test group
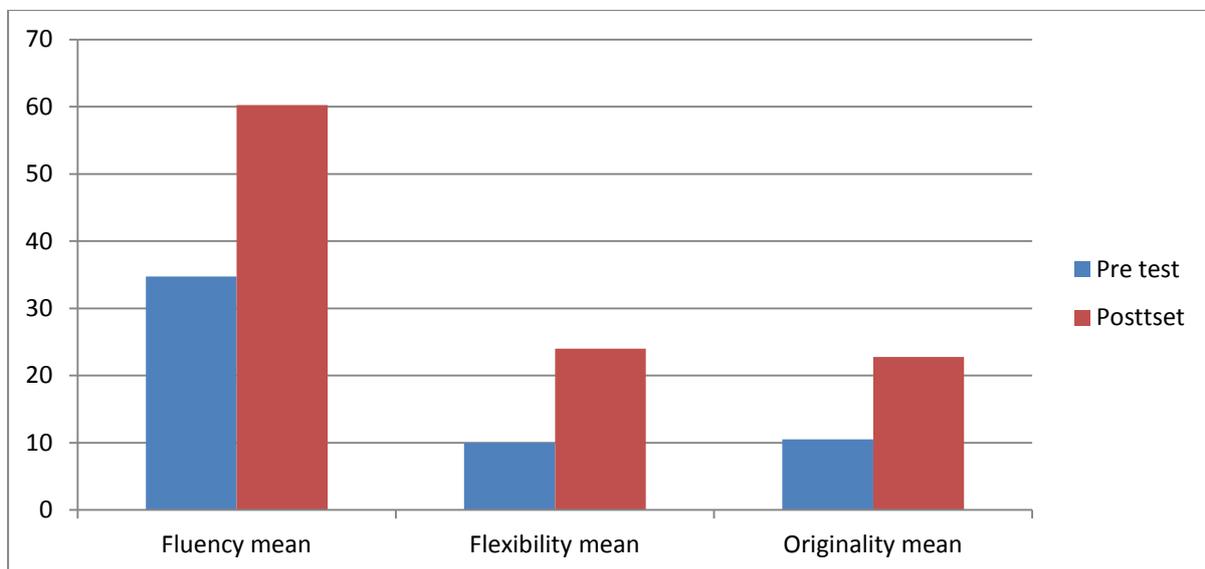
APPENDIX H: Subjects' informed consent letter

7 December 2010

Dear participant,

Thank you for participating in a Masters Research project. The researcher Nicolene van Jaarsveldt is conducting her research in the field of Psychology of Education. The research strives to accommodate teachers in a diverse classroom and also to improve teaching methods.
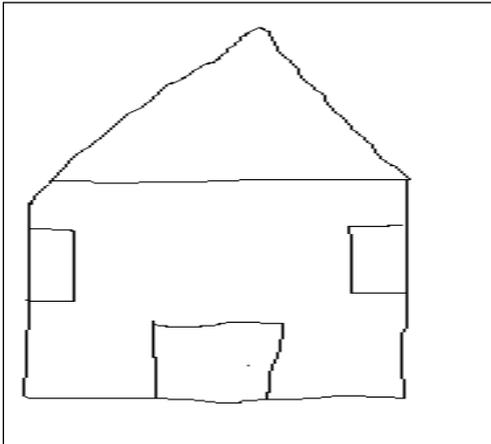
PRIVACY DOCUMENT

I hereby give the researcher Nicolene van Jaarsveldt the right to use my brain profile for educational research purposes. I also understand that my personal details will not be used and that all data will be used anonymously.
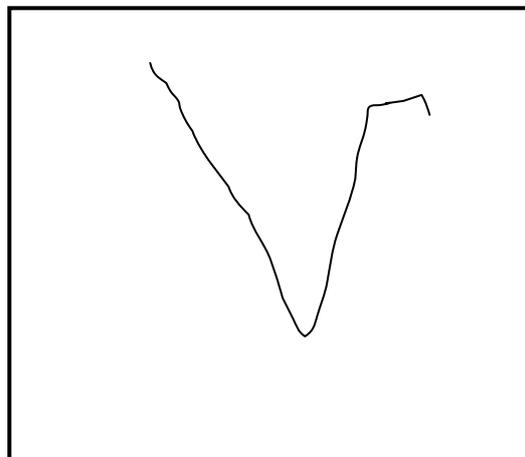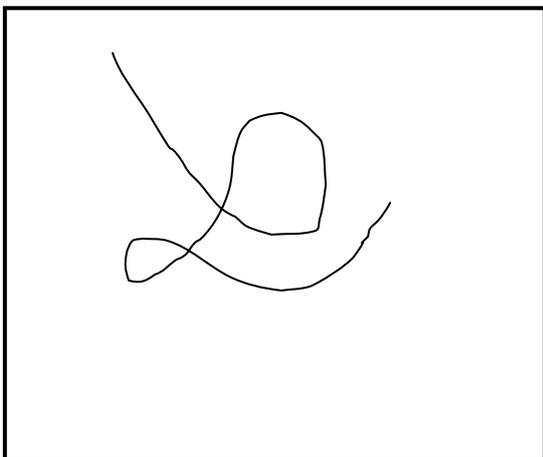
Name of participant:

_____

Signature:

_____

Activity one: Complete the following picture adding as much detail as you can. You have 3 minutes.


Activity two: Add lines to the incomplete figures below to make pictures out of them. Try to tell complete stories with your pictures. Give your pictures titles. You have 3 minutes.

Activity 3: Complete the following in a purposeful way. You have 3 minutes.

_____   _____   _____   _____

_____   _____   _____   _____

Activity 4: Add details to the shapes below to make pictures out of them. Make the circle a part of the picture you make. Try to think of pictures no one else will think of. Add details to tell complete stories with your pictures. Give your pictures titles. You have 3 minutes.
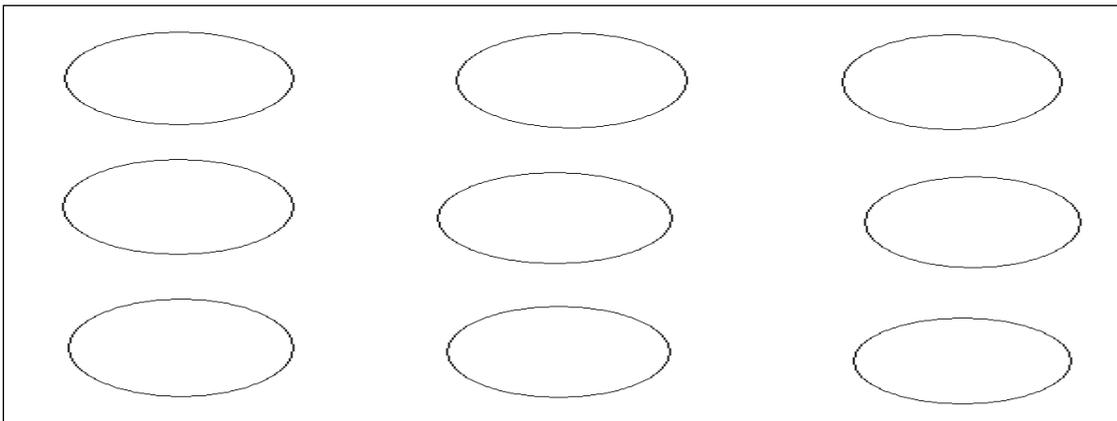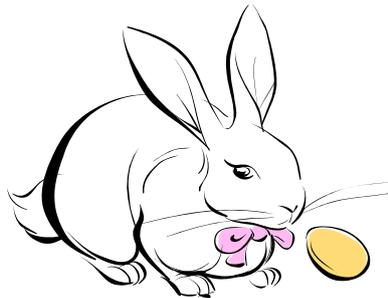
APPENDIX J: Example of the TTCT verbal pre and post-test

Activity one: Ask as many questions as you can about the picture. Work for 3 minutes.

Activity two: Try to improve this stuffed toy so that it will be more fun to play with. Work for 3 minutes.

Activity 3: How many different uses can you think of for a spoon?

List as many ideas as possible. Work for 3 minutes.

_____

_____

Activity 4: What if you could be a Christmas tree. What might some of the things be that you would do? Work for 3 minutes.

_____

_____

APPENDIX K: Confirmation of language editing

DECLARATION

Date: 25 February 2011

Thesis: Creativity as a crucial process in the development of the young child
Student: N.van Jaarsveldt
Student number: 4162214
Degree: Master of Education, University of South Africa
Subject Psychology of Education
Supervisor: Prof. M.W De Witt

I, Lynette Fish hereby declare that I have proof read (language) the above thesis.

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