THE FACILITATION OF CREATIVE PROBLEM SOLVING SKILLS FOR LEARNERS IN FURTHER EDUCATION AND TRAINING

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SUMMARY

The aim of this study is to identify a teaching strategy which can enable Further Education and Training learners to enquire creative problem solving skills. A programme was formulated to this effect. Four sessions were conducted to the subject of study using facilitation as teaching method. Facilitation engages learners actively in learning activities when compared to traditional and old teaching methods. Participants were engaged in different activities which enable the participants to use creative problem solving skills. At the beginning of the programme, the participants were not as active as towards the end. Based on the creativity that the participants displayed towards the end of the programme, the researcher concludes that the participants were able to acquire creative problem solving skills.

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CHAPTER ONE

INTRODUCTORY ORIENTATION

1.1 INTRODUCTION

Career patterns are (or were) traditionally associated with certain organisations, and people following particular kinds of careers used to be employed by specific organisations for a whole lifetime. Now the opposite tends to happen and organisations are proving to be more and more reluctant to establish permanent relationships with their employees. Organisations find they are unable to guarantee positions or predict what particular skills they will need in the future. These factors tend to create a situation in which organisations tend to prefer to have temporary relationships or associations with their employees or contractors. In such a situation, educational goals have to change for people to adapt themselves to the changing world (Schreuder, 1997:12).

In order to achieve these goals, education as a discipline requires educators, in particular, to adjust themselves to these changing developments – and in particular to changing teaching and learning methods. Both teaching and learning strategies can be designed and modified so that learners can acquire skills that are relevant to the organisations they will encounter in their future careers. An ability to choose the relevant strategies depends on an array of factors, including the environment, the number of learners who need to be taught, expertise, and the knowledge that the educator should have of subject content.

What has been said above highlights the fact that particular situations require specific learning strategies. A learning strategy should not be chosen for its own sake but rather because it will allow the learner to undergo a successful learning experience. Learners will benefit from a strategy that is comprehensive and that enables them to cope in a variety of situations – even those they encounter outside the classroom. Learning about new strategies is part of the aim of education. The aim of education is to develop learners to become better adults. An adult who knows how to read and write appropriately will be a more competent person because he or she will be able to exercise the appropriate skills that are demanded by the situation (Murphy, 1989:61).

Schreuder (1997: 12) describes the situation that obtains between modern organisations and their employees (outlined in paragraphs above), and shows how education has a role to play. Education has to make learners more skilled and competent people so that they can adjust to their situations. Because the kinds of skills and positions that will be important in future are very difficult to predict, appropriate life skills have to be taught to learners now.

Which learning strategy can therefore be used to analyse learning tasks for the learner? The researcher is convinced that *facilitation* is the primary learning strategy that is needed. This learning strategy will be used in this study to enable the selected learners to acquire basic life skills. Education will then mean *developing learners so that they will ultimately be sufficiently skilled and competent adults to survive in a rapidly and challenging environment*. Core life skills will be taught to learners to prepare them for life. The aim of educating the developing child into an adult will be fulfilled.

The learning strategy that the researcher will put into practice during this study is *facilitation*. The purpose of this study is to develop a programme to assess if learners can acquire creative problem solving skills by means of facilitation . Creative problem solving skills will then be taught to FET learners during different session of the programme. The learners have to acquire creative problem solving skills so that they can be independent, able to do their school work on their own and even confidently solve problems with which they are confronted. Creative problem solving skills encourages enthusiasm, helpful attitudes and divergent thinking.

1.2 AWARENESS OF THE PROBLEM

We are living in a rapidly changing society in which our currency (the rand) is depreciating on a daily basis. This situation is aggravated by AIDS/HIV infections, which are widespread amongst adolescents. The police also arrest an increasing number of adolescents during the course of their work every day. Education should find ways of helping learners who are affected by such problems and situations (Sunday Times Magazine 162/2000:6).

One of the most notable issues in the education sector is the poor performance by matriculation candidates. In 1999, the pass rate was 51% in the whole country, while in the Zeerust District, only 47,2% passed (Zeerust District Matric Result Analysis, 1999).

How can learners be empowered to increase their performance capabilities? How can education help to reduce the rate of drug and alcohol abuse, and sexual misconduct? Through

the researcher's contact with high school learners on a daily basis, it became evident to her that more and more diverse skills are being taught to learners in order to make them adapt to their situations and problems when they would benefit much more if they were first taught active adaptability skills. *Active adaptability* is the ability to analyse possible choices and consequences before acting and the ability to adapt to change even when the initial event appears to be negative (Reece, 1990: 392). Active adaptability enables the individual to find positive ways of adapting and adjusting and of being in control rather than being controlled by change. Learners can be empowered if they are taught life skills that increase their capacity for active adaptability, i.e. creative problem-solving skills

Most parents of young people have left home to look for work in urban areas. The phenomenon of so-called migrant labour has forced young and inexperienced teenagers to take care of their siblings. There are no parents who can act as role models in most families. Children grow up without knowing what is morally good or wrong. Because of this, the child ends up performing socially unacceptable acts in order to be accepted by his or her peers and because he or she has no better role models for adolescent and adult behaviour. Most of these families come from farms and are used to a life of hardship and they do not distinguish between the roles of children and those of parents. Because parents who live in a rural village have different views about life in general, they cannot provide their children with good advice about urban problems and advise their children on how to protect themselves in dangerous urban situations where education is poor and the crime rate high.

Most parents in communities are uneducated and unemployed. Those who are employed are semi-skilled and earn very little. These parents cannot therefore afford to support their children or give them a better quality education. Many children go for days without even porridge to eat. Their cognitive development is often poor because they have never had any intellectual enrichment or stimulation inside their homes.

Such children are not prepared to benefit from school teaching since their basic necessities and needs are not met. Some children even steal food and other valuable objects to sell in order to earn a living.

Living a long distance from a school may cause a child to arrive tired at school and to perform badly in schoolwork. This may cause children to be absent from school, to fall pregnant, to withdraw from school (drop put), play truant and run away from home so as to avoid attending school

The impact of these factors in the total environment are determinants of the learner's behaviour. The school has to help the parents and significant others to deal effectively with development tasks. Skills necessary for the learners to survive in life can be reinforced in the school situation.

1.3 ANALYSIS OF THE PROBLEM

The research problem will be analysed from the background information and relevant literature survey. The information thus obtained will enable the reader to understand the context in which the study is made.

1.3.1 Context of the study

The different perspectives from which the study is conducted will be discussed. The system perspective will be explained. Firstly, the researcher will explain how the various changes that have taken place in South Africa necessitated a new education system. The changes in education made it possible to implement new approaches to learning and teaching. New approaches to learning skills and multi-skills approaches will be briefly discussed below.

1.3.2 System approach

The changes undergone by South Africa when it became a democratic state can be viewed from a system perspective. South Africa as a system consists of elements or subsystems, which are interdependent. All subsystems should be fully functional in order to sustain the whole system. The survival of a system also depends on the ability to adapt to the demands of its environment (Evancevich, 1996:24).

Subsystems, like religion, health and education, support the state in its attempts to provide people with better quality lives. When the system of government changed in 1994, all institutions had to change in order to become fully functional.

As part of the new government's endeavour to provide a better life for all in the long run, the South African Schools Act was passed in 1996. In terms of this act, learners are defined as creative beings who assist in formulating the code of conduct in their schools. Learners are legitimate members of school governing bodies, and they play an active part in the process of school governance. The school governing body also plays a major role in the overall governance of and policy making for each school.

Changes have also taken place in society's values. Such changes have been inspired by a human rights culture in South African society. Our nation's new human rights culture means people want to be treated with fairness and justice (McQuid Mash, 1991:8). Learners are therefore socialised by society to treat people equally.

Society discourages the kinds of legitimised violence that was used to solve problems under the old regime. Corporal punishment has been abolished in South African school. Educators are now obliged to use more humane ways to instil and maintain discipline in schools.

Globalisation has involved South Africa in international and economic competition. There is a need to develop products to match international standards. A diverse work force means that new approaches to human resources management have to be developed. Learners have to be prepared to deal with diverse populations. Creative problem solving skills need to be acquired to ensure the future survival of our workforce in the international arena (Solomon, 1996:600). Education as a subsystem has to support the state as the central unifying system. South African education before 1994 was too bookish and gave few opportunities to learners to explore content taught. Changes in education have entrenched learner participation in learning. This means that activities in learning have shifted from being educator-centred to be learner-centred (North West Policy Otcome Based Education Policy document).

Creative problem solving encourages the active participation of learners and makes learning the responsibility of *both* the learners and the educators.Education has to adapt to changes in order to sustain the systems that are *South Africa*, the *learner* and the *educator*. The country' survival in the global economy depends on the ability to teach core life skills. Creative problem solving can be taught in different ways and this will be discussed below.

1.3.3 Skill learning approach

Skill refers to a particular ability that develops from training and practice (Banyard, 1994: 279). Proctor (1995:40) describes a skill as a capacity or competence to successfully perform a task of some kind intellectually or manually. Different kinds of skills can be distinguished including coping skills for life, linguistics, social and intellectual skills.

A skill, unlike a talent, can be developed through training and practice. All the above-mentioned skills can be learnt through training. Practising to type on a computer keyboard as a manual/physical skill can empower a person to be able to produce a script by using

automatic movements – a skill that would have been very difficult before the skill practice began. Some skills can be learnt even if no formal instruction has been received. Drinking water without spilling any of it is a skill which can be learned without tuition.

The nature of skills enables learners to practise different kinds of skills that enable rapid and automatic responses to situations (Gallantly, 1986:20). The researcher will develop a programme within this context that will enable learners to acquire creative problem solving skills. Skill learning involves a series of tasks given to learners, tasks that the facilitator can adopt for successful teaching.

According to Banyard (1994:298), skill teaching involves, firstly, a set of sensory sequences that will enable a person to perform an action. When a person starts to learn a skill, the performance of that skill will not be as fast as after practice. The skill becomes faster and more automatic after a practice. The nervous system is involved in such processes and adjusts to the speed at which the response takes place.

Secondly, skills are learnt gradually and through reflected experience. Learning to drive a car does not take place at once, but one has to do it over and over again until appropriate response can be mastered. Experience of driving in heavy traffic and other driving skills improves the more one drives.

Lastly, skill learning requires the mastering of different processes or actions. The skill of driving should reflect a coordination between what the hands, the feet, the eyes and the mind are doing if effective driving is to take place.

Successful skill learning includes two features, namely, guidance and feedback (Rathus, 1990: 539). Feedback involves telling a person how effective his/her response in a situation has been. Feedback also means telling someone how one feels about something he or she has done or said. A person is able to adjust behaviour to attain a goal and thus be motivated to perform (Scermerhorn, 1991: 270). Feedback can be both intrinsic and extrinsic. Intrinsic feedback is task-oriented and enables the person to stick to the task – no matter how difficult it is. Intrinsic feedback is not task-oriented. Sometimes it is *immediate* and sometimes it is *delayed*. The facilitator can also use feedback in teaching.

The facilitator can also guide learners. Guidance involves directing a person to do what needs to be done. In the case of a learner who has to master a skill, the facilitator will demonstrate a

skill in order to assist the learne The learners will be able to acquire content that is relevant t[illegible] Therefore, the facilitator has to select content that will suit learners and guide them at the level at which they find themselves. Because this study is specifically based on acquiring skills of creative problem solving by the adolescent, the developmental level of adolescents will be taken into consideration. Chapter Two deals with the developmental level of the adolescents for such purposes. Content selected for presentation in the programme will take the context of skill learning into account. In learning skills, both feedback and guidance are important. Since this is important in learning skills, how can the facilitator ensure that guidance and feedback are properly given? The answer is "By being multi-skilled." This is discussed in the paragraph below.

1.3.4 Multi-skills approach

One of the educator's responsibilities is to manage and monitor both learning and teaching. To make this task less difficult the facilitator has to design a well-structured and effective lesson. The facilitator will then have to think of *multiple skills* that will make the lesson accessible and interesting. If educators use this strategy, learners will be able to learn, teaching will be effective and the task of the facilitator will be accomplished.

When teaching creative problem solving skills to learners, the researcher has to determine the content that the participants have to acquire, and then decide the method that will make the learning content accessible and actualise dynamic teaching and learning in an orderly manner (Louw, 1993: 36).

The researcher's first task when preparing for learning is that he or she has to determine the *content* that will be presented the participants. The choice made by the researcher will take into account the developmental level, environment and other factors that are crucial in learning. The learning content will be divided into appropriately sized components or segments that will be easy for learners to master.

When demonstrating the multi-skill approach, the facilitator has to set learning objectives. These are indicators of what the learners should achieve in terms of learning content in a short space of time (Louw, 1993:37). Slavin (1991:217) describes a model of the outcomes of learning, which can be pursued in instruction. The objectives for the different components that the learners can be expected to master are listed in Table 1.1. This model shows the different skills or learning outcomes the researcher can pursue by using a multi-skill approach during the facilitation of creative problem solving programme.

LEARNING OUTCOME	EXAMPLES OF PERFORMANCE MADE POSSIBLE BY THE CAPACITY
Verbal information	Describing the importance of creative problem solving
Intellectual skill	Showing how to perform a task
Discrimination	Distinguishing between concepts
Concrete concept	Identifying the concept
Defined concept	Classifying
Rule	Understanding rules such as "No one may leave prior to the end of the programme."
Higher order rule	Generate a rule for predicting misconduct that may occur during the programme
Cognitive strategy	Originating a novel plan to make an electrical kettle from material that has been supplied
Attitude	Choosing to work as a group rather than as a pair
Motor skill	Planning how to drill a hole in a bucket

Table 1.1: Different learning outcomes

The facilitator then has to decide which method should be used to present content to the learners. The four fundamental activities of teaching include discussion, example, play and assignment. The facilitator will choose a method that will foster learning of new content and achieve the objectives that were outlined by Slavin 1991.

1.4 LITERATURE REVIEW

The literature was studied in order to give direction to the whole study. The literature studied included a historical overview of problem solving, the origin and nature of South African schools research into creative problem solving, and the nature and origin of the South African education system.

1.4.1 An historical overview of problem solving

A vast amount of research has been done on problem solving skills. One such research study on thinking skills, that of Jordaan (1989: 446), postulates a theory that a human being directs his or her thinking in order to manipulate the symbols in the environment in which he or she finds himself or herself and so obtain a correct solution to a problem.

A human being's thinking can either be *directed* or *undirected*. Directed thinking reproduces knowledge which has already been acquired. On the other hand, undirected thinking is not based on objective consensual reality and this may include fantasising and daydreaming (Jordaan 1989:443). Human beings can use different ways to channel their thinking and so obtain solutions to a problem.

Gellantly (1989:20) proposed three ways in which problem solving can be done. They are:

- *The heuristic approach* This is where a person attempts the most likely solution first (in such a case, the problem may not be immediately solved).
- *The trial and error approach* As the name suggests, this means a random search for the solution to a problem.
- *The algorithm approach* With such an approach, the individual performs various steps to locate the problem after having obtained relevant information.

Osborn (Jordaan, 1989: 447) further proposed a model of creative problem solving that contains three stages. Human thinking can be channelled towards finding the solution to problems through the stages of:

- Fact-finding – where a problem is defined because it is pointless to find a solution to problems which are ill-defined
- Idea finding – during which more ideas are generated to obtain a quality solution (No judgement is encouraged at this stage because this will limit the number of ideas generated.)
- The solution is reached during the final stages and the most appropriate idea is then adopted.

Parnes (Jordaan, 1989: 447) added two stages to problem finding as discussed by Osborn. He places greater emphasis on problem definition and solution implementation. The problem has to be clearly defined if one wants to find facts that will lead to a solution. The last stage,

according to this theory, is solution implementation. In this stage, a person will have to find out whether it is possible to use the solution arrived at.

These theories contribute to understanding the facilitation of creative problem solving. Creative problem solving is important because it works in situations where traditional problem solving methods have already been tried but no solution has been found. These are problems which are generally poorly structured or defined. Watts (1992:232) believes that problem solving skills can be taught within the parameters of science. In the execution of such processes, different parts of problem solving seem to draw on different skills at different times.

One of the popular approaches which can be used to teach problem solving is to use group or teams during learning. Peer interaction stimulates group activities. The facilitator can also influence the learning of a group or team by using a cognitive instruction model of discovery learning. Learners will also be able to learn on their own through active involvement and by using the correct concepts and principles. The facilitator will always give direction to learning and will intervene at intervals (Davis, 1981: 119).

Slavin (1990: 184) largely agrees with what has been suggested above about problem solving. He argues that problem solving can be taught to learners, but that it is not possible to teach learners all methods of problem solving since no two problems are ever the same. The same situation might call for different approaches to problem solving. Learners can be taught to be creative enough to solve diverse life problems.

Fredericks proposed the following strategy for teaching creative problem solving (Slavin, 1990: 188):

- *Time for incubation should be allowed.* In creative problem solving it is important to avoid rushing to find a solution. Several alternative solutions should be explored in turn.

- *Suspend judgement.* Learners are encouraged to suspend judgement in order to consider all possibilities before trying out actual solutions.

- *Establish an appropriate climate by a relaxed and even a playful environment.*

- *Teach underlying cognitive abilities.* Students can be taught to solve problems in different ways by generating ideas, thinking of unusual ideas, assembling facts, planning or clarifying what a problem comprises.

One may conclude this part of the discussion by saying that studies have revealed that human beings can direct their thinking to obtain solutions to problems. Learners can also be taught creative problem solving if opportunities for doing so are offered to them in educational contexts.

1.4.2 Research on creative problem solving

While Isaken (1983:11) conducted research on the teaching of problem solving, this research was conducted in a higher education setting. As the research was conducted in a foreign country and based on higher education, similar research should be conducted in South Africa. New approaches can be found to facilitate life skills to further education learners on the grounds that South Africa has a unique history. Similarly, it is advisable to intervene and correct at an early stage rather than to wait for learners to enter the highest level of education. If intervention is done at the higher level of education, too much damage will have been done to the growing mind. Facilitation of creative problem solving skills to learners in the further education and training band remains relevant in this context so as to correct anomalies of the past. In this instance learners will not memorise learning material but will work creatively on their own development.

If facilitation of creative problem solving skills is relevant, which methods can be used in South African system of education to respond to needs of a changing world?. The past and the current system of education have to be discussed before facilitation of creative problem solving that is based on the new education system can be examined.

1.4.3 The nature and the origin of South African education system

History of South African education highlights the fact that much attention was placed on content imparted to learners rather than the skills that can be acquired by learners (Hartstone, 1992: 69). The world of work therefore remained inaccessible to these learners because they were not equipped with skills to match the demands required by the labour market. The debate about the origin of education poses a question regarding the type of education relevant for a democratic South Africa.

Historically, education did not give life skills education the necessary attention that it deserves. According to the interim syllabus of FET, two periods per week were allocated to the subject. The situation was worsened by the fact that the subject was not examined and were therefore not "compulsory". Because of these factors and the changing of political situation, the department responded by introducing a new type of curriculum.

When it did this, the department was responding to the needs of today's changing world. A close look at the old approach shows that learning programmes were rigid and not negotiable. The educator was responsible for whatever took place during learning. Content was planned in such a way that it would be covered over a certain period. The learner's pace was not considered but the educator was expected to finish a specific amount of content within a specific time frame.

Most learners in this context were passive because rote learning was emphasised. The new approach is the direct opposite of old approach. The difference between the old approach and the new approach to learning is shown in Table 1.2.

OLD APPROACH TO LEARNING	**NEW APPROACH TO LEARNING**
Passive learners	Active learner
Examination-driven	Learners are assessed on an ongoing basis
Rote-learning	Critical thinking, reasoning, reflection and action
Syllabus is content-based and broken down into subjects	An integration of knowledge, learning relevant and connected to real-life situations
Textbook/worksheet-bound and teacher-centred	Learner-centred; the teacher is the facilitator; the teacher constantly uses group work and team work to consolidate the new approach
Sees syllabus as rigid and non-negotiable	Learning programmes seen as guides that allow teachers to be innovative and creative in designing programmes
Teachers are responsible for learning; motivation is dependent on the personality of teacher	Learners take responsibility for their learning; pupils are motivated by constant feedback and affirmation of their worth
Emphasis on what the teacher hopes to achieve	Emphasis on outcomes, i.e. what the learner becomes and understands

Content placed into rigid frames	Flexible time frames allow learners to work at their own pace
Curriculum development process not open to public comment	Comment and input from the wider community is encouraged

Table 1.2: The differences between the old approach and the new approach to education in South Africa

A new approach to learning – as emphasised by Curriculum 2005 – encourages learners to be actively involved in learning. An approach to learning and teaching based on the principles of Curriculum 2005 will be developed in this study. A life skills programme to facilitate creative problem solving skills will be put into practice in Chapter Four.

One may say in conclusion that it has become evident from the literature survey that the 1994 change in the type of government in South Africa has affected what is taught in schools – as well as approaches and attitudes in society at large and in South Africa's many and diverse cultures.

On should also emphasise (with regard to systems theory) that there should be a perfect match between the subsystems of the whole system (Evancevich, 1996: 24) because the old system of education, which was dominated by an essential European Dutch-British educational approach, has become obsolete in South Africa (Hartshorne, 1999:60).

The principles of Curriculum 2005 can be used to facilitate a new approach to learning. Facilitation of creative problem solving skills will be learned by the learners during this study. The facilitator will keep this principle in mind.

1.5 WHY IS THIS STUDY NEEDED?

The primary contribution of this study is to identify the basic life skills that could be taught to Further Education and Training band learners. Furthermore, guidelines or a programme will be formulated that will be used to facilitate the acquisition of creative problem solving skills. Two points need to be made:

(1) The results obtained from the programme will be assessed and recommendations will be used for effective teaching of life skill education.

(2) Findings obtained during the study could expand existing information on facilitation of life skills. Problems encountered will be highlighted to help other researchers on creative problem solving.

1.6 STATEMENT OF THE PROBLEM

The researcher has formulated the problem in the following way:

Can the acquisition of creative problem solving skills of learners in Further Education and Training best be facilitated?

This definition of the problem will be further examined and expanded upon in what follows.

1.7 PURPOSE OF THE STUDY

The purpose of this study is to:

1. Adduce literature (as part of the literature study) that will expand upon the following:

   - A description and elucidation of the terms *facilitation* and *creative problem solving skills*
   - Theories of development
   - Facilitation as a teaching method.

2. Undertake a life skill facilitation programme in order to help learners to acquire creative problem solving skills

3. Recommend possible ways to make life skills facilitation in schools more effective

1.8 ELUCIDATION OF CONCEPTS

Creative problem solving skill as an important terminology of the dissertation will be elucidated with some of the basic concepts.

1.8.1 Problem solving

Problem solving can be viewed as a process whereby a person discovers the combinations of previously learned rules so that he or she can apply them to achieving a solution to a novel situation. The process also yields new learning (Walts, 1996: 7). During problem solving one is confronted with a novel situation in which one has to formulate a connection between the facts, identify the goals and explore possible strategies to receive such goals (Sohanson, 1996: 5). All problems have the following two characteristics in common: a *goal* that has to be attained and a *solver* who is immediately unable to achieve a goal.

Whatever steps that are taken to find information that helps a person to arrive at the correct solution is problem solving (Kahney, 1989: 24).

1.8.2 Creativity

To be *creative* means to be *original*. Creativity is a process of bringing something new into being. Creative processes take place during times of challenges. It produces new ideas and increases the level of a person's development (Kroon, 1990: 446). As new ideas are produced, problems may be solved because a person acquires different understandings of the situation (Mayersky, 1990:30).

1.8.3 Synthesis: creative problem solving

Creative problem solving is the product of both thinking and problem solving. When a person has a problem, he (at the same time) has a goal which he cannot attain. The only way to reach the goal is to think of multiple ideas from which to choose. These ideas will increase a person's creativity because he or she will produce original ideas. At the end of the process, a person will choose the most suitable idea – the one that he or she regards as a solution to the problem.

Creative problem solving occurs when a person strives to obtain solutions to the problem

1.8.4 A skill

A *skill* is the ability to make and implement a sequence of choices to achieve a desired goal. A skilled person is competent, proficient and an expert with regard to a particular activity. A skill is thus a capacity or competence successfully to perform a task of some kind, whether intellectually or manually (Proctor, 1986: 7).

1.8.5 Core life skill

Life skills are indicative of how a person makes personally responsible sequences of choices in a specific area of life. *Core life skills* are those that are central or most important in life skills education (Hopson, 1981: 51). Life-skills are taught and learned, and the learners are expected to apply them in coping with real life situations (Johnson, 1994: 31). For the purpose of this study, creative problem solving is identified as a core life skill for FET learners.

1.8.6 Facilitation

The word *facilitation* is derived from the cognate of a Latin word ("facile") that means "easy". To *facilitate* is to make a situation or process or condition easier, more free from difficulties and obstacle so the process or person can move forward or progress (Bentley, 1994: 27). Facilitation is also the art of providing the right stimulus for a group so that they can participate fully in their own growth and move towards their own greater involvement in their communities (Rooth, 1995:2).

During facilitation, the facilitator works within the group to help the group to achieve what it wants to achieve. He or she does not control the learning environment, but strives to empower people (Rooth, 1995: 2).

1.8.7 Synthesis: the facilitation of core life skills

The researcher will facilitate creative problem solving because it has been identified as a core skill of FET learners. The aim is to provide the learners with the necessary and appropriate stimulus that will promote their growth. Empowered learners will move towards greater involvement in their communities. Various sessions will be held for the FET who will be identified as a sample for this study.

1.8.8 Further Education and Training Learner

A *learner* is any person, child or an adult who receives formal education or must receive education in terms of the South African School's Act. *Further Education learners* are all the learners in Grade 10 to 12. At the end of the phase, these learners are awarded FET certificates. In this study, a *learner* only refers to a child who receives formal education (thus excluding adults from this definition for the purposes of this research).

1.9 PROGRAMME OF THE RESEARCH

The study consists of six chapters, each of which deals with the following:

Chapter 1

Chapter One deals with the introduction, awareness of the problem, analysis of the problem, problem statement, the elucidation of concepts and programme of the research.

Chapter 2

Chapter Two deals with the theories of development.

Chapter 3

Chapter Three deals with core life skills in education. A programme of life skills facilitation will be outlined.

Chapter 4

Chapter Four deals with empirical data. A life-skills programme that the researcher will conduct for the subjects will be discussed. Formulation of the hypotheses, research methodology, a sample of this study and selection of techniques, will all be discussed in this chapter.

Chapter 5

Chapter Five deals with the finding of the study.

Chapter 6

Chapter Six deals with summary and recommendation.

A summary of each chapter is presented in Table 1.3 below.

CHAPTERS	HEADINGS	PURPOSE
Chapter 1	Introduction	To introduce the problem that has to be studied.
Chapter 2	Development theories on adolescents	To review existing literature on units of analysis
Chapter 3	Creative problem solving as a core life skill	To obtain new insights into the phenomenon of creative problem solving by explicating central concepts and contrasts
Chapter 4	Empirical data	To collect information about the research topic
Chapter 5	Results of findings of the study	To analyse and interpret data collected in chapter four
Chapter 6	Summary and recommendation	To summarise all the chapters in this study and to make recommendations for further study

Table 1.3: Summary of the chapters of this study

CHAPTER TWO

THEORIES OF DEVELOPMENT

2.1 INTRODUCTION

In this chapter, various development theories will be described and explained and particular emphasis will be given to the development stage of adolescence. The participants that will be used as subjects in this study are FET learners, each of whom falls within the parameters of the adolescence stage. The discussion of the development theories serves to direct the researcher during the selection of the techniques and content that are used to collect data in Chapter Four. Content selected will be adjusted to the development level of the subjects.

The concepts of adolescence and development will be discussed under sections 2.2 and 2.3 respectively. Development theories will be discussed under section 2.4. The implication of each theory for education will also be addressed. The chapter will conclude with a summary.

2.2 THE TERM "ADOLESCENCE"

The term "adolescence" comes indirectly from Latin word "adolescere" which means to grow into adulthood. This stage begins with the onset of puberty and ends with the assumption of adult responsibility (Mussen 1991:568). This stage is also characterised by various dramatic changes and is therefore considered to be difficult and arduous for those who are living through it.

Education should be directed to help adolescents towards acceptance. During this difficult period, relevant skills can be taught to facilitate self-acceptance.

2.3 "DEVELOPMENT" DEFINED

The concept "development" may be defined as an ongoing process of change in the structure of an organisation, which continues throughout life (Gerdes, 1988). During development, changes occur over a period of time in neurological structure and these cause new ways of reacting, new attitudes and new concepts and beliefs and to become activated and habitual (Mussen, 1990:4)

Although most of an adolescent's physical and neurological structure resembles that of adults, this does not mean that they are simply miniature adults (Slavin, 1991: 78). Adolescents see or perceive the world differently from adults. Another fact that should be understood is that adolescents do not have the maturity to learn in the way that adults do. Even if concepts can be taught over a long period of time, teaching strategies should nevertheless be adjusted to the developmental levels of adolescents (Slavin, 1991: 24).Theories of development describe the various stages that human beings pass through and the changes that occur as they move from one stage to the other. Developmental theories will be discussed in the section below so as to demonstrate how adolescents actually develop.

2.4 DEVELOPMENTAL THEORIES

Developmental theories study the physical, emotional, cognitive and social development that occurs throughout the life span of human beings. They use both heredity and environmental factors to discover abnormalities in development with a view of predicting behaviour. Moral development is important because to gather data from the participants, the researcher will depend on group work where interpersonal relationships have been observed. Information obtained from theories will enable the researcher to select subject content relevant to the group.

The developmental theories that will be discussed are:

- Jean Piaget's cognitive development
- Eric Erickson's theory of development
- Jean Piaget's normal development and
- Kohlberg's theory of moral development

2.4.1 Piaget's theory of cognitive development

Piaget's work with children resulted in concluding that children of the same age make the same kind if mistakes in their answers. This alerted him to the fact that children in various groups have the same cognitive structure (Gerdes, 1989:153). Development depends largely on the child's manipulation of the environment (Slavin, 1991:26) Principal concept exists in Piaget's cognitive theory of development. The concepts, which guide human development according to the theory, are, adaptation and organisation.

2.4.1.1 Organisation

Organisation is the process whereby the cognitive structure is integrated into a coherent whole (Mussen, 1990:270). During the course of the development two year olds are able to learn concepts such as dog, fish, boy or mom. After a few years the child will be able to classify the concept into organised hierarchies of animals and human beings. During the adolescent stage, the learner can classify animals into either vertebrates or invertebrates. Man is able to organise experience, due to maturation.

2.4.1.2 Adaptation

Human cognition makes it possible for man to adapt to complex environments. Human beings interact with the environment to form the organisational structure, thus getting new experience in life. During the process human beings adjust themselves to the environment (Gerdes, 1989:154). The process of adaptation occurs through assimilation and accommodation (Slavin, 1990: 272). Firstly the building block of Piaget's theory, the schema and assimilation, will be discussed.

(a) Piaget's process of adaptation: scheme

According to Piaget, the *schema* is a mental framework or structure which encompasses memories, concepts and programmes for action which are pertinent to particular interrelated cognitive contents which develop as a result of interaction between the individual and the environment (Gerdes, 1989:153). All patterns of behaviour used in dealing with objects are guided by schemas.

A schema can be simple or complex – as when a learner attacks a mathematical problem or when various concepts are used to process a complex schema. When a baby uses objects to produce a loud sound, simple concepts can be used to explain the process.

A person who is involved in creative problem solving also uses a schema. Such a person must also use concept rules and the best possible methods to arrive at the correct answer. Schemas like adaptation, develop through the process of assimilation and accommodation.

(b) Piaget's process of adaptation: assimilation

When the pattern of stimulation of an activity arises from some schema, it results in the evocation of a new schema. This process is called *assimilation* (Banyard, 1994: 190). Assimilation occurs when new information is incorporated into existing cognitive structures (Gerdes, 1989: 154). Schemas expand as new information is incorporated without any fundamental change of existing information. New data is usually coded and filtered before it is incorporated into the existing schema. This makes assimilation possible (Banyard, 1994: 190).

(c) Piaget's process of adaptation: accommodation

Accommodation occurs when the qualities of the environment do not fit existing concepts adequately (Mussen, 1990: 273). The cognitive structure is then adjusted in such a way that an inassimilable experience can be "fitted" – thus enabling an individual to cope with his or her environment. If the adjustment required is too great, the schema may divide and a new schema will be developed (Gerdes, 1989: 154).

The accommodation of a schema can be attained through trail and error when the thought process adapts to elements of novelty and "strangeness" in various situations. Accommodation is thus a mechanism of learning which allows a person to accommodate new objects and situations (Ruthas, 1990: 36).

2.4.2 Piaget's cognitive developmental stages

2.4.2.1 Introduction

Piaget's cognitive developmental theory comprise the following stages: the sensorimotor, the preoperational, the concrete operational and the formal operational. Children pass through these stages at different paces (Gross, 1992: 741). The stage which is relevant to this study is the *formal operational* because FET learners (who are subjects of this study) fall into this group. The formal operational stage will be discussed in detail in the following paragraphs. This stage is also referred to (more generally) as *adolescence*.

2.4.2.2 Formal operational stage

The formal operational stage begins at puberty and extends through adulthood. According to Piaget's theory, it is the final developmental stage. Intellectual development attains its highest level during this stage (Ruthas, 1992: 366). Intellectual development is characterised by an ability to construct hypotheses and the ability to find solutions to the problem in a systematic way.

2.4.2.3 Combination system

The adolescent is able to search methodically and systematically in order to find solutions to problems, and thinking at this stage can be detached from concrete objects (Mussen, 1990: 280). The following example illustrates this.

When a learner is asked a question as to how many different sums can be made using ten cents, two cents and five cents coins, young children will try a random combination of coins, whereas an adolescent may use a systematic plan. He/she has the ability to ensure that all possibilities are used. All available information is used to generate relationships (Slavin, 1991: 492). All possible means of solving the problem are considered and effective solutions are chosen.

The possibility of using combination systems enables the adolescent to even solve geometric problems. Furthermore, adolescents are able to relate to highly complex problems such as those embodied in moral and political issues (Gerdes, 1989: 285)

2.4.2.4 Hypothetical conditioning

The formal operational stage is characterised by hypothetical deductive thought. This is the ability to follow or understand concepts or a situation without literally experimenting (Mussen, 1990: 280). Adolescents are able to think about situations that they have not experienced before (Gross, 1992: 745).

Hypothetical conditioning enables adolescents to deal with possibilities and not just actualities. Adolescents can accept conditions that are arbitrary (hypothetical) and that are not bound to their experience about reality. They can apply logic to any given set of conditions and utilise factors such as speed, weight and time in solving a particular problem (Slavin, 1991: 83). We may consider the following example.

The ability to reason about hypothetical problems can be used in a debate in which one is able to defend a point of view regardless of experience or personal feelings or convictions. The defence is judged according to documentation and consistency. This kind of reasoning may also be referred to as *hypothetical deductive reasoning* because the individual is able to construct a set of hypothesis which are deductions from the conclusions. Each element can be related to every other element, thus allowing the individual to consider various hypothetical prepositions when examining a problem (Fontana, 1985: 9).

Adolescents, therefore, can think as scientists and formulate hypotheses and test such hypotheses (although such activities are not exclusively scientific and in fact are constantly used by all adults in their everyday life). An increasing ability to plan as well as being able to think ahead makes this possible (Mussen, 1990: 283)

2.4.3 Contribution of Piaget's theory to learning and to study

The concepts of *organisation adaptation* make it possible to understand human behaviour and development. According to this theory, adolescents are involved in the construction of the world rather than merely being passive receivers of information. They respond to the world either through organisation or adaptation. Adolescents are able to grasp skills or any information that can be taught by organising the environment or adapting appropriately.

The learners are therefore not simply passive receivers of the learning content. As they learn and develop, they have to interact with the environment. As learners, they participate in their own learning. The facilitator has to consider this fact during selection of techniques used in Chapter Four.

Piaget's theory also sets limits to the kind of content that children of different ages can learn. If the child (for example) is not ready to think in an abstract way, there is no way that abstract mathematical problems can be taught. A child who is too young can also not manipulate concepts such as (for example) conservation and space. In selecting content, the facilitator has to consider the level of cognitive development of the child being taught, or else learners will encounter problems in learning. Problems that do not harmonise with the cognitive development of the group might demotivate and confuse learners (Gross, 1992: 759).
In conclusion, one might say that the task of the facilitator is to encourage learners to participate. Learning through interaction should facilitate the acquisition of social, cognitive and physical skills. A learning environment that complements natural ability and the child's developmental stage is the basis of all successful teaching and learning.

2.5 ERIC ERICKSON'S THEORY OF MORAL DEVELOPMENT

2.5.1 Introduction

Erickson expanded on existing developmental theories by arguing that personality develops because of complex social factors and genetic influences. A crisis arises from the interaction between these factors. He proposed eight stages of psychosocial development, each of which are polar opposites.

An overview of these eight stages that explain how possible outcomes are used to identify the different stages will be presented in section 2.5.3. A detailed discussion of stage five, which is the stage relevant to this study, will be discussed in section 2.5.4. Finally, the researcher will conclude with a discussion of Erickson's theory as a whole.

2.5.2 Factors which influence development

Individual development is a result of the interaction between genetic and social influences. A genetic structure common to all human beings governs patterns of development. Erickson believed that human beings pass through a predetermined sequence of psychological stages, each of which is genetically determined. Individual characteristics emerge at a certain age in a particular sequence until a person develops into a whole (Meyer, 1989: 153).

Developmental changes in some cases can be either visible or invisible. Cognitive and social skills may even be developing although there may be no immediate evidence of their development. Teeth start to grow long before that process is visible. Similarly skills may not surface during life skills facilitation. The facilitator may only notice that they have developed during or after a lesson presentation.

Social factors can influence the individual and at the same time offers an opportunity for growth. The opportunities offered and demands made are according to the potential and needs of a specific stage of development. For example, socialisation skills and the opportunity to socialise are given through schooling (Meyer, 1989:152).

2.5.3 Eight stages of moral development

Erickson proposed eight stages of moral development stretching over a life span. Each stage has a developmental crisis as a nucleus of development. The crises arise as result of an

attempt by opposite poles to resolve the problem inherent in each stage. Each stage is named after the opposing outcome. The fifth stage, for example, has *identity* as the positive outcome, and *role confusion* as the negative outcome. Healthy development requires that the establishment of a sound identity will triumph over role confusion. The stage is called "Identity Versus Role Confusion" (Gross, 1992: 628)

A second opportunity to resolve this dilemma will arise if the adolescent was unable to resolve the conflict and develop identity at an earlier stage. Erickson believed that a person might resolve an earlier unsatisfactory identity crisis during the flowing stage, although it might be difficult to achieve a successful outcome at this later stage (Meyer, 1989: 157)

The eight stages of moral development according to Erickson and Piaget are shown in Table 4.1.

AGES	ERICKSON	PIAGET'S
Old age	Intergrity v/s Generativity v/s	
Middle age	Self absorption	Formal operational
Early adulthood	Intimacy v/s Isolation	
-18		
-17		
-16	Identity v/s	
-15	Role Confusion	
-14		
-13		
-12		Concrete operational
-11	Industry v/s	
-10	Inferiority	
-9		
-8		Pre-operational
-7		
-6		
-5	Initiative v/s Guilt	
-4		
-3	Autonomy v/s Doubt	
-2		
-1	Trust v/s Mistrust	Sensirimotor

TABLE 2.1 MORAL DEVELOPMENT OF ERICKSON AND PIAGET

2.5.4 Identity versus role confusion stage

The adolescents, who are the population of this study, are at the identity versus role confusion stage of moral development. The stage begins with the onset of puberty and ends with the beginning of maturity, which occurs in about the twenty-fifth year (Meyer, 1989: 160). Erickson called this adolescent stage *identity versus role confusion* because during this stage adolescents experience conflict between identity formation and role confusion (Mussen, 1992: 603).

The biological changes which occur in the body compel adolescents to reconsider earlier certainties. They begin to question previously acquired roles and skills. They compare their self-images to those of other people. Erickson named the search for congruence between self-image and the role expectations of society *the search for identity* (Meyer, 1989: 10).

Identity implies how one perceives oneself as an entity separate from other people (Mussen, 1990: 614). The need for identity encourages a person to know himself or herself and determine his or her rightful place in society. If identity does not develop during adolescence, some adults, instead of creating suitable identities that are unique to themselves, may appropriate unsuitable identities from other people.

The search for identity may manifest in different behavioural patterns such as falling in love, in group activities, as well as in delinquent or anti-social behaviours. The adolescent may thus defy and subvert with rules of society and of people close to him or her in his or her search for identity (Meyer, 1989: 160).

The search for identity may be pursued in two different ways. It can be prematurely foreclosed or indefinitely extended (as discussed in sections 2.5.4.4 to 2.5.5.6).

2.5.4.1 Identity foreclosure

Identity foreclosure means that a person accepts uncritically the definition of himself or herself as imposed upon him or her by others and complies unquestionably with the wishes of his or her society and family (Gerdes, 1989: 290). Identity foreclosure is an interruption in the process if identity formation because potentials are prematurely fixed. Adolescents whose identities are prematurely foreclosed crave recognition by others, respect authority and tend to conform to external expectations (Mussen, 1990: 61).

Adolescents who have foreclosed identity formation at an early stage experience difficulty in being flexible and in responding appropriately to cognitive tasks. Foreclosure may lead to a low sense of esteem and this may cause dropping out from school (Mussen, 1990: 25).

Adolescents can form a negative identity by identifying with anything that is the direct opposite of a positive behaviour (Gerdes, 1988: 290). Such an adolescent for example may not live up to the expectations of the school code of conduct and may join a gang and start to steal other people's property.

Adolescents need to experiment and to remain flexible while they are in the process of finding their own identity. Learners should be allowed to explore roles as they participate in learning. Classroom activities become lively and meaningful when they enjoy the intellectual and creative practices in which they are engaged. A primary goal of sound teaching is to teach learners to learn to think *creatively*.

2.5.4.2 Experimentation with various identities during adolescence

Adolescents who cannot develop a sense of identity are characterised by an inability to make decisions, make commitments, demonstrate consistency and have no future goals with regard to occupation (Mussen, 1990: 621).

Society, and especially the school, can accommodate an adolescent's search for identity by providing *a psychological moratorium*. This is a period in which an individual has few definite commitments and is allowed to experiment with various identities. Failure during the process can be tolerated, but it should be tolerated with caution. Extreme cases may lead to drop out, cultural dysfunctionality, drug addiction or delinquency. However, society may lengthen the period of experimentation by extended education (Gross, 1992: 603). The adolescent who spends a longer time in education cannot have access to all the advantages that a working adult can enjoy. Because adolescents do not earn any money, they cannot afford expensive clothes or buy drugs – as can a person who is working.

The school can support the adolescent by providing active support and necessary life skills training. The adolescent can be taught the kind of creative problem solving that will help him or her to choose the best in any situation, no matter how problematic or difficult the situation may be. Learners who have developed creative problem solving skills are able to weigh situations and choose suitable solutions. They are able to deal with problematic situations defensively and creatively.

2.5.4.3 Identity moratorium

Identity moratorium occurs when an adolescent assumes and experiments with an identity without having any desire to choose a particular one (Gross, 1992: 603). Such adolescents may end up without having any particular identity.

A school is a place that can provide adolescents with methods for deciding on their identity. They can be given appropriate skills like creative problem solving skills that can help them to search for and find a suitable identity. Learners who have acquired creative problem solving skills will be able to use them when they move into society.

2.5.4.4 Identity achievement

Although adolescents may experience conflict during a search for identity, they may emerge with a firm commitment, goal and ideologies (Gross, 1992: 603). Even though the adolescents do experience conflict, what is ultimately important is that they *do* find a suitable identities.

Learners in this later stage no longer want to please parents or educators simply to earn approval. Learners in the identity versus confusion stage are no longer interested in pleasing parents or educators in order merely to win their favour. They rather feel the need to break away from parental control in order to establish themselves independently. Authority and the rules of educators may (at this stage) be rejected as much as those of parents. Educators should encourage the adolescents to take responsibilities when they are able to. Educators can set standards and rules with clear consequences for achieving or failing to achieve.

2.5.4.5 Identity confusion

During a search for identity the adolescent may experiment with several identities. This process may involve forming extreme views with regard to certain issues. Such adolescents may end up with confused identities (Gross, 1992:632). Adolescents with confused identities will always choose to behave differently from what is expected by society. The following four areas may be negatively affected by such processes.

(a) Intimacy

An adolescent may be involved with unsuitable, unstable or unbalanced partners. The individual who gets involve with such partners may have a fear of commitment or close relationship. This may mean that an adolescent does not *want* to have a stable relationship with a partners or the opposite sex because of a fear of commitment. He or she may therefore end up with no significant relationships.

(b) Time perspective

An adolescent who has no sense of time and who avoids taking on a functional adult identity is unable to plan for the future. The optimum time to achieve this identity is during the adolescence stage. If the adolescent has no sense of time this implies that crisis of previous stages have not been successfully resolved so as to allow for optimal development (Meyer, 1989).

Educators can assist in the developmental maturation of learners by introducing concepts from the next higher stage. Then, by the time the learner reaches a specific stage, the successful crisis resolution of that stage will have already been experienced in some detail. Thus, for example, concepts dealing with identity versus role confusion can be introduced during industry versus inferiority stage so as to prepare the learner for acquiring an adequate sense of time.

(c) Industriousness

The adolescent may fail to become industrious (diligent and productive) due to a lack of commitment to his or her studies or work. The adolescent may find it impossible to concentrate on activities that require individual participation. Such individuals lack the necessary sense of responsibility to take charge of his her studies, work or responsibility.

(d) Negative identity

A negative identity, which is the identity that is the opposite of what parents and other important adults can approve, develops. Taking on this identity dose not constitute a rebellion against authority: it is rather a way of achieving an identity. Adolescents do not know who they are, where they belong or to whom they belong. While the successful attainment of self-identity will make it easier to deal with crises later in other stages, the unsuccessful resolution

of crises in earlier stages complicates the handling of later crises (Meyer, 1985: 157). While the optimum time to achieve identity is during adolescence, a person may overcome this crisis in the later stage. A sense of identity is achieved if one knows where one is going and if one is coherent and has accepted recognition from significant other people (Gross, 1992: 263). At school, learners can rebel against authority because they still do not know themselves in the sense of having a stable identity. Educators have to be supportive and sympathetic towards such learners so that they will guidance whenever they go astray.

2.6 IMPLICATION OF THE THEORY TO LEARNING AND THIS STUDY

Through a successful search for identity, adolescents become mature people and begin to lead responsible lives. Once an adolescent knows and has accepted himself or herself, he/she will be able to lead a responsible life, perceive the world and himself or herself correctly (Gross, 1992: 635). Life skill education can make the period of searching for an identity very enriching if one has learned core life skills. During such periods, learners will share essential patterns of culture with others. The implication for the participants in the programme of this study is that adolescents (participants) who have successfully searched for identities can share their essential characters with others. Group discussion, which will be used mostly in data collection, encourages the sharing of ideas and their essential characteristics.

- *Identity* means that all roles of being a child, a learner, sibling, and so on, which one has learnt through past experience, are integrated into a whole. Education can ensure that adolescents develop a sense of psychological identity. Once they have this sense of identity, they know who they are, where they belong and they are not influenced by the immorality and inappropriate behaviour of other people with whom they come into contact.

The researcher has to recognise the participants' past experience by allowing them to contribute towards the design of learning media and ground rules.

- During the adolescent stage, learners have broken away from parents as caregivers and they are progressively gaining independence (Mussen, 1990: 602) The educator's authority might be rejected because they no longer want to be treated as young children. Learners can take responsibility for learning by *themselves* drafting the rules and expectations about the standards that they should achieve. Ground rules and learning objectives can be clearly stated to achieve the necessary cooperation in the classroom. The participants in this study will be able to draft ground rules for the programme and define what they expect to learn.

● Most adolescents identify more readily with peers than with parents, and are more concerned about their peers' good opinion than they are about the school's rules and expectations (Gross, 1993:635). Conforming to peer influence arises during this stage. Cooperative learning strategies in which learners work in a group can be used. The researcher has found that group work is the best method to use during facilitation (see Chapter 3) because adolescent like to conform to the group and because group members will do what others think is right.

● The adolescent with a well-established ego would be able to behave appropriately in any situation. According to the theory, both social and genetic factors should not be forgotten because they influence development. There are societies and cultures which, because they regard the women as inferior, do not be include them in important cultural activities. The task of the school is to ensure that each adolescent possesses a well-established ego structure that permits the growth of positive self-esteem. If they do not have such a system in place, they might well experiment with those dangerous activities described in the section about identity confusion (see section 2.5.4.5 above).

2.7 THEORIES OF MORAL DEVELOPMENT

2.7.1 Introduction

One of the prerequisites of classroom discipline is that satisfactory relationships should prevail between learners. Moral development can help learners to maintain such relationship. The theories of Jean Piaget and Kohlberg will be discussed because they guide the intentions of this study.

2.7.2 Piaget's theory

According to Piaget's theory (Gross, 1992:821), morality is a system of rules which govern interaction between people. Piaget wanted to know how children acquire moral knowledge and how one could correlate that knowledge with age. He proposed two stages of moral development: heterogeneous morality and autonomous morality (Slavin, 1990: 47).

2.7.2.1 Heterogenous morality

Heterogeneous morality stage is also called moral realism. The child enters this stage at five years. During this stage, the child thinks that rules are handed down by authority, that they are

unchangeable and that breaking them leads automatically to punishment. The second stage is built upon this stage (Slavin 1990:47).

2.7.2.2 Autonomous morality

The child attains the second stage at the age of ten or eleven years. Blind obedience to authority is rejected and the child believes that moral rules can be changed by consensus. Moral reasoning begins to change and children become flexible in their reasoning (Slavin, 1990: 45). Piaget believed that progress from the first stage to the second stage depends mainly on cognitive development and social experiences. Egocentrism declines in intensity and children learn to work cooperatively with others.

During the autonomous morality stage, the individual's world has expanded (if one compares it with the earlier stage) to include more peers. As morality begins to change and the child learn to cooperate and interact with others, the child understands that rules are the product of mutual agreement, renegotiation and common consent (Slavin, 1990:47).

Learners in FET are able to act in accordance with the requirements of cooperation and mutual respect. They cannot thus be treated as children, belittled or humiliated in front of their peers or anyone else. Educators should set explicit expectations and rules to achieve certain standards. Learners can be given as much responsibility (with clear guidelines) as they can reasonably and successfully handle.

2.7.3 Kohlberg's theory

Kohlberg refined Piaget's theory of moral reasoning. He believed that cognitive development does not guarantee a particular level of development. He studied how children and adults reason about rules that govern their behaviour in certain situations. According to his theory, moral development may be divided into three levels. Each level is further divided onto two stages (Slavin, 1990:47).

Level 1 The pre-conventional level

Stage 1 Punishment and obedience orientation

At this stage, moral judgment is based largely on expectation of rewards or punishment. What is wrong or right is judged in terms of obeying rules to avoid punishment. Moral action is essential to avoid punishment and things are not regarded as being right or wrong in themselves (Slavin, 1990:47).

Stage 2 Moral development is still individualistic

What is wrong or right is determined by other people's wants. The saying "You scratch my back, I scratch yours" describes this stage.

Level 2 Conventional morality

Moral judgments reflect social conventions. This level focuses on interpersonal relationships and social values as these take precedence over individual interest (Slavin, 1990:47).

Stage 3 Interpersonal concordance: "good boy", "good girl" orientation

Good behaviour is whatever pleases and is approved by others. One wants to win the approval of others by being acceptable (Gross, 1992:828).

Stage 4 Law and order orientation.

What is right at this stage is showing respect to authority. Right behaviour means doing one's duty and maintaining social order. Laws are automatically and unquestionably accepted and obeyed (Gross, 1992:828).

Level 3 Post-conventional

Moral reasoning is based upon abstract principles, which are believed to be right rather than wrong because society considers them to be right (Slavin, 1990:448).

Stage 5 Social contract orientation

Moral judgment is based on the laws and conventions that govern society. Laws, which violate concepts such as quality, liberty and justice, are opposed (Slavin, 1990:448).

Stage 6 Universal ethical principle orientation

The degree of inner confidence of the person determines what is right. What is right is accepted, not according to public opinion of laws of society, but because it is legitimised by inner confidence (Rathus, 1990 371).

2.8 FOCUS OF THIS STUDY

The different stages of moral development have been discussed with a view to orientating the reader as to how development actually takes place. The most important stage, which needs further attention, is Stage 5, *Social contact orientation*, because FET learners are in this stage.

When learners are in Stage 5 of moral reasoning, the "good boy", "good girl" orientation has been left behind and learners no longer compete for educators or parents' approval. Rules can no longer be accepted or obeyed unquestionably. Learners want equality, liberty and justice in whatever is done at school. To ensure that three concepts are not violated, the stage has the following implication to the educator.

- All the learners have to be treated fairly and equally. This means that low and high achievers, delinquents and those who always obey school rules all need equal attention.

- All learners should be engaged in decision making at school. This can be done through the LRC (Learner Representative Council). Involving learners in drafting classroom rules can facilitate the highest achievement levels.

- If justice is to be maintained, learners have to be acquainted with their code of conduct so that they do not transgress school rules due to ignorance.

- Above all, learners with creative problem solving skills will be able to participate fully in the drafting of their own rules at school. They will be able to produce a comprehensive code of conduct and classroom rules to help them to get through times of crisis. Creative problem solving skills thus has to be taught to FET learners.

2.9 IMPLICATION OF THE THEORIES TO EDUCATION AND TO THIS STUDY

These theories of moral development have outlined how development takes place. This will make it possible to specify those attitudes that learners should have acquired as they come to confront the social and emotional crises of adolescence. A facilitator has to know the group that he or she will be dealing with so that he or she can help to develop healthy and balanced life styles through the acquisition of creative problem solving skills.

Adolescents who are in this autonomous stage have left behind the stage of intense egocentrism. More contacts with peers and other children have made this possible. Because learners in this stage can work cooperatively with others, cooperative learning strategies can be successfully used.

Because older children believe that rules can be changed by consensus, they are able to respect the points of views of peers and educators. The facilitator should reject an authoritarian relationship in favour of egalitarian relationships. Learners should be allowed to work independently after the objectives of the lesson have been set.

2.10 SUMMARY

Different theories have been discussed. Amongst these are Piaget's theory of cognitive development, Erickson's personality development theory, Piaget's moral development theory and Kohlberg's theory of moral development. Understanding the nature of development makes it possible to understand the behaviour of adolescents as the population of this study. During the selection of techniques the researchers will be able to adapt content and learning media to their level. Development is an ongoing process of change in the structure of human beings. Dramatic changes are experienced during adolescence. The facilitator has to appreciate this fact because this stage is generally accepted as the most difficult period in anyone's life span.

Piaget's theory of cognitive development explains the changes that occur during development. Concepts such as schema accommodation, adaptability and organisation can be used to explain how development actually happens. Both heredity and environment can be used to help learners. The researcher has to ensure that the content used in the programme suits the developmental level of the learners of the learners and that the environment is conducive for participation by all learners.

Erick Erickson also believes that heredity and environment interact during the course of development in human beings. Eight stages of personality development have been outlined. Conflict develops as a result of crises that are generated by friction between the social and genetic factors.
Adolescents in the identity versus confusion stage are in the fifth stage. Erickson believed that adolescents experience conflict between identity formation and role confusion. A search for identity can either be premature or indefinitely extended. An adolescent confused about identity may experiment with several identities. They may experiment with inappropriate

social behaviour, drug taking and other substance abuse (such as consumption of alcohol) and sexual misconduct.

A successful search for identity causes the development of a positive self-concept and results in the person becoming a responsible and mature adult person. Education should allow adolescent learners a psychosocial moratorium during which they can experiment with various identities. At school learners can be given time to participate in role-play or experiential learning. The learners will then have opportunities of sharing their feelings and fear with others as well as learning from other people.

CHAPTER THREE

FACILITATION OF CREATIVE PROBLEM SOLVING

3.1 INTRODUCTION

The theory about the development of adolescents discussed in Chapter Two indicated which subject matter is relevant at this stage of human development. More information on the facilitation of creative problem solving skills will be presented in this chapter. This includes stating why facilitation of creative problem solving is important. According to Curriculum 2005, Life Orientation is important to learners. This will be explained below in terms of critical and specific outcomes. The two-core life skills of creativity and problem solving will also be fully explained and how such skills can be taught will be outlined. A summary of the chapter will be presented at the end.

3.2 WHY IS THE FACILITATION OF PROBLEM SOLVING IMPORTANT?

Creative problem solving pays dividends to all stakeholder groups – including the system of education itself, the community, the educators, and the learners. The importance of creative problem solving to each stakeholder will be briefly discussed in turn.

3.2.1 The system of education and the educator

Creative problem solving presents a paradigm shift from the traditional method where learning activities were teacher-centred to a modern method of being learner- or participant-centred. Facilitation encourages participation, which can be achieved mainly through experiential learning as an activity where one has something to share and learn during the lesson. The traditional method of teaching did not encourage participation. In that system, the educator was the source of experience and learning.

The new method encourages effective teaching because the educator has to prepare the lesson thoroughly in order to accommodate several techniques that are used during the facilitation session. During facilitation, the educator has to consider the interest and level of the learners. He or she must take into account the fact that the learners have different talents, learning styles and abilities. The educator therefore should not distance himself or herself from the learners, but rather strive to create a relaxed learning climate in which he or she is not the "fountain of all knowledge" (as was the case in the old traditional method). Instead, she or he

has to *facilitate* (Hopson, 1981: 7). Such a system needs highly qualified educators who facilitate better academic results. This is a critical current issue in education.

3.2.2 The community and learner

The discussion about awareness of the research problem in Chapter One (section 1.2) highlighted the fact that learners need to acquire coping skills because of the challenges of a changing environment. Creative problem solving skills can be equated with coping skills. Creative problem solving skills have an impact on the community and the learner's life both now and also later when they are adults. The learners will become competent and self-reliant enough to solve their own problems. Levels of stress should be reduced because learners will suffer less from anxiety, confusion, low self-esteem and feelings of depression.

Young people will increase their chances of being better employed because during the process of life skills facilitation, they will learn other crucial skills in addition to creative problem solving ones. They will, for example, learn communicative skills and interpersonal skills, and these will enable them to present themselves convincingly as prospective employees.

Above all, creative problem solving skills enable learners (1) to abandon the old outmoded and inefficient methods of solving problems and (2) actively to organise their thoughts and understanding of the situation. The importance of facilitation of creative problem solving is rooted from the aims of life skills education, which are closely related.

During the facilitation of creative problem solving in this study, the researcher has to strive to encourage competency and self-reliance on the part of the participants. If learners are self-reliant and competent in solving problems, they will move into their communities' equipped with skills to deal successfully with problematic situations.

3.3 AIMS OF LIFE SKILLS EDUCATION

The Interim Syllabus of Guidance and Life Skills Education indicates three major aims:

(1) To make school more stimulating, more personalised and more relevant to the lives and futures of today's learners and educators;
(2) To encourage the acquisition of personal and interpersonal skills that will let people live more effectively, take greater charge of their lives and become shapers of their own existence, and

(3) To begin a process in which each of us is able to develop skills and to become more confident [as we] make responsible contribution to the system ... [we] live and work in.

The aims of life skills education are related to the importance of facilitation of creative problem solving. Both encourage the active acquisition of life skills and are concerned with the future – not only of the individual but also of society in its totality.

The facilitator in this study has therefore to encourage the acquisition of personal and interpersonal skills amongst the participants. Having acquired these skills they will become more confident, take greater charge of their lives and contribute to the community they live in.

3.3.1 Curriculum 2005 outcomes

The two general outcomes, which are relevant here, are the critical outcomes of Curriculum 2005 and the specific outcomes of Life Orientation, as discussed in the policy document. (North West Outcomes Based Education policy document).

3.3.2 Critical outcomes

The policy document on Outcomes Based Education (OBE) explains critical outcomes as being broad and general cross-curricular outcomes, which are adopted by the South African Qualification Authority (SAQA). There are seven critical outcomes with additional outcomes to ensure that learners gain skills, knowledge and values.

The seven critical outcomes are as follows:

(1) Identify and solve problems in which responses display that responsible decisions using critical and creative thinking have been made.
(2) Work effectively with others as members of the team, a group, organisation, and community.
(3) Organise and manage oneself and one's activities responsibly and effectively.
(4) Collect, analyse and critically evaluate information.
(5) Communicate effectively using visual, mathematical and/or language skills in the modes of oral and/or written presentation.

(6) Use science and technology effectively and critically, showing responsibility towards the environmental and the health of others.
(7) Demonstrate an understanding of the world as a set of related systems by recognising that no problem-solving context exists in isolation.

The learning programme should include the following additional outcomes to ensure that the learner is fully developed personally.

(1) Reflecting on and exploring a variety of strategies to learn more effectively
(2) Participating as a responsible citizen in the life of local, national and global communities
(3) Being culturally and aesthetically sensitive across a range of social contexts
(4) Developing entrepreneurial opportunities

3.3.3 Specific outcomes (life orientation)

Specific outcomes refer to what the learners are able to do at the end of a learning experience. They include skills, knowledge and values, which the learner is able to demonstrate in order to achieve an outcome or a set of outcomes. Each of the eight learning areas has a set of specific outcomes, which explains what the learner will be able to do at all levels of learning. Life Orientation empowers learners to live meaningful lives in their society. Its eight specific outcomes therefore include:

- understanding and accepting themselves as unique and worthwhile human beings.
- using
- using skills and display attitudes and values that improve relationships in the family, group and community
- respecting the rights of people to hold personal beliefs and values
- demonstrating value and respect for human rights as reflected in Ubuntu and other similar philosophies
- practising acquired life and decision making skills
- assessing career and other opportunities and setting goals that will enable them to make the best use of their potential and talents
- demonstrating the values and attitudes necessary for a healthy and balanced lifestyle
- evaluating and participating in activities that demonstrate effective human movement and development

3.3.4 Conclusions about critical and specific outcomes

Although both the specific and the critical outcomes are concerned with the total development of the learner, they both emphasise skill development. A variety of skills that are to be acquired by the learners are important here, including decision making skills, communication, interpersonal relationship skills, and (most importantly) creative problem solving – which is listed as the first outcome under critical outcomes.

In this study, the researcher will design a life skills programme comprising four sessions to facilitate the acquisition of creative problem solving skills. The objectives of each session have to include one or more of the specific outcomes mentioned in the policy document of OBE, such as decision making skills, attitudes, improved relationships and the spirit of Ubuntu. The outcomes will be included in the objectives of different sessions.

3.3.5 Core life skills for secondary school learners

The above paragraphs have highlighted the skills which learners should acquire because they are relevant to life tasks. However, each life stage presupposes development tasks which the individual has to master during a specific stage. The developmental phase of the Further Education and Training learners has been discussed in Chapter Two. The researcher agrees with Slavin (1990: 3) when he says that creative problem solving forms part of the basic skills which adolescents must master. In order better to understand the concepts inherent in creative problem solving, problem solving will be dealt with separately. The two terms will be compared later in this chapter.

3.4 PROBLEM SOLVING DEFINED

Three definitions of "problem solving" follow:

Problem solving exists when:

- "... a situation in which an individual wants to achieve something but does not know what course of actions are needed to get what he/she wants" (Murphy, 1989).

- "...whenever a goal is blocked either due to lack of information or resources" Keney (1986: 5).

- "...a person is confronted with something and does not know immediately what series of activities to perform" Gallantly (1986: 74).

Therefore, a person has a problem if (1) he or she cannot achieve his or her goal, or (2) does not have the necessary resources or information.

Problem solving takes place whenever one attempts to close a gap between the actual situation and the desired situation (Keney, 1986: 5). Problem solving also happens when one is confronted by a novel situation and formulates a connection between the facts that identifies the goals and exploring the given facts (Sohanson, 1986).

Whenever a problem exists, there is a goal that has to be achieved in order to come to terms with the situation and a person is not able to achieve the goal immediately. Lack of information or resources may block the achievement of such a goal. When a goal is blocked, a person has a problem. Whatever such a person does to achieve a goal is called *problem solving*.

Watts (1991) further explains problem solving as a process by which a learner discovers the combination of previously learned rules that he or she can apply to solve a novel situation, and in which he or she learns something new. This explanation highlights some key points in problem solving:

- the learner who discovers
- previously learned rules
- the novel situation
- new learning

Problem solving therefore results in new knowledge and skills being acquired. This knowledge and skills can be used in new problems, new situations and new contexts.

3.4.1 The nature of problem solving

The definitions of Kahney (1986: 24-25) and Watts (1991) are instrumental in explaining the nature of problem solving.

(a) Kahney's definition

According to Kahney (1991: 9), problems consist of a goal and solver. Because a goal is blocked due to lack of information and resources, a person cannot come to terms with the situation.

A solver is a person who is not immediately able to solve a problem. Extra steps have to be taken (apart from what a person knows at the moment) to find information and arrive at a correct solution. A person can perform actions as a means for solving a problem. There are also various conventional actions a person may perform when solving a problem – action such as reading, making notes, editing and writing. The *goal* and the *operator* are central to Kahney's definition.

(b) Watts's definition

Watts (1991) uses the following formula to explain the nature of problem solving:

PROBLEM = OBJECTIVE + OBSTACLES

To achieve the objective, the obstacles must first be removed. Some obstacles are more complex and larger than others and so have to be divided into smaller obstacles. The learner will be more likely to solve a big problem if it is divided into smaller units.

He further postulates that problems can be divided into *given*, *owned* and *goal orientated*.

In *given* problems, the solver is given both the goal and the strategies. In *goal orientated* problems, the solver is given only a goal and has to decide on his or her own strategies. *Owned* problems give the solver an opportunity to decide both the goal and the strategies.

These definitions imply that the learners might have goals or objectives they want to achieve. At times there are obstacles, which deter them from reaching their goals. Most problems can be divided into smaller and more manageable parts. When the problem is solved, the learner

has also learnt something. The goal to be reached is not the only important factor of the activity; the means and methods used to reach the ends are also important.

3.5 HOW DOES A PERSON SOLVE PROBLEMS?

A problem solver who uses a heuristic method has no guarantee that he or she will get what he is looking for. During a heuristic search, a person may ask for directions in an unfamiliar environment, follow instructions, but still end up in a wrong place. A heuristic approach is simple and familiar but no one can ever know in advance whether it will lead in the right direction. If properly executed, it guarantees a correct answer. A person who follows the right rules for solving a mathematical problem, could find the correct solution (Gellantly, 1986: 177).

(a) Protocol analysis

Unique methods are needed to gather data. A problem solver can be asked to think aloud while solving a problem. Whatever actions a person takes is recorded and analysed. A person who solves algebraic calculations can speak aloud. Calculations can be used to verify comments and thinking (Gellantly, 1986: 77).

(b) Conclusions about the nature of problems

The learners can use many different ways to solve problems and the method used will depend on the objective the educator wants to attain. When using means-ends analysis, the problem can be divided into smaller manageable parts and this approach will in all likelihood solve the problem more quickly. This method can be used when the problem is extensive and it is difficult to arrive at a solution. In this study, the participants will be asked to use means-ends analysis to try to solve the problem of making an electric kettle. Firstly, the participants will be asked to identify objects that they could use, and secondly they will be asked to think of ways of connecting objects into a hole.

Heuristic searches can be used to solve problems when learners have to listen carefully and when they are given definite rules for solving problems. Heuristic searching thus encourages the development of listening skills.

If the educator wants to understand the way in which learners solve problems and if he or she also wants to identify problematic areas in his or her work, protocol analysis can be used. When using such a method, the learner will think loudly or even write answers.

Various explanations and meanings of problem solving have been given in the above paragraphs. A facilitator has to find out the best way to teach his or her learners to solve problems. Strategies, which can be used by the learners, will now be explained.

(c) Learning strategies of problem solving

Learners can use *tactics* to accomplish a learning job. Various teaching strategies exist which the facilitator can use to accomplish his or her objectives. Facilitation involves the active participation of the facilitator and learners (Derry, 1989). The learning strategies, which learners can use to acquire problem-solving skills, are *transference* and *problem ownership* (Watts, 1991: 5)

(1) Transference

Transference is a straightforward strategy of teaching principles to learners by giving them similar problems to do. This is done with the expectation that the learners can learn to extract general principles from problem solving experiences. The learner can be asked to perform drill or practise problems which may lead to instances of the problem being solved quickly and easily (Watts, 1991: 5).

Even if the above is true, one should still acknowledge the fact that problems are different and that ways of finding solutions are therefore also different. The learners can be taught problem solving skills and be expected to use the same skills in future. What is important are the skills used by the learner to come to terms with the situation. One way of encouraging problem solving is problem ownership. Creative problem solving can be applied through problem ownership.

(2) Problem ownership

Some of the responsibility and ownership for learning can be transferred to the learner. The solution to the problem will be reached in a creative activity. The learner will also gain confidence if the facilitator allows him or her to apply his or her imagination (Watts, 1992: 13).

Derry (1989) explains how a learner can use *verbal* tactics of learning. The learner can elaborate an idea, summarise important facts, scan or even take notes. Such tactics are important components in creative problem solving skills, and will, therefore, be described as techniques in Chapter Four.

The researcher will encourage problem ownership by encouraging the participants to own the programme from the beginning. The participants have to understand the fact that participation in the programme is not compulsory, and that the content that will be presented in the programme will not be finalised by the researcher. The participants are free to make inputs that will improve the programme.

When the programme is in progress, the participants will be encouraged to take notes, summarise content presented and even elaborate on their facts. All these activities are undertaken so that the participants can gain confidence, extend their imaginations and to improve their comprehension. Above all, tactics will improve learners' creative problem solving skills.

3.6 CREATIVE THINKING AS A CORE SKILL

3.6.1 Introduction

Problem ownership differs from a mere transference of information (this was discussed under learning strategies for problem solving skills). To ensure that learners become more independent, problem solving creativity should be encouraged. The reason why learners should be creative will be discussed in the following paragraphs. The meaning of creativity will be defined, and various elements that will enable the reader to understand creativity as a skill for improved learning will follow.

3.6.2 Why is it important for learners to solve problems?

Mayesky (1990) emphasised why creativity is important to the learners by citing:

- rapid changes in modern world, which require that problems be tackled creatively, and
- modern technological advances and discoveries that have mandated the acquisition of this skill.

Learners will benefit from the process (which will be described in Chapter Four) because they will learn:

- to express themselves openly,
- to feel good about themselves,
- to develop their potential to think,
- to develop individuality and skills, and
- the habit of considering many possible answers to any problem.

Rapid changes in the modern world have lead to unprecedented technological advances. Learners have to be prepared for those changes through acquiring the skills that will enable them to survive in a technological world.

3.7 CREATIVITY DEFINED

Many definitions and models of creativity exist. These include the following:

(a) Kroon's definition

Kroon (1990: 46), defines creativity as the production of new ideas, an active stimulation and increasing process towards unknown output in times of challenges or crisis.

(b) De Bono's definition

According to De Bono (1981: 5), creativity occurs when we organise our thoughts in a way that leads readily to the understanding of the situation. Creative ideas are original. Sometimes creative people can be characterised as "rigid" because they are locked into or bound by the way they perceive things.

(c) Smith's definition

Creative thinking is different from ordinary thinking because it is always of a higher standard that rises above ordinary expectations. A person who is creative demonstrates this by being creative (Smith, 1992: 4)

(d) Proctor's definition

Proctor's creative process consists of various steps. It is unnecessary to go through all the stages when solving a problem. The place where one starts will depend on the information and the time that are available. The steps are:

(1) Awareness

During this stage the individual becomes aware of a need, dissatisfaction or problem in the environment. A potential problem can be identified and treated as an opportunity to do something creative. Although one can take the initiative to locate a problem, at other times a critical problem is evident.

(2) Involvement

The individual becomes aware of a problem in the environment. If a group is dealing with a problem, all those concerned should agree that they could use the process as an opportunity to do something creative. Steps towards the solution of the problem should be regarded as being critical.

(3) Stating the problem

The problem or a system to be studied should be described. Information pertaining to the problem can be gathered by using available resources. Because there can be different solutions to a problem, possible solutions or steps should be described. For instance, if one is designing a new product, features such as shape could be considered. Different methods of generating new ideas, such as brain storming and lateral thinking, may be used.

(4) Insight

In the process of solving a problem, a person obtains new information. One has to use that information to achieve the desired goal. The information that is obtained will be better recalled if it is written down. One can then pursue promising or unusual ideas, which can then be evaluated to check their suitability.

(5) Testing and evaluating

When there are several ideas that might represent the solution to the problem, ranking them can be helpful. A comparison of the advantages and disadvantages of various ideas can be carried out. Sometimes ideas which are generated can be evaluated very easily. In some cases one particular solution may obviously be more suitable than others. In such a case, ranking is not necessary.

(6) The implementation of the solution

The idea or solution to the problem should be tested so that one can establish whether it actually offers a solution to a problem or not. Putting ideas into practice can sometimes be difficult if there are obstacles to prevent their introduction. Things such as inadequate resources, lack of commitment and motivation may contribute to this effect.

(e) Osborn's model

Osborn (Stein, 1993) proposed that creative thinking involves three stages:

(1) Fact finding – during which the problem is defined to try to avoid ill-defined problem.

(2) Idea finding – which helps in the process of generating potential ideas. The more the number of ideas that are generated, the greater will be the probability that a high quality solution will found.

(3) Solution finding – which helps to select and evaluate the best ideas. Evaluation should never be done in the previous (second) stage as this may limit the total number of possible ideas.

(f) The Osborn–Parnes model

Parnes conducted research on creative problem solving and added two stages to Osborn's model. His additional stages of problem finding and acceptance placed a greater emphasis on problem definition and solution implementation – both of which encouraged creative effectiveness (Parnes, 1991: 34)

If one uses the model instead of merely reacting in a habitual way, one will concentrate on the objective aspect of the process. The following steps are emphasised:

- Re-examine for more facts in the fact-finding stage.
- Re-define the situation in many ways (problem-finding).
- Generate alternative ideas as responses to the situation viewed (idea finding).
- Evaluate against a backdrop of multiple consequences (solution finding).
- Develop the best idea as fully as possible before implementing it (acceptance finding).

Each stage in the creative problem solving process contains a set of convergent and divergent activities. There is an initial search for data and then a narrowing down of data. The Osborn-Parnes model was further expanded by Scott-Isaken and Donald Treffinger. They added a preliminary problem solving stage of objective finding. This stage helps to *identify* a target area that needs to be resolved (Parnes, 1991:).

The Osborn-Parnes Model is demonstrated in Figure 3.1 below.

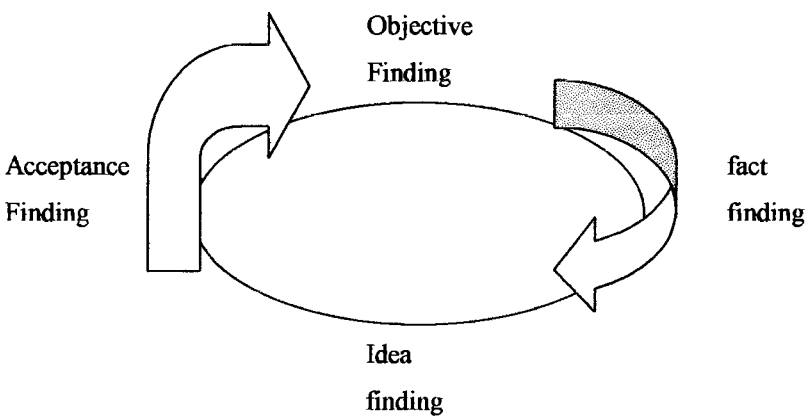

Figure 3.1 Stages of creative problem solving process

(g) Mayesky's creative process model

Mayesky's (1990) model of creative process consists of two stages:

- The first stage: A problem solver uses imagination to play with ideas, explore the situation and test alternatives that will lead to discovery of more ideas, solutions and answers to the problem.

- The second stage: This passes on to the testing of those ideas that might be workable solutions to the problem.

(h) Kroon's ideal model

Kroon suggests that creative thinking involves breaking down and restructuring of our knowledge about the phenomenon so that we can gain some insight into its nature. Creativity thus occurs when we organise our thoughts in such a way that it readily leads to a different view about the situation.

3.7.1 Conclusions about the definition of creativity

Considerable confusion exists about what creativity really is (Proctor, 1995: 20). However, all the above definitions of creativity stress the following facts:

- New ideas should be generated and examined.
- There must be an in-depth understanding of the situation.
- Original approaches must be sought.
- An orderly approach must be pursued (records must be kept).
- Ideas must be restructured if insight is to be gained.

In creative thinking one must therefore restructure ideas so as to gain insight into the situation. This kind of thinking will produce new original ideas of high standards and new information (records). More information can be obtained if one utilises the various models of creative thinking.

3.7.2 Models of creative thinking

An overview of the creative process has been presented with a view to presenting a technique for obtaining a general framework for creative problem solving strategy. The models that were discussed included that of Kroon, Osborn and Parnes, Mayesky and Stein.

3.7.3. Branford and Stein's creative process

Brandford and Stein proposed a model for improving problem solving. The components of the approach represented are (Brandford, 1993):

- identify problems and opportunities. When problems are noticed one should actively respond.
- defining a goal. Different goals reflect how people understand a problem differently.
- exploring possible strategies. This involves re-analysing one's goals and considering strategies that might be employed to achieve those goals.
- anticipating outcomes. It is important to anticipate possible outcomes before one acts on a strategy.
- looking back and learning. This last stage involves looking at the effect of the particular strategy and learning from experience.

3.7.4 Conclusions about the models

The models discussed above explain the creative problem solving process. All models should be seen as being possibly complementary and divergent. This will help the researcher to consider all possible solutions when trying to understand the process.

3.8 CREATIVE PROBLEM SOLVING

Creative problem solving is the product of both innate creativity and learned skills. When a person has a problem, he or she also has a goal which cannot be achieved. The obstacle has to be removed before the goal can be reached. A way to come to terms with the situation is to have multiple viewpoints about the situation. One has to be creative when solving problems.

Learners should be equipped with problem solving so that they can reach their goals in life. Facilitation encourages learners to learn how to solve problems on their own. As learners obtain more and more experience in problem solving, their performance should improve.

The above explanation is represented in figure 3.2 below.

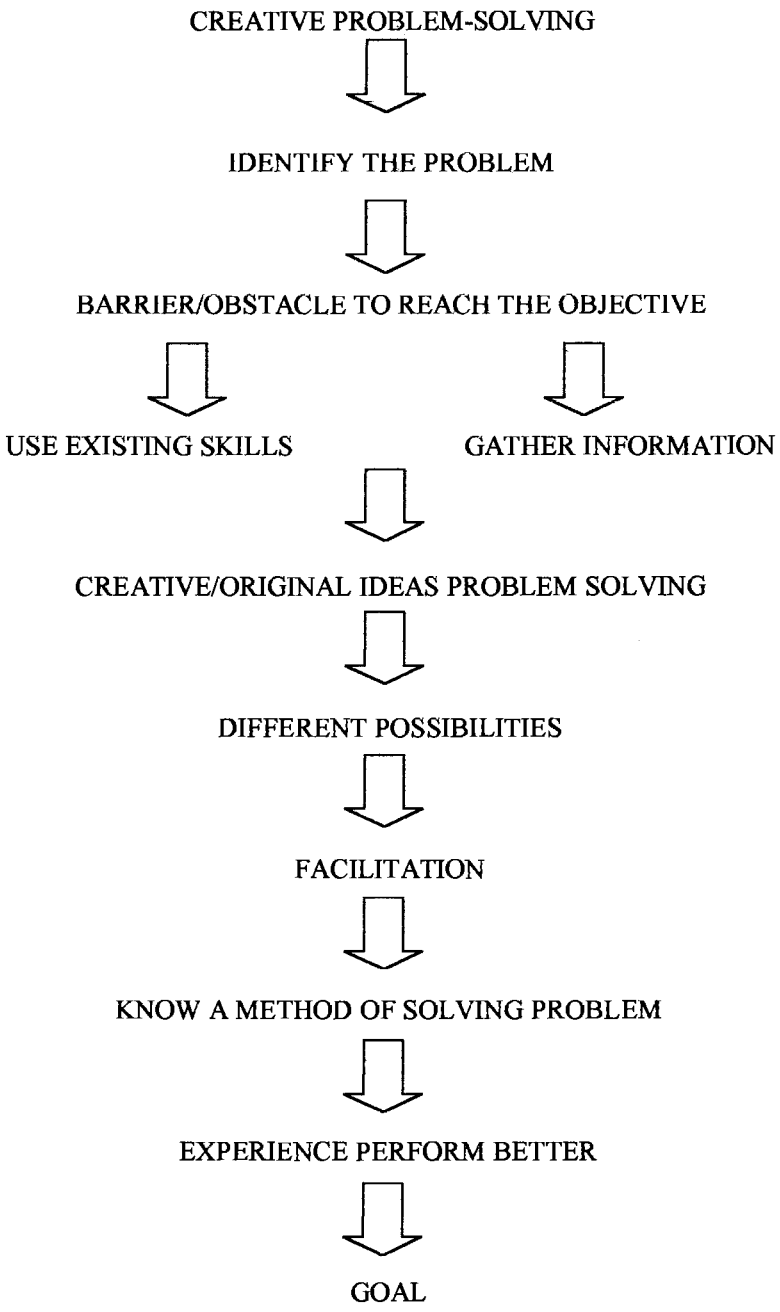

Figure 3.2. The creative problem solving process

Life skills, which are fundamentally important for FET learners, have been discussed above. Life skills will be further explained with the aid of examples in the following paragraphs.

3.9 LIFE SKILLS

A *life skill* is the ability to make and implement a sequence of choices to achieve a desired goal. A skilled person is competent, proficient and is expert in various activities. *Skills* enable a person to make an appropriate and competent response to a situation so that he or she can successfully perform a necessary task (whether intellectual or manual) (Proctor, 1995: 40).

The development of skills takes place through practice and are repeatable. A person who jumps over a fence by pure luck and is not able to jump over the same fence again, is not demonstrating a skill (Collins, 1986: 7).

A skill is characterised by fluency, speed, and automation. An activity is *fluent* if it runs smoothly. A fluent speaker provides an appropriate message with a minimum of unsuitable pauses and hesitations. *Rapidity* means that appropriate responses are made quickly. A netball player who scores a ball in a net should not only place it into the right place but should do it in the shortest possible space of time. Throwing a ball (for a skilled ball player) should be easy and the player should not have to think of it. This ensures that the skill is *automatic* (Gallantly, 1986: 20).

Life skills, therefore, are indicative of making personally responsible sequences of choices in specific areas of life. These choices are relevant to developmental tasks and specific problem in life (Nelson-Jones, 1991: 3).

Hopson (1981: 7) describes life skills acquisition as a process which requires competencies that empower rather than weaken people. Empowered people are able to make responsible choices in life, thereby enhancing personal growth (Nelson, Jones 1991: 2).

3.9.1. Conclusions about life skills

Life skills empower learners to live fulfilling lives now and in the future. The challenge facing educators in schools now is that their jobs have been redefined. They no longer have to be only career counsellors who give information to learners. They must now be professionals who prepare learners creatively and successfully to overcome those barriers that may prevent them from attaining their goals in life.

The new method of teaching which will best teach the learners creative problem solving is *facilitation*. Learners should develop ownership skills and – as a result – perform better in their learning tasks. A format which can be used to teach problem solving is discussed below.

3.9.2 A general format for a life skill programme

According to Rooth (1995: 8), the following general format can be adopted in each life skills session. It includes the following components:

(a) Ground rules

The participant's behaviour should be regulated during the course of the programme by setting ground rules at the beginning of the programme. There should be order – especially at the beginning of the programme when the participants need only to register progress and keep as active as possible. Facilitation is not a "one-man show". Both the facilitator and the participants should ensure that optimum learning takes place effectively. Both parties should therefore be involved in drawing up the ground rules.

Ground rules that are drawn up for this purpose will be well planned and have a clear and specific focus that will direct the participants towards the rules and procedures of the programme. The participants will be introduced to signals (which call for attention) such as bell-ringing or the clapping of hands. The facilitator will stop any misbehaviour immediately so that he or she maintain order and participants – and participants will be expected to respond appropriately and supportively (Slavin 1991: 72). Ground rules should include the following aspects:

- the need of confidentiality,
- the voluntary nature of work, and
- will and effort to make the work enjoyable, informative and ground-breaking.

(b) Ice-breakers

An *ice-breaker* is a fun activity that creates a relaxed and open atmosphere that relaxes the participants before they proceed to more demanding activities (Greathead, 1998: 97). Ice-breakers enable participants to feel at ease during the programme. This might include being asked to walk around, talk and draw themselves (there are numerous ice breakers that are used in different kinds of groups).

(c) Activity

There should be a sufficient number of activities to keep the participants involved throughout the session. Involvement encourages a sharing of experiences and skills among participants. Participants learn far more if they are involved in an exploratory way with the subject matter than if the facilitator forces information upon them.

Activities can be given to a group of participants or to individuals. In group activities, the participants can be asked to discuss certain points such as:

- how to be involved in group project, and
- how to present feedback on work that has been done.

Individual activities include:

- the writing of notes,
- evaluating individual and group work,
- reflection, and
- presentation and feedback.

(d) Connecting to the self

The participants should be given an opportunity to identify their own feelings, experiences, and the meaning derived from a particular activity. Participants can be asked to share their experiences with the group. Doing this will enable them to learn from their experiences. Connecting to the self can be done by using a variety of activities including feedback, reflection and evaluation (These will be discussed in the following paragraphs).

(e) Feedback

Feedback acknowledges the effectiveness of one's performance in a task. Feedback also tells someone what he did or feels about the situation in general. Feedback is usually given *after* a targeted skill has been displayed and can either be done by the facilitator or the participants. According to Banyard (1994: 3), the facilitator should encourage participants to give honest feedback because:

- firstly, one is able to evaluate the pace of learning as there is no time to cover the content again when learners are lagging seriously behind.

- secondly, feedback will indicate whether the participants are on the right track or not.

- thirdly, feedback enhances learning so that the participants' strengths are established and weaknesses are transformed.

(f) Reflection

Reflection enables the participants to re-capture and re-evaluate their experiences during learning. The participants can be asked to demonstrate a skill or be given reflection worksheets on which they will be able answer a few questions about a skill that they have learnt.

(g) Note taking

Note taking is an old and common strategy that can be used to summarise material studied. Note taking also encourages the mental process to be involved in the most important ideas. Participants can be asked to make contributions by writing comments on the chalkboard. Notes should, however, be clearly displayed. The facilitator can also write notes to supplement a participant's own note taking (Slavin, 1991: 72).

Note taking is important and should be used to:

- keep the participants active and involved with the content,
- reinforce learning, and
- focus the attention of the participants on material taught.

(h) Evaluation

Evaluation can be used formally to measure learner performance. The facilitator can maximise learning and make meaningful decisions only if the process in which the learners are engaged in, can be estimated. Facilitators can improve their effectiveness only if they know the degree to which the learners have mastered learning objectives. Information obtained can be used to select teaching material and techniques in the future. Evaluation

serves to reinforce a participant's hard work because it will enable the participant to diagnose progress or a lack of it (Slavin, 1991: 78).

The facilitator can use feedback to evaluate a participants' progress because tests and examinations are not appropriate in life skills session. The participants can evaluate the programme during the last session because such comments can help to improve future programmes.

(i) Experiential learning

The participants will acquire creative problem solving skills through experiential learning. In experiential learning the participants have sometimes to share from their experiences and to learn from the experiences of other participants.

(j) Expectations

The participants will state what they expect to learn from the programme. The facilitator will guide the participants to list the expectations of the programme by stating the objectives of the programme.

3.10 CONCLUSIONS ABOUT THE FORMAT

The format of a life skills education programme will contain different activities which the facilitator will implement in order to facilitate creative problem solving skills. The facilitator has to be innovative and creative in providing relevant resources for learning. The researcher will design a life skills education programme based on this format and test it in a sample (as described in Chapter Four).

3.11 SUMMARY

This chapter has explained how the facilitation of creative problem solving can be conducted. The first sections explained the importance of creative problem solving for all stakeholders in education. As far as the education system is concerned, it propagates a new teaching method in which learners are actively involved in their lessons. The educator has to prepare a range of activities to accommodate techniques while the learners must acquire competency and self-reliance in solving problems.

Information about the aims of life skills education and Curriculum 2005 outcomes was presented by means of an analysis of the relevant documents.

Creativity and problem solving concepts were dealt with under separate headings so as to gain a deeper understanding of the phenomenon.

Various writers explain problem solving as a process of acquiring knowledge and skills – a process that can be used in novel situations. According to Kahney, a problem consists of a goal and a solver. Watts uses the formula

PROBLEM = OBJECTIVES + OBSTACLE

to explain the nature of problem solving. According to this formula, one has to remove the obstacles before the problem can be solved. A person can solve a problem or remove an obstacle by using means analysis, a heuristic search and protocol analysis.

Learners can stimulate their own problem solving skills by using and internalising strategies of problem ownership and transference. The researcher agrees with Mayesky (1990) when he writes that learners can be taught to solve problems creatively. Models of creative problem solving devised by Kroon, Mayesky, Osborn and Parnes were also reviewed.

Learners' acquisition of creative problem solving skills can be facilitated. Life skills, as a concept, was explained. It was suggested that a carefully designed and formatted life skills programme could be used to facilitate the acquisition of life skills. Finally the researcher announced that a programme of her own design would be used (as described in Chapter Four) to collect data.

CHAPTER FOUR

RESEARCH DESIGN

4.1 INTRODUCTION

A research design is a plan that outlines the method of data collection that the researcher will use to investigate the research hypotheses (Huysamen, 1997: 10). The design therefore includes specifying exactly what the researcher wishes to find out about the phenomenon in question. In this chapter, a research design focuses on what will facilitate the acquisition of creativity and problem solving skills among FET learners.

The research methodology utilised in examining the research question is described below. This includes the aim of the research as it was outlined in Chapter One. The hypotheses are derived from the research problem as they are described in section 4.2 below.

The research methodology is described in detail in section 4.4 and therefore also includes the sample that will be studied. Techniques selected solely for the purpose of this study and for a life skills facilitation programme will also be discussed. The chapter concludes with a summary.

4.2 HYPOTHESIS

The main hypothesis that guides this study may be expressed as follows:

- The acquisition of creative problem solving skills can be facilitated.

The sub-hypotheses that guide this study may be expressed as follows:

(1) Creative problem solving which can be acquired through facilitation can form the basis for life skills education for Further Education and Training learners.
(2) Creative problem solving can empower FET learners to live their lives more effectively.
(3) Learners posses potentials which can be developed through the acquisition of creative problem solving skills.

4.3 PARADIGM PERSPECTIVE

This study is based upon the following three assumptions (Mouton, 1993: 192).

- **Meta-theoretical assumptions** - which are the presuppositions and beliefs underlying this research

- **Theoretical assumptions** - which include the definitions of concepts. These concepts have already been defined in Chapter One and will not therefore be dealt with again in the following paragraphs.

- **Methodological assumptions** – describe the aims and methods of data collection techniques.

The first and third of these will now be dealt with in turn.

4.3.1 Meta-theoretical assumptions

This study reflects one of the fundamental approaches of postmodernism. It challenges some aspects of our common historical-educational culture and the way in which it has entrenched traditional modes of transferring various forms of social and cultural behaviour in education and in community life in general. In this way it challenges one of the assumptions of modernism. Part of the agenda of modernity has been to improve the conditions of human life by (1) the widespread application of science and technology to human living conditions and (2) by making traditional knowledge-based education widely available – where "knowledge" is narrowly and academically defined (Mouton, 1993: 192) Modernity envisages knowledge (thus narrowly defined) as its central resource for improving social economic, cultural and educational conditions in the world, and for resolving all kinds of problems associated with the human personality. Its grand design was therefore to reduce poverty, unemployment, inequality and every other kind of human, social and environmental ill (Harrison, 1994: 149)

This agenda of modernity cannot be dismissed as though it had never existed because it has in fact been the basis for much that is good and valuable in world culture. Postmodernism incorporates these views but extends them because if humankind's basic needs are not met, human beings cannot go on to achieve any kind of higher need, however defined.

Postmodernism is flexible and decentralised in decision making so that people can move beyond traditional boundaries in order to achieve their higher needs (Mouton, 1993: 192). The researcher will use a special kind of flexible facilitation as a method to teach creative problem solving. Learning will be decentralised so that both the participants and the facilitator can be responsible for whatever is taking place. Also, in order to allow flexibility in the content that is presented, both the facilitator and the participants will be involved in decision making about the content itself.

The participants in this study will learn creative problem solving skills. Creative problem solving is an objective that can be included in learning areas of Outcomes Based Education. The researcher makes the assumption that the participants will be able to face the uncertainties, complexities and problematic situations of the future with confidence after this training (Westhuizen, 1996: 71).

Postmodernism regards the fact that people have widely differing views about reality as a desirable feature of human life and society. All opinions (in this view) are equally important. People observe what is happening in specific situations and bring to them their personal understandings of what they observe and how it may be explained. The postmodernist paradigm emphasises the value of subjectivity. According to postmodernism, there is no objective reality, but rather an accommodation (or otherwise) of numerous subjectivities (Babbie, 1998: 24).

The researcher in this study will use several techniques to obtain data from the participants. The techniques used will enable the researcher to obtain an idea of the participants' reality – no matter how subjective the participants' views might seem to be. Procedure and techniques will be based on generally accepted methods that are widely used in the social sciences.

4.3.2 Methodological assumptions

4.3.2.1 The aim of the research

This research is purely *descriptive* in that it describes existing phenomenon. Thus, creative problem solving as a process will be described from the viewpoint of the individual learners who participate in the programme. There will be no external manipulation of subjects because the researcher will describe the participants' responses by means of objective reflection (Mcmillian, 1993: 35)

4.3.2.2 Research approach

The research apporach is *qualitative*. Qualitative approach can be used in observation of behaviour of subjects. However, such observations can not be reduced to numbers. Data collected can not be quantified or be used in qualitative comparison (Babbie, 1990:261).The researcher will remain immersed in the situation for so that the results which will be obtained will remain objective (Gerber, 284). Facilitation and acquisition of creative problem solving skills will be explored. The researcher will thus facilitate the acquisition of creative problem solving for the participants so that they will be able to replicate this process in the future (Giddens, 1990: 328),

4.3.2.3 Research design

The research design used in this study is case study. The objective of case study is to investigate the dynamics of single bounded systems. This includes a group family or participants in a project (Welman, 1997:191). In this study the researcher will investigate how a group of learners acquire creative problem solving skills.

4.3.2.4 Data collection techniques

The researcher will design a programme that will be used for the purpose of this study. The programme will be discussed in section 4.6. The techniques will include various methods and skills that will be used in data collection. They will be discussed in section 4.5.

4.3.2.5 Data analysis and interpretation

Data will be analysed by group discussion. Interpretation of data will be done by reflection by the researcher after every session.

The following criteria will help in recognising creative product (Kokot, 1992:154).

- Uniqueness. Meaning the difference as determined by both the comparison of the product with other of its own type.
- Appropriateness. Which is how well a product fits the context.
- Transformation. The degree to which the product innovates rather than merely improving existing forms.

4.4 POPULATION AND SAMPLING

A population encompasses the entire collection (or units) about which the researcher wishes to draw conclusion with regard to the research problem (Huysamen, 1997: 8) Human beings are probably the most common objects of research in the social sciences (Mouton, 2001: 48). The participants in this research project are grade eleven learners of Ngotoane High School at Lehurutshe township in North West Province.

Random sampling for purposes of selection will be used to exclude any form of bias and to give all subjects in the population an equal chance of being included in the sample (Huysamen, 1997: 39). A sample of eight (8) subjects will be chosen from the Grade Eleven learners of Ngotoane High School who are under the age of eighteen years. A daily attendance register will be used as a sampling frame to select participants for this study.

4.5 SELECTION OF TECHNIQUES

The *techniques* refer to various skills and methods which the facilitator has used in the life skill programme to assess if creative problem solving will be acquired by means of facilitation. Most of the techniques that will be used are those which were discussed in Chapter Three under the format of life skills facilitation. The researcher found that the format used by Rooth (1995: 8) is relevant to this study.

Among the techniques that will be used in this programme are:

4.5.1 Ice breakers
4.5.2 Brainstorming
4.5.3 Feedback and presentation
4.5.4 Note taking
4.5.5 Assessment or evaluation
4.5.6 Ground rules
4.5.7 Group work and discussion
4.5.8 Experiential learning
4.5.9 Reflection

Each of these will now be discussed below.

4.5.1 Ice breakers

An ice breaker is used to make the participants feel at ease at the beginning and during the course of the programme. An ice breaker also leads the participants into the theme of the workshop by including various activities. The participants can (for example) engage in activities that allow them to laugh, jump, dance and think (Rooth 1995: 6). In other words, the ice breaker should serve to loosen people up and relax them.

Each session of the programme will have an ice-breaker which will include the following:

- Introducing a group member (first session)
- Making an electrical kettle (second session)
- Different uses of objects (third session)
- Participants drawing themselves with eyes closed (fourth session)

4.5.2 Brainstorming

Brainstorming is a techniques of generating ideas from the group within a short span of time. Participants are encouraged to produce diverse ideas and views. (Evancevich, 1996: 540). Brainstorming is the same as divergent thinking because the process also attempts to generate multiple solutions to problems (Rathus,1995: 279).

The four rules which govern brainstorming are (Schermenhorn, 1999: 271):

1. All criticism is ruled out, and judgement and the evaluation of ideas are withheld until the generation process has been completed.
2. "Freewheeling" is welcome. Wilder or more radical ideas are welcome.
3. Quantity of ideas is what is wanted.

Brainstorming encourages participants to suspend judgement during the early stages of the process. The participants will have the opportunity to develop as many ideas as possible – no matter how ridiculous they may seem to be. The ideas-generating period is followed by an evaluation period. The process will be used in the programme in order to keep the participants active while they are simultaneously generating ideas.

4.5.3 Feedback and presentation

The facilitator will use feedback sessions at the end of activities to find out how participants felt or thought. She will be able to tell whether the participants are on the right track when they are learning a piece of work as a group.

The participants will be asked to present material after they have learned a piece of work as a group. All participants will then have the opportunity to share their findings when the results are presented. All group members will be actively involved in the preparation of the contents and media that will be used as a group. The members will learn interpersonal skills such as listening and being cooperative.

4.5.4 Note taking

During the course of the programme, the participants will use note taking and the summarising of material to be studied. Note taking is effective in learning since it requires one mentally to process main ideas. The participants will take notes and decide on how to re-organise the material given in skeletal note form that will be used to direct the participants' own note taking (Slavin, 1991: 172).

The participants will also be asked to write short summarises that will be based on the facilitator's notes.

4.5.5 Assessment or evaluation

Participants' performance can be measured by using a variety of techniques. All the means that will be used formally to measure performance to make meaningful decision about learning in this programme will be referred to as *assessment* or *evaluation* (Slavin, 1990: 479). Different ways of assessing the participants' performance will be used. These will include:

- Asking questions – The facilitator will ask questions during feedback to encourage self-assessment. Questions like "Why do you think the work is perfect?" might be asked.
- Practical assessment – The participants will be asked to *demonstrate* some concepts in a practical way. The ice breaker in which the learners are asked to make an electrical kettle is one of the practical assessments which the participants will be asked to do. The researcher

wants the participants to be creative as they make the electric kettle and have the opportunity to do a practical task.

Self-assessment requires the participants to assess their own performance in a specific task. The participants can be asked to do a group project where they will be able to recognise the limitations in their work. The facilitator can ask leading questions to help the participants to assess their work. The participants will give feedback on tasks such as those in which they are asked to draw themselves with their eyes closed.

4.5.6 Ground rules

A life skills facilitation programme needs rules that the participants have to observe if it is to progress smoothly. Ground rules will serve the same purpose as classroom rules and will therefore be observed throughout the programme.

The participants will be asked to formulate ground rules for the programme. Notes on the ground rules and of objectives of the programme will be written on a chalkboard and the learners will be asked to re-write them.

4.5.7 Group work and discussion

Learning of the kind defined above assumes self-directed study by the learners. The participants can be given the opportunity to manage instructional situations by themselves. As skills and attitude are better acquired in small groups, most discussions will be carried out in small groups or pairs. The participants will be able to share views, analyse and compare material supplied.

To develop effective discussion, the facilitator will plan the seating arrangements so that the participants will be able to respond to each other's questions in the group. The facilitator will use her discretion to protect the confidentiality of individuals because group discussions sometimes reveal personal information.

The participants will be given feedback on tasks such as that in which they are asked to draw themselves with their eyes closed. Group work and discussion will be conducted mostly in activities (such as when participants list their expectations of the programme in the first session and list the importance of problem solving and systematic review in the third session).

The participants can be asked to undertake a group project in which they are asked to work on a task together. Such projects encourage learners to learn the social skills of working together with others and give them opportunities to think and process the main ideas of the material that is being studied.

Group work encourages self-directed study by learners because it gives them the opportunity to interact with their peers. Skills and attitudes can be learnt easily in small groups and the facilitator has more of an opportunity of managing the instructional situation in a facilitative and non-directive way. (Davies, 1981: 119)

4.5.8 Experiential learning

Experiential learning results from sharing experience. This can happen by means of shared activities in which participants teach and learn from each other. Participants use their present and past experience to develop and educate themselves further. The whole person's development in terms of body, mind, thoughts, feeling and actions becomes the catalyst for further development (Rooth, 1995: 4).

Experiential learning needs participants to be active in acquiring life skills. In the programme, the participants will be asked to present information that they have gathered during the programme and any relevant information from past experiences as a way of giving feedback.

4.5.9 Reflection

Participants can be asked to recall and re-evaluate their experience so that it can become consolidated as a valuable and permanent lasting learning asset. Reflection can be a group activity in which participants are asked to demonstrate an action or individual activity (participants are given reflection worksheets at the end of the workshop) (Rooth, 1995, 4).

Each participant will be given a reflection worksheet at the end of a session to assist them to reflect on their learning experiences. (A copy of the reflection sheet will be supplied in an appendix.)

The techniques which the researcher will use in the facilitation of creative problem solving for participants are clearly explained in the above paragraphs. The format which will be used in the programme will be explained in the next sections. How different techniques will be used is clearly stated in the format.

4.6 PROGRAMME OUTLINES

A programme will be designed to assess if the acquisition of creative problem solving skills can be facilitated. The four sessions that will be conducted with the participants are fully explained in sections 4.6.1 to 4.6.4 below.

4.6.1 The first session

The participants and the researcher will meet during the first session in order to start the programme. The main facilitation objectives of the session will be:

- to build a relationship amongst the participants,
- to introduce the participants because they will be meeting for the first time,
- to inform the participants of the objectives of the programme, and
- to list ground rules and expectations about the programme.

4.6.1.1 Relationship building

A healthy relationship leads to the building of an effective human environment in which people can learn. This will be the key responsibility of the researcher. Once the relationship of trust and understanding has been established, participation in the whole programme will be heightened. The researcher will show interest in the participants by calling the participants by their names. Individuals participants will be welcomed by a handshake as they arrive at the venue.

The participants have to be informed that the atmosphere of trust and openness is deliberate because it leads to active participation during learning. The facilitator must ensure that such an atmosphere will prevail throughout all the deliberations of the programme. In such an atmosphere the participants will feel free to raise their concerns or points of view without fear of being ridiculed or being rejected by others or by the facilitator. Each member's contribution remains equally important and will be kept confidential.

4.6.1.2 Introducing subjects by means of ice breakers

The participants will be divided randomly into four pairs. They will be given five minutes to talk to each other. During the discussion the participants have to introduce themselves and

talk about interesting things that happened to them in the previous two days. The participants will then introduce their partners to the group. They will also have to give feedback on the interesting things that happened to their partners in the past two days.

No name tags will be used to identify the participants. Instead, everyone will be encouraged to learn the names of all other participants as quickly as possible.

4.6.1.3 Objectives of the programme

The researcher had previously (informally) outlined the objectives of the programme when asking the participants to take part in the programme. However, she will give a short introduction to educate the participants about what she hopes to achieve by means of the programme. The two aims of the programme are:

- to teach the participants creative problem skills, and
- to assist learners to move from mere acquisition of knowledge into a skills learning type of education.

The person who possesses information but who cannot apply that knowledge and adapt it to circumstances can not be a creative and effective member of society.

Shifting towards a skills learning paradigm is an effective way of ensuring that learning becomes relevant to the participants. A person who has mastered learning skills does not just accumulate information: he or she is also to engage his or her feelings, beliefs and imagination and apply them to whatever he or she does.

The facilitation objectives of the programme are therefore:

- to enable the participants to solve problems creatively thus doing away with rote learning. Most of the content that learners obtain from academic subjects cannot be applied in their daily lives because educators have to stick rigidly to syllabuses. Such methods only ensure that the learners reproduce the information that they have learnt.
- to teach participants problem solving strategies that will motivate them to learn because learning outcomes will be immediate and visible.
- to enable participants to assess their own progress because whatever they will be learning will be put to the test. Participants will be actively involved in programmes

in which they will be asked to demonstrate some skills. There is no need to involve the judgements of examiners.

- to teach participants to apply creative problem solving skills in their daily lives so that they can become independent in future.
- to develop the participants in their ability to:

  - express themselves openly,
  - learn to feel good about themselves,
  - find solutions to difficult problems,
  - think creatively and laterally, and
  - develop new skills such as interpersonal communication.

The purpose of the programme therefore is to facilitate the acquisition of creative problem solving and life skills. The information about creative problem solving skills will be cascaded in four sessions which will last approximately one hour each. The participants will each then be handed a copy of the programme outline. The facilitator will give a brief summary of what will happen in each session. The summary of the programme is only tentative and the participants will be welcome to suggest additional content.

4.6.1.4 Ground rules

The programme has to have rules which the participants will have to observe to ensure its smooth running. The facilitator will inform the participants about some ethical concerns that should be a part of the ground rules. The ethical concerns which the facilitator will discuss concern:

- respecting the participants' right to privacy,
- maintaining confidentiality by not using participants' names when publicising the results of this study,
- asking participants to formulate ground rules for the programme through brain storming, and
- agreeing about ground rules that will be clearly displayed on the chalkboard throughout the programme so that the participants can become acquainted with them.

4.6.1.5 Expectations and objectives

The facilitator has already stated clearly what attitude, behaviours and information the participants will acquire in the programme. Only when the information which the facilitator hopes to achieve is clearly stated will the facilitator find out what the expectations and objectives of the participants are.

Their stated expectations and objectives will reveal whatever current experience participants have of a topic. The facilitator will also then be able to design educational experiences that are relevant to the group.

The participants will form pairs to discuss the expectations and objectives that the group hopes to attain. Each pair will then give feedback to the whole group. Notes and listed objectives will then be written on the chalkboard and the participants will be given time to write them down.

4.6.1.6 Closure

The first session will come to an end. The participants will suggest the date of the next session. The researcher will thank the participants for their involvement in the search for information about the research problem.

4.6.2 The second session

The facilitation aims of the second session are to complete the following activities:

- to review the previous session in order to remind the participants what happened in the first session,
- to use an ice breaker to engage the participants in creative problem solving activities from the beginning of the session, and
- to list the reasons why creative problem solving is important.

4.6.2.1 Review of the previous session

After the programme has started, the participants will review what happened in the previous session so that they will be able to cope with what will happen in the next two sessions.

The facilitator will summarise what transpired in the first session. This summary will include reviewing:

- the objectives of the programme as stated by the facilitator,
- the ground rules, and
- the expectations and objectives – as stated by the participants.

4.6.2.2 The ice breaker

The ice breaker that the participants will perform will require some problem solving skills. This activity will also prepare them for the exercise of listing the reasons why of creative problem solving is important.

The participants will be supplied with the materials that they will use in the ice breaker exercise – in which they will have to make an electric kettle. (This project was utilised by a learner during a science fair.)

The participants will be given both relevant and irrelevant materials in order to make the task more challenging. Materials supplied to the participants will include the following:

1. A 20 litre plastic bucket
2. Glue
3. Drill
4. Element
5. Sand
6. Stone
7. Blanket
8. Newspaper
9. Electric plug
10. Pieces of clothing
11. Books
12. Electric pages and many more

4.6.2.3 Feedback

After completion of the task, the participants will give feedback and share the experience of making an electric kettle. The steps which are applicable to making an electric kettle would be:

- drilling a hole in the side of a bucket and the other one on the lid of the bucket.
- joining the elements to an electrical cord outside the bucket. This is done through a hole bored on the side of the bucket.
- connecting the other end of the electric cord to a plug.
- using the glue provided to close the space around the electric cord.

After this, the kettle would be ready for use.

4.6.2.4 The importance of creative problem solving

The participants will be asked to list the reasons why creative problem solving is important because:

- the facilitator wants the participants to acknowledge the fact that creative problem solving is important, and
- the objectives of the programme need to be integrated with the participants' outlook and attitudes to life.

The participants will work in pairs when completing each activity. Amongst other answers the facilitator hopes to receive are:

- Creative problem solving enables people to deal with future problems and challenges that cannot be anticipated in the present.
- Creative problem solving will have a clear, positive and powerful impact on the learner's lives and careers.
- Participants will be able to tackle problems on their own and in their own particular way.

Each pair will then be asked to present its contribution. The participants will present their findings to the group in order to share their experiences on the task. The relevant facts will be written on the chalkboard so that participants can take notes.

4.6.2.6 Closure

The participants will decide on the date of the following session before they leave.

4.6.3 The third session

The facilitation aims of the third session are:

- to participate in an ice breaker that will lead the participants to the theme of the next activity
- perform a systematic review exercise that will encourage participants to be creative and believe in themselves.
- to allow feedback that will give the participants the opportunity to share their findings and be actively involved in dissemination of information about creative problem solving.

4.6.3.1 The ice breaker

The aim of the ice breaker will be to encourage the participants to use creative problem solving skills by considering the different ways in which the object can be used. The participants will be given different objects.

They will name them, explain how the objects can be used in different ways in everyday use. The objects that will be supplied to the participants will include:

- Mug
- Sand
- Bottle tops
- Blankets
- Spoon

The participants will be given five minutes to perform the ice breaker. A mug for example can be tied from its handle and be attached to something. There are no wrong or correct answers and the participants will be encouraged to find as many uses for the objects as possible.

The participants will be encouraged to give as many answers as possible in the ice breaker exercise as this will encourage them to obtain multiple solutions in the next activity.

4.6.3.2 A systematic review exercise

This exercise requires participants to think of a variety of solutions to a problem. They will have already started acquiring this skill in the ice breaker activity. The systematic review exercise will also encourage them to believe in themselves by defending the answers that they think are correct. The facilitator will discourage participants from doubting their creative skills.

The exercise will also require the participants to apply creative problem solving skills in a working environment. The participants will review the characteristics of existing products. The participants will be given the task of changing the packaging and marketing of the following products:

- A packet of Simba chips
- A litre of milk
- Socks
- Coke

The "new" product will have to be marketed. This means that new marketing and packaging strategies will have to be discovered.

The participants will follow a certain strategy to find the answers to the systematic review exercise.

- Participants will form themselves into four pairs.
- Each pair will choose any product that they would like to change.

characteristics, its methods of packaging and how the new products could be manufactured.

- They will have to consider how they will change the use, purpose, and target markets as well.
- The pairs should also think of the methods they will use of promoting the product (methods such as advertising and pricing).

4.6.3.3 Feedback

In changing a litre of milk, the participants can consider changing the physical characteristics of the milk. The milk could be converted into a solid state and packaging in different sizes such as a half litre or two litre pack. Packaging shapes could be (for example) cylindrical or tetrahedronal. The material used for containerisation could be metal, glass or paper. Computers and machines could be used to simplify the labour involved in production and other tasks.

4.6.4 The fourth session

The facilitation aims of the fourth session are to:

- Participate in an ice breaker which will enable the participants to learn different ways of solving problems.
- To list obstacles to problem solving and solutions to each problem. The facilitator needs to understand from the participants' point of view what factors can really block creative problem solving skills.
- To give the researcher an opportunity to evaluate a programme so as to get a clear idea of the feelings, thoughts and impression of the participants about the programme
- To reflect on what the participants have learnt in the programme
- To review participants' expectations about the programme to find out if they have learnt what they expected to learn from the programme
- To formally terminate the workshop because it will be the last session of the programme.

4.6.4.1 The ice breaker

The participants will be asked to participate in an ice breaker which will lead them to the theme of the session. The ice breaker will also encourage the use of creative problem solving in an array of situations.

The participants will be given the topic "How will I look like five years from now?" They will be encouraged to solve their problem by using a different approach from the ones that they have used in the past. They will be asked to close their eyes and draw themselves.

The participants will be given five minutes after that to give feedback on how he or she felt during the activity and he or she will show the others his or her drawing.

4.6.4.2 Obstacles to creative problem solving

The purpose of this activity is to encourage participants to express their creativity because they themselves doubt their own ability at times. This exercise will attempt to remove the barriers that prevent creative ability.

The participants will list obstacles to creative problem solving by utilising the brain storming method. The facilitator will allow a great diversity of ideas to be listed before starting the next activity.

4.6.4.3 Overcoming obstacles to creative problem solving

The participants will list solutions to the obstacles that they have listed under obstacles that prevent creative problem solving. The participants will form two groups. Each group will get problems to solve.

4.6.4.4 Reflection

The participants will be given an opportunity to recap what they have learnt at this stage. They will be given the following questions to answer (Rooth, 1995: 69):

1. Is it important to be creative when solving a problem?
2. Do opportunities such as the ones offered by the programme exist in the school situation?
3. What is your level of creative problem solving?
4. How can you improve your level of creativity?

4.6.4.5 Reviewing the participants' expectations about the programme

The participants will be asked to write a paragraph to evaluate the programme. The comments should be forthright and should explain what really transpired in the programme. The participants should record their honest opinion about their feelings, the facilitator, their regrets and anything else that might improve a similar programme in the future.

4.6.4.6 Expectations

The participants will also be asked to state whether their objectives and expectations about the programme were attained. They will compare their opinions with the objectives and expectations they stated at the beginning of the programme. The participants will then decide whether those objectives and expectations were really achieved.

4.6.4.7 Termination

The programme will be formally terminated. The researcher will thank the participants warmly for their contributions and the success of the programme. The participants will be welcome to consult the researcher regarding problems similar to those in the programme, if they find that they are unable to implement creative problem solving effectively in their daily lives.

4.7 SUMMARY

The research question of this study is: "Can the acquisition of creative problem solving skills of learners in Rurther Education and Training best be facilitated?

A specific research design which explains how the data about the research question will be collected has been explained, as have been the hypotheses of this study, the research methodology, the sample and population that will be selected. The appropriate research approach is qualitative.

The various techniques which will be used to assess if the acquisition of creative problem solving can be facilitated to facilitate a life skills programme are explained in section 4.4. Most of these techniques used have been adopted from Rooth (1995: 8). The activities encourage active participation by the learners.

CHAPTER FIVE

EMPIRICAL RESEARCH

5. 1 INTRODUCTION

This chapter concentrates on the results of the programme that was designed to enable participants to acquire life skills. The programme was discussed in detail in (Chapter Three, section 3.4.5.1). Four sessions of the programme will be discussed under different subheadings below (sections 5.3 to 5.6). The main aim of the programme to assess if facilitation can be utilised to equip the participants with two central skills, namely problem solving and creativity. Information obtained from the results of the programme will be scrutinised to determine whether or not the outcome of facilitaton reflects the acquisition of these skills.

The sample that the researcher has utilised in this study is described in section 5.2.

5. 2 THE SAMPLE

The sample of eight learners was drawn from Grade eleven learners of Ngotoane High School. Four girls and four boys who were under the age of eighteen participated in the programme.

The learners who were selected were appraised of the programme before it began so as to ensure that they really wanted to participate (this stage also gave them the option of withdrawing – if they so desired – without any penalties being incurred by them). Participation therefore was voluntary and the participants were assured that the information obtained during the programme would be kept confidential. The programme was conducted during the sports period. When the programme began, all the participants were present and eager to learn.

5. 3 THE FIRST SESSION

The facilitation aims of session one were to:

- **build rapport** so that a close understanding and sympathy between the researcher and the participants could be developed. Once a mutual understanding has been established, participants are far more willing and keen to participate in different activities.
- **educate the learners about the objectives of the programme**. The participants must know what the facilitator wants to achieve with the programme and how they can contribute to these gaols.
- **negotiate, record and display the ground rules** (the **dos** and **don'ts**) that would guide the participants to a create an environment that conducive to fulfilling the aims of the programme.
- **examine all expectations** – including what participants hoped to learn from the programme.

5.3.1 Rapport building

The aim of the activity used was to allow the group to meet an interact in unstructured and non-directed way. The researcher as the facilitator needed to clarify her role and what she expected from the group. Effective contact enhances a conducive environment for learning. A healthy relationship was established between the participants themselves by way of introductions.

The participants were required to introduce one another. Discussing interesting things that had happened to group member in the past two days facilitated this activity. This activity was carried out in pairs. Each member of the pair has to introduce his or her partner to the group. The pairs, which were formed, were as follows:

5.3.1.1 Participants 1 and 5

Participant 1 received an invitation to attend the Drama auditions at Mmabana Recreation Centre. Sello Maake-ka-Nchube (her favourite actor) would be the member of the interviewing panel. Participant 5 reported that there was nothing of social interest in her life at that time because her grandmother had died two days previously. This participant preferred to talk about her hobbies instead.

5.3.1.2 Participants 2 and 6

Participant 2 did not talk about anything of interest but said his hobbies were music and soccer.

Participant 6 had obtained position two in school music competitions held at Mmabatho Civic Centre. This learner sang as a solo tenor.

5.3.1.3 Participants 3 and 7

Participant 3 met her old friend and was happy because she had not known her friend's whereabouts. Participant 7 has visited her aunt in Botswana.

5.3.1.4 Participants 4 and 8

Participant 4 enjoys travelling, listening to music and taking part in beauty contests. Participant 8 was selected as the best player of under seventeen soccer player in the Zeerust District.

5.3.2 Reflections by the researcher

The participants had no problem about talking to one another – even in the absence of any interesting events in their lives.

The participants participated actively in doing this exercise, mainly because they were not from the same class. Instead of being quiet when there was nothing to be discussed, the participants talked about their hobbies. When the participants were faced with a problem (such as having nothing interesting to relate), they solved it by talking about their hobbies. They then used this information to introduce each other in broader terms.

This activity made the participants creative and they adapted to the group with ease. The learners were not discouraged by the idea of problem solving. During the adolescent stage, the cognitive development of the individual allows one to be reasonable and rational when one is faced with a novel situation. The learners all possessed interpersonal skills which enabled them to associate with each other. Thus, the objectives of the activity were attained. The participants got to know each other and positive attitudes were reinforced.

5.3.3 The objectives of the programme

The objectives (as described in paragraph 4.6.1.2) were presented by the researcher. The researcher wanted to guide the group so that the participants would be able to list what each participant wanted to learn or expected to learn. The researcher listed the following items as the objectives of the programme.

- to replace the habits of rote learning with participatory learning
- to train the learners in effective problem solving strategies
- to encourage the learners to apply creative problem solving in their lives
- to encourage independent learning.

5.3.4 Expectations

The researcher indicated to the participants what they might hope to achieve. This assists the participants to list what they then expect to learn. The participants were able to come up with a group agenda which included expectations, hopes, issues or concerns. Although the participants found it difficult to list expectations, they expected to be taught a lot about problem solving, independent learning and effective strategies of problem solving.

5.3.5 Reflections by the researcher

The researcher had to probe the participants in order to obtain relevant responses. They seemed to possess no relevant knowledge or experience whatsoever. During the discussion they brought up interesting topics like the Millennium Bug and Aids. The participants wanted to know the causes of the two problems. The reaction of the participants showed that that they were aware of problems around them. If they were to solve such problems, they would have to be involved in the environment. The participants all have to be equipped with problem solving skills. The facilitation objectives of the exercise were therefore attained.

5.3.6 Ground rules

The facilitation aim of listing ground rules was to create the opportunity for everyone in the group to contribute to rules that would guide the structure and activities of the programme. As the concept of *ground rules* was unfamiliar to participants, the researcher had to explain to them what they are and then guide them to find relevant answers. The participants were told

that different people, groups and enterprises tend to have rules that are observed by all participants – rules that enable the organisation to *function*. In some instances the educator list such rules so that the learners can work in harmony. Examples of rules (in education) are (1) corrections of the previous work should be done before a new exercise is given, and (2) books which are not covered will not be marked. In order to set an environment in which everyone would be able to interact and help one another, the participants agreed to :

- be punctual at all times,
- switch off their cell phones,
- not only belong to one group but change membership of groups to advance discussions (when necessary),
- be cooperative in changing groups during the discussion,
- actively participate in everything,
- respect the points of view of other participants, and
- never leave before the end of the programme.

5.3.7 Reflections by the researcher

Most participants found it difficult to list ground rules. The participants' reactions showed that this was their first experience in such an exercise. *Facilitation* as a teaching method is still unknown to the learners; they are all accustomed to having obligatory subject matter imposed on them. Their educators also decide what they *must* learn and exactly *how* learning will take place. Active participation is new to them. However, the researcher successfully used probing to obtain relevant answers to the activity.

5.4 THE SECOND SESSION

The facilitation aims of the session are to:

- review previous session in order to find out whether the participants still remember the objectives of the programme, the ground rules and their expectations,
- do an ice breaker that will lead the participants into the theme of the session, and
- re-emphasise the importance of problem solving – which is the most important aspect of the programme. The researcher has to understand whether creative problem solving is important from the participants' points of view. The activity also encourages active participation.

5.4.1 Reviewing the previous session

Notes on ground rules and expectations were still written on the chalkboard. The researcher indicated to the participants that the ground rules would be applicable for the rest of the programme.

5.4.2 The ice breaker

The participants were asked to make a kitchen utensil as an ice breaker exercise. The ice breaker encourages and participants to engage in active creative problem solving.

5.4.2.1 Reflections by the researcher

The participants followed the following method:

- They tested the elements to find out whether they were working by plugging them into an electric point.
- They drilled a hole to connect the element to the bucket. The elements were too small to fit into the holes that were drilled (the participants then drilled bigger holes).
- They used ordinary plastic bags to close the spaces. A plastic bag was burnt to close the spaces around the element on the sides of the bucket.
- The elements were connected to an electrical cord through the holes that had been drilled.

The utensil made by the learners was different from what the researcher discussed in Chapter Four. By using their initiative, the participants used hot plastic instead of glue to close the holes. The researcher attained the objective of encouraging the kind of creative thinking that leads to the next activity.

5.4.3 The importance of creative problem solving

The exercise will encourage the participants to recognise that creative problem solving is important by listing their own views. At the same time, the researcher harnessed the objectives of the programme. The participants listed the following important points:

- Learners should be enabled to tackle problems on their own.
- Help learners who are not equipped with problem solving skills.

- Help learners to have enthusiastic attitudes when they are faced with problems (one should avoid making remarks like "This is not possible").
- Creative problem solving has a clear and a powerful impact on the learner's lives and their careers.

The researcher added the following important points after the participants had listed their own views:

- Because many individuals suffer from anxiety and feelings of depression, they cannot solve problems in their lives and sometimes even commit suicide.
- Help to develop the kind of divergent thinking with which participants will be able to generate multiple solutions to their problems.

5.4.3.1 Reflections by the researcher

Although the researcher added a few points of her own to the participants' responses, the participants seemed to be aware of the importance of creative problem solving. The reaction shows that they were gradually becoming more creative when they were faced with problems. The objective of delineating the importance of problem solving was attained. Participants responded creatively to the researchers facilitation efforts.

5.5 THE THIRD SESSION

The facilitation aims of the sessions were to :

- do an ice breaker that would make the participants think about and decide on different uses for objects. An ice breaker would also lead them into the theme for the systematic review exercise
- encourage participants to be creative and to believe in themselves. Most learners tend to doubt their own creative capacity.
- give feedback that would give the participants the opportunity to share their findings and to be actively involved in the programme.

5.5.1 The ice breaker

The participants were handed different objects. They had to explain how these objects could be used differently from their daily or obvious use.

5.5.2 Some different or unusual uses of objects

5.5.2.1 Spoon

- Put it on ink and use it as a pen or heat it and use the melted iron for welding.
- Use it as a musical instrument by beating it with a small stone.

5.5.2.2 Sand

- Put sand on top of a cupboard in the laboratory and cook on top of it, thereby by-passing the use of heating equipments.
- Use sand as a fire extinguisher.

5.5.2.3 Blanket

- Use a blanket as a table cloth or a curtain.
- A blanket can be used to make clothes. By cutting it into pieces one can make a pair of trousers or a dress.
- Fold a blanket and slide on it over the floor to clean a room.

5.5.2.4 Mug

- Use a mug as a flower pot
- When it is cold, pour water in a mug to warm your hands (use mug as a heater).

5.5.2.5 Reflections on the ice breaker

The participants asked to be given another two minutes in order to complete the ice breaker. They came up with brilliant ideas because instead of listing only one use, they listed many. They were therefore becoming more creative and confident.

5.5.3. Systematic review exercise

The participants "manufactured " new products from existing ones. The purpose of using the product and the buying patterns were also re-envisioned. The product which the participants chose were Coke, fruit juice and Morvite.

5.5.3.1 Coke

Although the existing properties of Coke were left as they are, the container and its uses were changed. Coke would be poured into a spiral plastic container The product will be used as a "shampoo" to make "dreadlocks" (a hair style). The spiral shape resembles the shape of the dreadlocks.

5.5.3.2 Fruit juice

The participants thought that the existing fruit juice was not selling well. The juice would be mixed with drops of alcohol to make it little intoxicating. Those who enjoy alcohol would enjoy the product's alcoholic content as well as its nutritional value. A built-in straw would be supplied so that it could be drunk anywhere.

5.5.3.3 Morvite

Morvite is a nutritious supplement that is freely supplied to the primary school learners by the Department of Education. This nutritious powder would be used to bake cakes for the learners. To make the cakes look appetising, different shapes and colours would be made.

5.5.4 Reflections by the researcher

The participants did not have problems in "manufacturing" any new products. They were confident and were able to apply creative problem solving to their daily lives. They were able to change characteristics, uses and the projected market (buying patterns) of the products. Various uses of objects were generated that related to daily living. Again, the facilitation of creative problem solving seems to have been effective.

5.6 THE FOURTH SESSION

The facilitation aims of the session are to:

- do ice breaker in which participants had to think of different ways to solve problems
- list obstacles to problem solving and possible solutions to each problem. The aim of the activity was to encourage creative problem solving and also find out the participants' opinions about what really blocks their problem solving skills
- evaluate the programme so as to ascertain the feelings, thoughts and impressions of the participants
- decide on whether the participants could recall what they had learnt
- review expectations about the programme (the aim is to ascertain whether the participants have learnt what they expected to learn)
- formally terminate the programme.

5.6.1 The ice breaker

The ice breaker was that participants had to draw themselves with their eyes closed. It was hoped that they might be able to understand the different points of view from which a problem can be solved. Divergent thinking encourages a person to have different solutions to a problem.

The researcher gave each of the participants a piece of paper. The participants had to draw themselves as they imagined they would look five years later. Each participant was given an opportunity to give feedback about how they felt during the activity. The pictures were shown to the group (see section 4.6.4).

5.6.2 Reflections by the researcher

This ice breaker made the learners use creative problem solving skills and think of what changes they might undergo in five years. Most pictures drawn showed old people. A lot of humour accompanied the exercise. The participants liked the exercise because they had never done such an activity before.

Facilitation was thus effective because the participants were creative and they acquired new problem solving skills.

5.6.3 Obstacles to creative problem solving

The participants were asked to list things that could block their creative problem solving. These obstacles to creative problem solving were listed through brain storming. The problems that were listed were the following:

- laziness
- family problems
- having too many problems to deal with at a time
- nervousness
- noise
- environmental pollution (sound and air)
- carelessness
- lack of concentration
- not understanding the problem itself
- weather

5.6.4 How to overcome obstacles to creative problem solving

The researcher told the participants that sometimes people doubt their creativity – especially when the environment is not conducive to express their skills. Participants were encouraged to be confident in drawing on their creative problem solving skills.

The participants formed two groups to discuss solutions to creative problem solving. They listed the following ways of dealing with the factors that could diminish creative problem solving skills.

5.6.4.1 Family problems

If one has a problem at home, one should talk to the family members concerned. If this does not work, one should seek help from other members in the family before seeking assistance from outside.

5.6.4.2 Having many problems

When one is confronted by many problems, it is better to prioritise them. Dealing with the most important and urgent ones first, helps. One should solve problems as they arise and not wait until they accumulate.

5.6.4.3 Nervousness

One should try to relax before attempting to solve a problem. Drinking cold water can help to calm one.

5.6.4.4 Noise

One should look for a quite place like a library or other places where noise is minimal.

5.6.4.5 Environmental pollution

People can be encouraged to be sensitive to others' needs in a particular environment. Making noise during lessons and studying should be discouraged.

5.6.4.6 Carelessness

The cause of this problem seems to be a lack of enough time. Time management can solve such problems – especially when one is writing examinations.

5 6.4.7 Lack of concentration

The participants agreed that one should relax, close one's eyes and take a deep breath before trying to solve a problem.

5.6.4.8 Not understanding the problem

People sometimes lack concentration because they do not understand the context of the problem. More information about the problem should be made available. One can use a dictionary to find out the meaning of difficult words.

5.6.4.9 The weather

If one wants to be comfortable enough to be attentive, one should put on clothes that are appropriate to the weather.

5.6.5 Reflection by the participants

The participants answered five questions in order to recall what they had learnt in the programme.

- All participants agreed that it is important to solve problems creatively.
- Six out of eight participants said that such opportunities do not exist in the school situation.
- One participant said he possessed a high level of creative problem solving skills. Others said that their level was average.
- Participants responded differently to the question of how they could improve their creativity. Some suggested that could do so by reading, debating or participating in class. Others suggested singing and taking part in sporting activities such as scrabble and chess.
- The answers that the participants gave to the learners were the same as the ones they gave about overcoming the obstacles of creative problem solving.

5.6.6 The evaluation of the programme

The researcher had to find out whether her facilitation strategies was effective. Evaluation had to be done through establishing the expression and feelings of the participants. Their feelings served as evidence of effectiveness of the programme.

The participants were asked to write a paragraph to evaluate the programme. They were asked to make their comments honest. The participants were asked to write about their feelings and opinions about the programme, the facilitator, their regrets and anything that could be done to improve any similar programme in the future. The participants were asked not to write their names on the paper containing the comments.

The participants said that the programme had been boring in the beginning because they were not acquanted with one another.as well as the teaching methods used. They had enjoyed it towards the end because they have learned to be creative, thus enjoy the teaching method

used. They experienced the programme as positive and felt that it should be extended to include other learners.

5.6.7 Termination

The researcher thanked the participants for their role and participation in the programme.

5.7 SUMMARY

This chapter describes the results of a life skills enhancement programme. The aim was to explore how the acquisition of creative problem solving skills can be facilitated. Four sessions were conducted during the programme. The details of what transpired in each session were discussed. The researcher reflected on all the activities of each session. A sample of eight learners from Ngotoane High School was used as subjects.

During the first session, the participants met with the aim of building rapport, negotiating and recording ground rules and listing their expectations of the programme. The participants performed an ice breaker exercise. The purpose of this was to build up rapport among the participants. The researcher listed the objectives of the programmeso that they would be informed about what she hoped the participants in programme might achieve. The participants in turn listed what *they* expected to learn from the programme. They found this activity difficult. The researcher probed them to obtain a relevant response. The participants also experienced problems in trying to devise the ground rules but they were guided by the researcher to obtain relevant results.

In the second session, the researcher got the participants to perform an ice breaker exercise, list the reasons why they thought problem solving was important, and review what they had done in the first session. The researcher indicated to the participants that the ground rules would be applicable to the rest of the programme and that the objectives and expectations of the participants about the programme would be achieved during the course of the programme. Later, before the programme ended, the participants would be given an opportunity of deciding whether *they* thought the expectations had been achieved.

The electric kettle was made from materials supplied by the researcher. The participants said that involvement in the programme had made them aware of the importance of problem solving. The researcher added a few points to those that had been listed.

During the third session only two activities were performed: an ice breaker and a systematic review exercise. The participants were asked to think of different ways which objects from everyday life could be used in different and creative ways. The researcher achieved the aim of the ice breaker exercise because different ways of using the objects were listed. In the systematic review exercise, the participants were given different the products which they could change (to create new products). The product's shapes, uses and marketing strategies were changed. The products that were changed by the participants were Coke, fruit juice, Morvite – and each of these new products was given a new name.

The last and the final session included doing an ice breaker exercise, evaluating the programme, reviewing the expectations about the programme, and terminating the programme. Various obstacles to creative problem solving were listed. Then participants were later formed into groups to discuss possible solutions to each of the obstacles. The participants evaluated the programme by means of questionnaires which the researcher supplied. The participants agreed that their expectations about the programme had been met. The researcher thanked the participants and then formally terminated the programme. Based on the participation in the life skill programme, the researcher concludes that the acquisition of creative problem solving skills can be facilitated.

CHAPTER SIX

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

6.1 INTRODUCTION

This chapter sets forth what the researcher did to resolve the research problem. This chapter also brings the research effort to its destined conclusion. The findings and recommendations will be shared in this chapter. The hypotheses that were discussed in this study will be reviewed. A concluding statement with regard to the problems and questions related to the study will be made. Lastly, the researcher makes recommendations and shortcomings that the stakeholders in education can take into consideration if they wish to improve life skills facilitation in schools.

6.2 SUMMARY OF CHAPTERS

This study sought to describe the facilitation of creative problem solving among learners in Further Education and Training. Information which was obtained from the literature review and data collection from the participants include the following:

6.2.1 Chapter One: Introductory orientation

Chapter One deals with the introductory perspective of the research topic (facilitation of creative problem solving for further education and training learners). The chapter also focuses on the analysis of the problem and the different contexts from which the study is made. The context of the study uses a system approach, skill learning and a multi-skill approach. A literature survey was done to give background information and to guide the study. Aspects such as historical contributions to problem solving, research into creative problem solving and the origin of South African education system were all discussed. The contributions that the study will make to education and further research in this topic were also discussed under the aims and objectives of the study. Lastly, the concepts central to this study were elucidated.

6.2.2 Chapter Two: Theories of development

The developmental theories of Piaget, Erickson and Kohlberg were discussed. More emphasis was given to the development stage of adolescence because adolescents are the subjects of this study. Adolescence and development were explained as core concepts in this chapter.

Piaget's theory of cognitive development, Erickson's theory of personality development and Kohlberg's theory of moral development made it possible for the researcher to understand the development of adolescents. Relevant information based on the understanding of developmental theories also made it possible for the researcher to select techniques for the purpose of collecting data for this study.

6.2.3 Chapter Three: Facilitation of creativity and problem solving skills

The reasons why learners should acquire creative problem solving skills were presented and defended through relevant documentation about Curriculum 2005 and life skills education. Creativity and problem solving skills were examined in some detail. A general format for the facilitation of life skills was discussed. The researcher adopted the format and used it for data collection in Chapter Four.

6.2.4 Chapter Four: Research design

The researcher designed a programme to evaluate if the acquisition of creativity and problem solving skills can be facilitated. The programme focused mainly on the techniques and activities that are used in the facilitation of life skills programmes. The hypotheses were stated and research methodologies were accounted for. Lastly, the programme outline and chapter summaries were presented.

6.2.5 Chapter Five: Empirical research

Chapter Five presents the results of the programme which was conducted on a representative sample of FET learners as the sample of the study. Four sessions with different activities were conducted to encourage the acquisition of creative problem solving skills. The chapter focused on what transpired in each session. In the first session, the researcher concentrated on building a good relationship among the participants by using different activities. In the second session, she engaged the participants in creative problem solving skills exercises. In the third session, she harnessed the learning of creative problem solving skills. The participants reviewed what had transpired in the programme and to what extend the objectives attained in the fourth session had been fulfilled. The researcher reflected on the activities of the programme in order to evaluate the objectives that she had set for different activities and sessions.

6.3 EVALUATION OF THE MAIN HYPOTHESIS AND SUB-HYPOTHESES

Both the main hypothesis and sub-hypothesis which guided this study will be evaluated.

6.3.1 The main hypothesis

The main hypothesis is that creative problem solving skills which can be acquired through facilitation. It was also stated that education can form the basis of life-long education for Further Education and Training learners. The main hypothesis was evaluated in terms of a literature survey and the results of the programme in which the subjects of the study had been engaged.

A literature survey pertaining to creative problem solving was carried out. Relevant documents were quoted in Chapter Three to define what creativity and problem solving are. The two terms were then synthesised in the same chapter. The specific outcome of OBE and the critical outcomes of Life Orientation list *creative problem solving* as one of the important skills that should be acquired by the learners.

The researcher then explored whether what has been stated in the above paragraph could stand up to testing. She designed a programme to facilitate creative problem solving skills and other skills in a selected sample of learners. The objectives of the programme which was administered to the subjects of this study (section 4.6.1.3) have been described – but the main aim was to assess if the acquisition of creative problem solving skills could be facilitated. Although the main aim was that the participants should acquire creative problem solving skills, other skills were also acquired by means of the facilitation efforts. These skills included the ability:

- to open oneself to others,
- to seek multiple answers to a problem, and
- to develop new skills of communication and other interpersonal skills.

The participants in the programme were invited to engage in different activities that were designed to help them acquire creative problem solving skills and the other skills that have been mentioned above. The participants had the opportunity to discuss the topics that were presented, to give feedback and do ice breaker exercises. The participants thus acquired

communicative and interpersonal skills while at the same time they were acquiring creative problem solving skills.

The teaching method which the researcher used to conduct the programme was *facilitation*. According to literature survey, facilitation is not preaching, teaching or lecturing. Rather it is a teaching method in which both the participants and the facilitator are equally involved in the activities of the programme. The researcher involved the participants in all the different sessions of the programme. Neither the researcher nor the participants dominated the proceedings. They both shared the responsibility of learning. The researcher and the participants listed the ground rules, expectations and objectives of the programme as part of the facilitation. The researcher guided the participants when they went astray and at times updated them with regard to what had happened in the previous sessions. Based on the above discussion the hypothesis can be accepted.

6.3.2 Creative problem solving can empower learners to live more effectively

The following discussion will serve as evidence that this hypothesis can be accepted.

During life skills facilitation it became evident that the participants were not used to activities such as establishing ground rules, doing ice breaker exercises, or listing what they expected to learn from a programme. Most of the learners found the programme boring at first (see Chapter Five) since they were not used to participatory learning.

The programme also enabled them to acquire life skills other than creative problem solving skills. All learners have innate abilities that can be developed through education or facilitation. Skills acquired from the programme can be used by the learner in real life situations. Participants of the programme were empowered in communicative skills which they can use in daily life. They were able to express themselves freely and solve problems easier than at the beginning of the programme.

6.3.3 Learners possess potential which can be developed through the acquisition of creative problem solving

A literature survey on the development of adolescents has shown that learners have a specific cognitive, social and emotional potential. Learners need to be offered the opportunity to develop such abilities further. When the learners have acquired creative problem solving skills, it is possible for them to implement such skills from their environment. The learners

who participated in the programme were able to complete the activities and exercises with ease. Since they have acquired life skills from the programme, these learners can now utilise these skills when they are faced with similar problems in future.

6.4 RECOMMENDATIONS AND SHORTCOMINGS

Acquiring creative problem solving skills is important for the learners not only to succeed at school, but also in the labour market where there is a high demand for people trained in life and problem solving skills.

The literature and practical research on the facilitation of creative problem solving skills shows that the following recommendations are applicable to further studies.

6.4.1 Co-facilitation should be used in life skills training sessions

SHORTCOMING:

Only one facilitator presented the life skills programme (as shown in Chapter Five) to the subjects of this study.

MOTIVATION:

Although facilitation requires responsibility and the skills of both the participants and the facilitator, a co-facilitator would have enormously benefited the process. Both the facilitator and co-facilitator will employ different teaching approaches that are necessary for the group. Each will complement the weaknesses of the other. A successful facilitation programme needs a lot of preparation (which includes designing the programme, preparing material and managing the session). Sharing these responsibilities implies more insight and opportunities for interacting in the group.

6.4.2 Multicultural learners should be used as participants in future studies

SHORTCOMING:

The learners from the same school and culture were used as subjects in this study.

MOTIVATION:

Future studies should be set in multicultural settings by drawing learners from different races, colours, religions, languages. Such settings may be complicated by problems such as poor language proficiency and the prejudice of learners (Slabbert, 1992: 441).

Learners can benefit from these settings if they are taught interpersonal relationships and communication skills. Language proficiency improves as learners are given opportunity to discuss and debate issues during their learning process.

The kind of cooperative learning that was used in this study led learners to make friends with others in the group. Participation of heterogeneous group leads to a better understanding of other people's languages, culture and race and thus reduces the amount of prejudice in South African society.

6.4.3 Well-coordinated life skills education is required in all schools

SHORTCOMING:

Not all secondary schools in the Zeerust District have full-time life skills education or Guidance counsellors.

MOTIVATION:

All schools should offer Life Skills Education so that they do not deprive learners of the opportunity to acquire the basic skills of life. Learners should be educated in their totality that takes into account both the physical and the emotional aspects of the growing mind. A well-established career and counselling centre provides learners with a totally different environment from the ordinary classroom environment. Pictures on different life skills topics can be displayed on the walls and furniture can be movable so as to allow for group interactions. Constant monitoring of life skill educators and guidance may improve the situation.

6.4.4 Facilitation as a new approach to learning should be encouraged

SHORTCOMING:

Educators are used to old of teacher-centred approach.

MOTIVATION:

Teaching should emphasise facilitation as a basic method of learning. A good facilitator possesses skills such as organising, caring, communicating and monitoring progress in the classroom. He or she is flexible and does not stand in the way of learning. Learners who are involved in the lesson in an exciting way tend to misbehave less, are more enthusiastic and are more likely to learn more efficiently. Facilitation discourages learners from being passive and expecting the educator to do everything for them. The facilitator can motivate the learners to be independent and effective creative problem solvers.

When facilitation is used resources are needed to make the task of the educator easier. Overcrowding in classes often means that educators do not to carry out their duties as they are supposed to do. School authorities should ensure that they support the educators by making resources needed available and by admitting only a reasonable number of learners to each specific class.

6.4.5 Larger groups, which include more participation in the programme, need to be studied

This study focuses on the FET learners from one school. The participants in this study represent a larger population of Grade Eleven learners. A larger number of participants needs to be studied to make the research more reliable and generalisable. The facilitation of a much bigger group could be possible if there were a co-facilitator. A co-facilitator would ensure that all participants are properly accommodated. The small number of participants in this study make it impossible for the researcher to generalise findings. A larger group would mean that learners from other schools could be included in the programme. Facilitators could join forces to design a learning programme for a larger group.

6.4.6 More research on creative problem solving has to be done – especially in other learning areas

SHORTCOMING:

This study was based on one learning area, namely of a Life Orientation. Other learning areas should be integrated and concentrate on the same theme.

MOTIVATION:

The literature review done at the beginning of the study highlighted the fact that creative problem solving is important. Creative problem solving also forms a part of both specific and critical outcomes as outlined by OBE documents. A life skills programme was designed to assess if facilitation could equip learners to be prepared for challenges in their lives. Educators from other learning areas should recognize this fact and continuously involve their learners in creative problem solving. Extensive further research could be conducted on this same theme. When learning areas are integrated by focusing on one specific theme, learners will benefit from that activity. Learning should have a common vision that will benefit both learners and the community in the long run.

6.5 CONCLUSIONS

Creative problem solving is fundamental to life skill learning. If schools want to develop their learners as whole beings, they should ensure that life skills education form a part of the school curriculum. Education should refrain from accommodating only the cognitive development of learners. Cognitive development should be supplemented by the holistic development of all learners. When the learners are equipped with both life skills and problem solving skills, they will be able to face all the challenges of life creatively and sucessfully.

When facilitation is used as a teaching method, there should be a sufficient amount of resources. In such circumstances, a considerable number of learners can be accommodated successfully in one classroom. The problem of over-crowded classrooms and a lack of equipment still exists in numerous schools. The researcher is aware of this situation. Facilitation can be used in education to create an atmosphere in which educators can improvise, thereby exemplifying to learners that they too can be creative. This kind of modelling is important to learners because it teaches them essential life skills. The teaching methods of the old regime that were used, before OBE was introduced, did not accommodate or encourage creativity in learners. In that system educators were only a source of information who were expected to stuff information into the heads of reluctant learners.

Opportunities should be created in education to encourage learners to acquire creative problem solving skills. The programme that was design solely for the purpose of this study has shown how learners can acquire creative problem solving skills via facilitation. The participants in this study were also able to acquire other skills such as communication and interpersonal skills within a short space of time. The results of the programme have shown

that facilitation, as a new approach to learning, creates new opportunities in learning. These opportunities can reverse the lack of interest on the part of learners because learning has traditionally been an educator-centred experience.

6.6 SUMMARY

This chapter began by summarising the earlier chapters of this study. Chapter One deals with the introductory orientation which introduces the research topic. Chapter Two deals with theories of development and discusses the development of adolescents. Adolescent development is important in this regards because it is the subjects of this study. Chapter Three deals with the facilitation of creative problem solving skills, creativity, problem solving and the life skills facilitation programme. In Chapter Four, the methods used to collect data were discussed, while in Chapter Five the results obtained from using the research methods in Chapter Four are discussed.

The main hypothesis and the two sub-hypotheses derived from this study were evaluated by the researcher and various recommendations were made.

The researcher also took note of several shortcomings inherent in the study and noted that the findings and recommendations could form the basis for further study and research for those interested in these vital educational skills, techniques and methods.

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APPENDIX 1

REFLECTION WORK SHEET

Answer the following questions in brief. You honest opinion will help in understanding the process of creative problem solving.

1. Write a short paragraph about what you have learnt from the programme.

2. What are the shortcommings of the programme?

3. What are the strengths of the programme?

4. Is there any diference between how you are taught in different subjects and how the programme was facilitated?

5. Give a reason to answer given to the above question.