An Investigation into Creativity amongst Pre-Service Teachers

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Certificate

Certified that the work incorporated in the Dissertation bearing the title

AN INVESTIGATION INTO CREATIVITY AMONGST

PRE-SERVICE TEACHERS

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Comprises the result of an independent and original investigation carried out by the research. The materials obtained (and used) from the other sources have been duly acknowledged in the Dissertation.

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AN INVESTIGATION INTO CREATIVITY AMONGST PRE-SERVICE TEACHERS

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- Bhavesh A. Patel

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INTRODUCTION

1.1 Introduction

"No system of education, no syllabus, no methodology, no text book can rise above the level of its teachers. If a country wants to have quality education it must have quality teachers".

- V.S.Mathewa

The Almighty God, the Creator of the Universe, is the supreme-mind who possesses the finest creative abilities. He has created all of us and all that is revealed in nature. We are elevated to be called His creation. According to Indian philosophy, we are constituents of the Supreme Power as the rays of the sun are the constituents' parts of their creator, the sun. Therefore, every one of us ought to possess creative abilities-and has these abilities. Every one of us is a unique creation, but does not possess the same creative ability as his peers. Some of us are endowed with high creative talents and contribute to advancement in the fields of art, literature, science, business, teaching and other spheres of human activity, and cultural changes. Mahatma Gandhi, Abraham Lincoln, Homi Bhabha, Newton, Shakespeare, Leonardo da Vinci were some of the creative individuals who left their mark in their chosen fields. Though they were undoubtedly gifted with creative abilities, the role of environment in terms of education, training and opportunities in their development cannot be ignored.

Good education, proper care and provision of opportunities for creative expression inspire, stimulate and sharpen the creative mind, and it is in this sphere, that parent, society and teachers make a significant contribution. They are required to help the children in nourishing and utilizing their creative abilities to the utmost. The educational process, therefore, should be aimed at developing creative abilities among

children. This can be achieved by acquainting the teachers and parents with the real meaning of the creative process and the ways and the means of developing and nurturing creativity. This in turn can be done if creativity is adequately considered and properly nurtured in the teacher education programme. As aptitude for teaching is given importance, creativity amongst teachers should also be given due recognition. With this consideration, the present study was taken up as a small step to have an overview of creativity amongst pre-service teachers.

1.2 Statement of the Problem

The problem for the present study can be specifically stated as-

"AN INVESTIGATION INTO CREATIVITY AMONGST PRE-SERVICE TEACHERS"

1.3 Explanation and Operationalization of the Terms Used

Creativity

Creativity is a process by which something new is produced- an idea or an object including a new form or arrangement of old elements. The new creation must contribute to the solution of some problems.

Pre-service Teachers

Pre-service teachers in this study are those people who are undergoing training in the B.Ed. course.

1.4 Objectives

- To assess the level of creativity amongst Pre-service Teachers.
- To assess the level of fluency amongst Pre-service Teachers.
- To assess the level of flexibility amongst Pre-service Teachers.
- To assess the level of originality amongst Pre-service Teachers.
- To suggest activities whereby creativity amongst pre-service teachers can be enhanced.

1.5 Research Questions

- What is the level of creativity amongst pre-service teachers?
- What is the level of fluency amongst pre-service teachers?
- What is the level of flexibility amongst pre-service teachers?
- What is the level of originality amongst pre-service teachers?
- What type of activities can be included in the curriculum to enhance creativity amongst pre-service teachers?

1.6 Delimitations of the Study

The study is delimited to pre-service teachers of Waymade College of Education and H.M. Patel Institute of English Training and Research Centre of Sardar Patel University.

1.7 Rationale of the Study

An improvement in education whether quantitative or qualitative can be secured only through the efforts of teachers who are the direct agents in the process of education. Children with good character, right tastes, sound knowledge, and worthy capacities are essentially the products of able teachers. The education commission has rightly said that ‘the future of India is now being shaped in her classrooms’.

The teachers, therefore, are the most potent factors for preparing children not only to fit in to the democratic, secular and socialistic pattern of the country but also to meet the various challenges posed in life.

Hence, it is very important to plan for the preparation of the teachers in such a way according to such standards that they are properly equipped to plough this important role. The teacher is no longer a subject teacher only. By implication he is a practical psychologist, a hygienist, a guidance expert and what not. It is needless to emphasize, therefore, that the teacher does not perform a single function called 'teaching', rather he is in turn a lecturer, counsellor, educator, questioner, encourager, coach, listener, arbitrator, friend, critic, interpreter, helper and judge among others.

The importance of the teachers in the educational programme of a country is too great. The greatness of a country does not depend on lofty building, gigantic projects and large armies but on the quality of its citizens. If a nation has young men of sterling character and unimpeachable patriotism, she is found to make rapid progress in all fields. Young men are entrusted to the care of the teacher and it is therefore the sacred duty of the teacher to impart the right type of knowledge and make them good citizens. It is the teacher who impresses his children with his personality.

The teacher, a national integrator as he is the backbone of society, the teacher actively shares the responsibility of reconstructing a social order, with all the cherished values and traditional beliefs which are being eroded by the surge of new ideals and practices.

Educators are legitimately concerned that their students make useful contributions to the society. Such concern runs deep in the code of ethics of the profession. It takes little imagination to recognize that the future of our civilization depends upon the quality of the creative imagination of our next generations.

It has been found that creative individuals are characterized by wide latitude of flexibility of ideas. In our education system, the rigid curricula, lecture oriented teaching and examination system, dampens part of creativity in children. Hence, we must create a more flexible educational system in which individuals should be

provided with opportunities and encouragement needed for stimulating, nourishing creative thinking. In such a scenario it is the responsibility of college's courses and teachers in education, to remove the erroneous belief that the creative work, teachers and their pupils can do is negligible. As aptitude, patience, perseverance, passion and professionalism are required in teaching so is creativity.

Therefore, the present day student teachers are to be trained in identifying the creative abilities of the children and encourage them to develop further in the directions in which they can grow to the fullest extent possible. The teacher training programme should include this component as an inherent component for pre-service teacher trainees. To achieve this goal the curriculum for the B.Ed. level has to be revised accordingly. First, it is essential to identify the creativity levels of pre-service teachers and then use appropriate methods and techniques to enhance their creativity. This in turn would enable them to think divergently, making new combinations from already existing objects and elements so that they are able to produce something new and desirable.

To practically apply this within our educational system it is first imperative to identify and tap the creativity of pre-service teachers at their entry level and then hone their creativity by using different teaching methods/techniques, academic and co-curricular activity so that their innate abilities are expressed explicitly. They can be then fluent, flexible and original in ideas.

With the intention to bring out qualitative change in teacher education and prepare competent teachers many different efforts have to be put in. the present study is a small step towards this direction only. Such investigation of creativity level of pre-service teachers can help chalk out training programmes in such a way so that their creativity can be honed up to a maximum level so that it has positive effect on teaching aptitude as well as attitude of the to-be teachers. So that competent teachers can be produced who can modify/alter/develop novel ideas according to the needs and demands of students so that quality of education at the school level can also be improved.

1.8 Scheme of Chapterisation

The dissertation has been divided into six chapters. The scheme of chapterisation is as follows-

Chapter-1: Introduction

This chapter which is the present one begins with an introductory note and states the problem of the study with the explanation of key terms. It also states the objectives of the study undertaken, research questions framed and rationale of the study as perceived by the researcher.

Chapter-2: Conceptual Framework

This chapter focuses on the conceptual framework or theoretical background of the study undertaken.

Chapter-3: Review of Related Literature

The chapter begins with stating the objectives with which review of related literature is done and then presents the different studies reviewed for the present work.

Chapter-4: Methodology of Investigation

The chapter focuses on the methodology adopted in the present study. It describes in detail about the research design selected for the present study, the tools used and the procedure adopted for data collection as well as data analysis.

Chapter-5: Data Analysis, Interpretation and Discussion

In this chapter the collected data has been analyzed and presented in a tabular form. Interpretations based on the findings have been presented and discussed in the light of the present study undertaken.

Chapter-6: Conclusions, Suggestions and Implications

The last chapter of the dissertation deals with the conclusions drawn from the present study. It also presents some suggestions for the future studies that can be undertaken in the field. The chapter ends with a reflective note by the researcher on the research undertaken.

Chapter: 2

CONCEPTUAL FRAMEWORK

"Of all the different factors which influence the quality of education and its contribution to national development, the quality, competence and character of teachers are undoubtedly the most significant."

Indian Education Commission, 1966 (p.46)

2.1 Introduction

The Almighty God, the creator of the universe, is the supreme-mind who possesses the finest creative abilities. He has created all of us and all that is revealed in nature. We are elevated to be called His creation. According to Indian philosophy, we are constituents of the Supreme Power as the rays of the sun are the constituents' parts of their creator, the sun. Therefore, every one of us ought to possess creative abilities-and has these abilities. Every one of us is a unique creation, but does not possess the same creative ability as his peers. Some of us are endowed with high creative talents and contribute to advancement in the fields of art, literature, science, business, teaching and other spheres of human activity, and cultural changes. Mahatma Gandhi, Abraham Lincoln, Homi Bhabha, Newton, Shakespeare, Leonardo da Vinci were some of the creative individuals who left their mark in their chosen fields. Though they were undoubtedly gifted with creative abilities, the role of environment in terms of education, training and opportunities in their development cannot be ignored.

Good education, proper care and provision of opportunities for creative expression inspire, stimulate and sharpen the creative mind, and it is in this sphere, that parent, society and teachers make a significant contribution. They are required to help the children in nourishing and utilizing their creative abilities to the utmost. The educational process, therefore, should be aimed at developing creative abilities among

children. This can be achieved by acquainting the teachers and parents with the real meaning of the creative process and the ways and the means of developing and nurturing creativity.

2.2 Importance of Creativity

Creativity is a trait that discriminates a creative individual from non-creative ones. It is a matter of individual differences. Considering the contribution of creativity to social progress and to the self-realization and self-esteem of the individual it is obvious that encouragement and promotion of creativity among young people should be a major aim and responsibility of the school. As has been pointed out earlier creativity is not given only to a few but in a smaller or greater measure is well within the reach of every individual. We do not divide people onto creative and non-creative but we range them along a continuum, some are more creative and some are less creative, and it is the creation of a small minority which achieves a high standard of originality, uniqueness, and objectivity and wins universal acclaim. The school cannot plant or produce creativity amongst children but it can certainly help to kindle what spark of creativity nature has gifted them into a brighter glow.

Teachers come across many instances, when a student's behaviour is surprisingly different from others while discussing about a controversial problem. Such students are talented ones, having special capabilities in tackling problems and producing original, distinct and unique solutions. To promote such ability in the students, the teachers have to take special pains. The main responsibility of the teacher is to provide situations and encouragement to induce young people to express themselves in a novel and original way. Everyone can draw, paint, sing or write a theme and the teacher's task is to guide and encourage young people to aim higher and to promote creative effort and achievement.

Creativity is visualized as a multivariate phenomenon. This is well reflected in the great diversity of definitions and variety of meaning attached to it. Some definitions of creativity given by different authors are as follows

2.3 Definition of Creativity

The term ‘creativity’ or ‘creative processes have been defined in many ways. Some of these definitions are as follows:

Spearman (1931)

Creativity is the power of the human mind to create new contents by transforming relation and thereby generating new correlates.

Bartlett (1958)

Creativity is an adventurous thinking or a getting away from the main track, breaking out of the mould, being open to experience and permitting one thing to lead to another.

Dehaan and Havinghhurst (1961)

Creativity is the quality which leads to the production of something new and desirable. The new product may be new to society or new to the individual who creates it.

Barron (1961)

Creativity means to make new combinations from the already existing objects and elements.

David Ausubel (1963)

Creativity is a generalized constellation of intellectual abilities, personality variable and problem-solving traits.

Passi (1973)

Creativity is a multi dimensional (verbal and non-verbal) attribute differentially distributed among people and includes chiefly the factor of seeing problems, fluency, flexibility, originality, inquisitiveness and persistency.

Wilson, Guilford and Christensen (1974)

The creative process is any process by which something new is produced—an idea or an object including a new form or arrangement of old elements. The new creation must contribute to the solution of some problems.

Stein (1974)

Creativity is a process which results in novel work that is accepted as tenable to useful or satisfying to a group of people at some problems.

M.J. Levin (1978)

Creativity is the ability to discover new solutions to problems or to produce new ideas, inventions or works of art. It is a special form of thinking, a way of viewing the world and interacting with it in a manner different from that of the general population.

Welsch (1980)

Creativity is the process of generating unique products by transformation of existing products. These products, tangible and intangible, must be unique only to the creator, and must meet the criteria of purpose and value established by the creator.

Paplia and Olds (1987)

Creativity is the ability to see things in a new and unusual light, to see problems that no one else may even realize exist, and then to comp up with new, unusual, and effective solutions.

2.4 Creativity: The Nature and Concept

There are many interpretations of the concept of creativity. The concept has been studied from a variety of disciplines – philosophy, sociology, neurobiology, psychology and so on. Each view point reflects its own relevant approach. The focus here is to describe the basic nature of creativity from the perspective of educational

psychology avoiding various conceptual issues. In other words, the emphasis is on how teachers should view and understand creativity in a classroom situation in terms of applied aspects and why it is necessary for teachers to be creative.

As a psychological construct, creativity has proved to be difficult to be understood in one single definition. There is no universal definition of creativity. From psychological point of view, attempts have been made to operationalise the term in order to study it scientifically. There are about 50 to 60 definitions in the psychology literature, each emphasizing different aspects of creativity. Some persons place more emphasis on qualities of the person who creates, others stress on how creative ideas and solutions are arrived at, and still others highlight the qualities of the products to be judged as creative.

Guilford clarifies the concept of creativity by making distinction between two types of thinking abilities namely; convergent thinking and divergent thinking. Divergent thinking is a kind of mental operation in which individuals think in different directions, sometimes searching, sometime seeking variety. Unlike convergent thinking where information leads to one right or a recognized best or conventional answer, divergent production leads to novel responses to given stimuli. The unique feature of divergent thinking is that a variety of response is produced. Guilford relates divergent thinking to certain well-known ability factors viz. Sensitivity to problems, fluency, flexibility, originality, redefinition and elaboration – which seem to go with creative output.

There seems, however, to be considerable lack of agreement among these scholars regarding the true nature and concept of creativity—its process as well as its product. Some of them consider it to be purely a function of the mind, a component of the cognitive behaviour while ***Ausubel*** and others maintain it to be an attribute of the person as a whole involving his total behaviour and functioning of his whole personality.

By assigning the characteristic of "a unique personal experience" to the creative product, the scope has been so widened as to include any novel idea or thing including

the rearrangement or reshaping of already existing and known ones. The definitions given above have considered creativity both as a process and a product, the thought as well as its result, but the central, essential condition of novelty or newness in the creation has not been overlooked by any one. By incorporating all these viewpoints, we may describe creativity as the capacity or ability of an individual to create, discover, or produce a new or novel idea or object, including the rearrangement or reshaping of what is already known to him which proves to be a unique personal experience.

Creativity as a concept has different meaning and interpretation for different people. It is indeed a multi-faceted phenomenon. But despite of differences in view points and definitions; all seem to have something common that creativity involves the ability to produce something new and unique. The something new or unique is usually a product resulting from a process initiated by a person. In short, creativity is a process where the individual locates gaps in ideas, thinking of alternative solutions to a problem, persists on idea, does not easily agree to what is usually thought to be correct and has unique/original ways of thinking or doing.

A close analysis of different definitions of creativity provide the notion that it can be described as the four Ps, that is the product of creative thinking (Product), the process of creative thinking (Process), the person who is creative (Person), and the press or environment in which the creation come about (Press).

2.4.1 Creativity as the Product

The word ‘Creativity’ is derived from the Latin word ‘Crea’ which means to create, creating something new, original and unique. ***Morgan (1953)*** listed 25 definitions of creativity and viewed that creativity involves the development of something unique. It may be a painting, a poem, a theory, a story or a solution. The newness only in the product is not enough. It must also be useful or satisfying. Both novelty and utility have to be combined in a product before it can be rated as creative.

2.4.2 Creativity as the Process

The process approach to creativity is concerned with what actually happens in producing something creative or in other words, what are the processes involved in the creative act?

Torrance, who is a pioneer in the field of creativity research, says, "*The process of creativity consists of sensing problems or gaps in information, forming ideas or hypotheses and communicating the result.*"

The process of creativity is also described as combination of ideas that are not generally associated together. This is what ***Mednick (1964)*** calls 'remote association'. There is an intermixing of ideas. This usually results in new combinations. Out of a number of combinations one or two may turn out to be creative.

Based on the product and process approaches, creativity may be defined as a process to fill a sensed gap resulting in a new insight in which ideas, not usually associated together are combined or some ideas are perceived in a new perspective leading to a novel and useful product.

There are different stages of the creative thinking process. Thinking of new and unusual ideas involves more than a flash of insight. Coming with new ideas is not the end of the process. Edison, the inventor of the light bulb, took years of experimenting with hundreds of failures until he succeeded in producing bulb which worked.

2.4.3 Creativity as the Person

Certain personal qualities help the individual to be creative like openness (descriptive terms like curiosity, adventure-someness, inquisitiveness, and exploration), an internal locus of evaluation (ascribing success as result of efforts and self confidence) and the ability to toy with elements. Review of published work in the area of creativity reveals that qualities like risk-taking, independent in making judgment, less authoritarian ***(Stein and Henze),*** awareness, humour, non-conformity, confidence, self sufficient, accepting disorder, strong affection ***(Torrance),*** fluency, flexibility, originality and elaboration in thinking, scepticism, intellectual playfulness

(Guilford), and many more characterize creative person at all levels whether they are in school or have grown into adults.

It is generally found that people are creative within particular domains, even though people who are creative in different may share common traits. This one may be a creative biologist but an uncreative novelist.

2.4.4 Creative as the Press

A deep into the creativity literature reveals that creativity is seen not only a person, as a product, as a process but it sometimes results from the person and his interaction with the environment, which is known as press. The more congenial the environment for creativity, the more a person is likely to exhibit his creativity.

Regarding environmental correlates ***Taylor and Barson (1996)*** have observed: "We are perhaps more in dark about environmental conditions which facilitate creativity than we are about any other aspect of the problem. Beyond obvious conditions such as the need for ample time in which to work freely on problems of one's own choice little is known."

Certain important factors like democratic conditions in group work, freedom of expression and movement, look of fear of failure and provision of psychological safety, encouragement and motivation, playfulness, breaking the barriers of conformity, family environment and background-play very important role in proper nurture of creativity of an individual.

Thus, the above described four Ps related to the creative thinking, point out the abilities and personality traits of individuals associated with creativity, which are as follows:

2.5 Abilities and Personality Traits Associated with Creativity

A creative person is the product of a number of abilities and favourable personality traits. Each field of creative work requires certain basic abilities. In the absence of requisite abilities, creative work of a high order can hardly be expected.

2.5.1 Creative Abilities

Creative ability is a characteristic endowment of human being and has been mainly responsible for development of civilization and culture. The major creative abilities are discussed as under:

(i) Divergent Thinking

Guilford's major contribution to creativity is his concept of divergent thinking as given in the Structure of Intellect Model. In divergent thinking there can be a number of answers which can emerge. It is an open-ended thinking.

Divergent thinking abilities generally include Fluency, Flexibility, and Originality.

(a) Fluency

Fluency is represented by number of relevant and unrepeated ideas which the individual produces. Relevance is judged on the basis of the appropriateness of the response when considered in relation to the test problem. An unrepeated idea is one which has been expressed only once under a given problem.

(b) Flexibility

Flexibility is represented by a person's ability to produce ideas which differ in approach or thought trend. All the ideas which fall under one category of approach or thought trend are treated as one for purpose of flexibility scoring. Thus if five ideas are produced and all belong to only one category of approach or thought trend, then the score for the flexibility will be one, but if all the five ideas are based on five

different approaches or thought trends, then the flexibility will be five depending on the number of categories of thought trends to which the responses belong.

(c) Originality

Originality is represented by uncommonness of a given responses. Responses given by less than 5% of the group are treated as original.

(ii) Intelligence as an ability

Guilford and his associates (1950, 56) on the structure of intellect have brought out with the distinction between the two types of thinking abilities as, convergent thinking came to be identified with intelligence as usually defined and measured by the well known intelligence tests, while divergent thinking gave the most obvious indication of the term 'Creativity'.

As the concept of creativity emerged, it was noticed that persons with IQ were not necessarily creative also. At the same time, creative ideas could come from persons, who did not have a very high IQ. This led educationalist to recognize intelligence as one type of ability and creativity as another. Of course, to be creative a certain level of intelligence is required but not vice-versa. Intelligence enables a person to comprehend complex problems while creativity helps him in being productive in new directions.

(iii) Problem solving ability

It refers to all those mental and experimental activities a person goes through in attempting to resolve some problems. There are certain abilities related to problem-solving and creative thinking. Among these are sensitivity in perceiving a problem, defining the problem, eagerness to look for more information, searching for alternative solutions, willingness to accept conclusions, searching for unusual ideas and seeing new relationships.

(iv) Intuition and the Unconscious

Intuition is the ability of coming to a conclusion without going through all the steps of analytical thinking. There are number of instances where the scientist knew the answer even before he started the investigation.

The unconscious follows a type of thinking that is different from the logical and analytical thinking of the conscious mind. Freud has studied the mechanism that the unconscious uses in thinking and calls them primary thought process. These mechanisms can be seen in dreams. Some persons have access to the resources of the unconscious in their creative work. But there is very few research evidence about how to use intuition and the unconscious in creative work.

2.5.2 Personality Traits

There are some personality traits that bear a close relationship to creativity. Some of these are as bellow:

(i) Motivation

Creative person who have attained eminence show a high level of motivation. They find their work so absorbing that they prefer to forego social and recreational activities that would take them away from their work. Eminent scientists are observed to work long hours, 7 days a week, because their work gives them more pleasure than anything else. This is what called ‘intrinsic motivation’. They work to satisfy an inner urge and not just to get an external reward.

(ii) Imagination and Visualization

Imagination saves the individual from unnecessary labours and expenditure of time. Many creative ideas are first imagined and then translated into action. Visualization is an aspect of imagination where in persons are able to see images and manipulate them. When visual images replace symbols their thinking gets a new direction leading to an unexpected solution.

(iii) Independence

Another important characteristic of creative persons is that they are independent in thinking and also independent in their judgment. If a person is swayed by criticism, he will never be able to implement his ideas. A creative person has the capacity for taking calculated risks. He is able to take risk because he has confidence in himself and courage of his convictions.

(iv) Tolerance of Ambiguity and preference for complexity

In any creative attempt a person will come across situation which are complex and which do not indicate any clear-cut results or solutions. He has to face complexity and ambiguity.

(v) Introversion

Creative persons are usually introverts. They avoid spending time in social gatherings or meeting people unless it has something to do with their work. They prefer solitude as it gives them time to do their thinking. But this does not mean that all creative people are introverts also.

(vi) Curiosity, Wide Range of Interests and Humour

Creative persons are open-minded and more receptive to new ideas. They are more curious. And due to this only they have wide range of interest. Creative people are usually interested in a variety of things, though due to lack of time they may have to forego many of their interests and hobbies.

Creative person have a sense of humour. This may not be of much help to them in their work unless they are writing something witty, or drawing a cartoon but the mental operation in humour is the same as in creative work. A direct benefit of humour is that, at crucial moments it helps to release tension.

(vii) Artistic and Aesthetic Interests

It is natural to expect high aesthetic interest among artist and writers. But scientists including social scientist also show deep interests in artistic creations and

music. One can say that rhythm, harmony, balance and other elements of arts have some kind of relationship to creation in fields that are not directly related to art.

These are some of the personality traits and abilities associated with creativity. Each individual will have a unique combination of these, or may have some other traits and abilities which have not been discussed here.

With the help of the above discussion, it can be stated that the level at which an individual is working is not the same as that abilities and personality traits. The latter is decidedly working at higher level. In this regard, several psychologists have tried to describe the levels and types of creativity, which are as follows:

2.6 Creativity – Levels and Types

2.6.1 Levels of Creativity

Creativity operates at different levels. The higher order level creativity might change the meaning of the Universe, whereas, the lower order level may marginally develop an idea or improve a product. All children have some element of creativity. It may be expressed in a child's writing essays, poems, paintings, drawings, music, dance, classroom discussion, experiments, working on projects and co-curricular activities.

Ghiselin (1963) puts creativity under two broad levels: primary and secondary. Primary creativity is that which "alters the universe of meaning itself, by introducing in it some new elements of meaning or some new order of significance, or more commonly both". The work of Einstein (theory of relativity), Copernicus, Harvey, Freud, Piaget and others are good examples of primary creativity.

Creative action at the secondary level brings about further development to an established body of knowledge. For example, ***Terman*** took up Binet's tests of intelligence, refined and modified them, and added new tests. Binet's work would come under primary creativity, while that of Terman under secondary creativity.

2.6.2 Types of Creativity

Creativity is of two types – verbal and non-verbal. A child may show creative behaviour in writing, or composing poems. This is verbal creativity. The child may show creative behaviour in drawing, painting, craft etc. This is non-verbal creativity.

Some students are good on verbal creativity, whereas others may be good on non-verbal or both. Normally creativity includes the capability of producing more ideas in many different directions and giving original responses along with their relevant details for the solutions of a given problem.

Thus on the basis of the above discussion, it can be concluded that creativity is not limited to artistic productions or scientific inventions and discoveries. It can find expressions in any activity, howsoever humble or grand it may be. It makes an object or activity better, richer, more productive, fruitful and aesthetically satisfying. Ultimately it proves that creativity is mankind's greatest asset and creative people are the backbone of any nation. Hence, the need of ***why*** and ***how*** to identify, nurture, and develop the creativity among individuals has been strongly felt.

Chapter: 3

REVIEW OF RELATED LITERATURE

3.1 Introduction

Review means a critical appraisal of a play, a book or other work or a formal assessment of something with the intention of instituting change if necessary. Review of related literature means referring to material related to the research topic.

The ability to carry out a literature review is an important skill for any student. The review of the literature is carried with an aim/objective to gain insight to the problem under study.

In order to do a literature review it is needed to spend time reading the literature relevant to the topic of research. Understanding the literature in the research topic prevents us from repeating previous errors, or redoing work which has already been done. It also gives us insight into aspects of the topic which might be worthy of exploration and future research.

A review of the related literature must precede any well planned research study. It enables the research to define the limits of his/her field. Also the researcher can avoid unfruitful and useless problem areas and avoid unintentional duplication of well-established findings. It also helps in developing insight of the research methodology. Also through reviewing the literature the suggestions and recommendations of previous researcher can be taken into account.

Taking all this into consideration the following studies were reviewed which have been mentioned below into the categories according to the research topic.

3.2 Review of Related Literature

3.2.1 Studies Related to Gender differences and Creativity

Kumar (1993) did a research on creativity among secondary school students in relation to sex, types of schools and ethnicity.

Aims of the study were: (1) To study the nature of creativity scores. (2) To find out the relationship between sex and different dimensions of creativity. (3) To find out the relationship between types of schools and different dimensions of creativity. (4) To find out the relationship between ethnicity of schools and different dimensions of creativity. (5) To investigate the difference between high creative male students and high creative female students on different dimensions of creativity. (6) To investigate the difference between low creative male students and low creative female students. (7) To investigate the difference between high creative private schools students and high creative government schools students on different dimensions of creativity. (8) To investigate the difference between low creative private schools students and low creative government schools students on different dimensions of creativity. (9) To investigate the difference between high creative tribal students and high creative non-tribal students on different dimensions of creativity. (10) To investigate the difference between low creative tribal students and low creative non-tribal students on different dimensions.

Sample consisted of 500 students of secondary school of Bharatpur, Rajasthan. Baquer Medhi Test of Verbal Creativity was used as tool of measure. Data were analyzed by using t-test of significance.

The findings of the study were: (1) Sex, types of school and ethnicity have their bearing on creativity. (2) High creative females are significantly higher than high creative males. (3) Low creative males are significantly higher than low creative females. (4) Males are more creative than female on fluency and flexibility dimensions of creativity while they do not differ in their creative clarity significantly on originality dimension of creativity and also on composite creativity. (5) High creative private schools students were significantly higher than their government

schools counterparts. (6) Low creative private schools students are more creative than below average creative government schools students. (7) High creative non tribal, low creative non-tribal and total non-tribal groups were significantly higher than high creative tribal, low creative tribal and total tribal respectively.

Hussain and Hussain (1975) studied creativity of both male and female students drawn from two cities of two different states of India, with respect to fluency, flexibility and elaboration. He did not find sex differences in respect to creativity. However, **Badrinath and Satyanarayan (1979)** mentioned that except in case of originality, there was no sex difference with respect to other components of creativity. On the same line **Pandey and Pandey (1984)** reported that there was no significant sex difference with respect to various creativity factors though it was evident from his result that 10^{th} grade female students mean creativity was significantly higher than 10^{th} grade male students in elaboration.

3.2.2 Studies Related to Socio Economic Status (SES) and Creativity

The relationship between SES and creativity has been studied by **Rawat and Agrawal (1997), Kumar (1989), Sharma (1986), Srivastava (1982), Singh (1978), Singh (1977), Thorat (1977) and Vohra (1975).** They have reported that creative thinking comes from high SES.

Shair (1988) studied creative thinking among boys and girls in relation to their socio-economic status. 200 subjects (100 boys and girls) in the age range of 14-16 years from twelve schools were selected as the sample for the study. The tools used were Test of Creative Thinking (verbal) by Baqer Mehdi, and socio-economic status questionnaire by Kapoor. Mean, SD, 't' test were used for analysis of data. It was found that:

(i) Creativity and SES were positively related.

(ii) No gender differences existed in creativity.

3.2.3 Studies Related to Intelligence, Achievement and Creativity

Upadhyaya (2000) conducted a study of creativity in English language at plus two level in relation to achievement motivation, imagery and achievement.

Aims of the study were: (1) To develop and validate the creativity test in English for plus two level students. (2) To study the extent of creativity in English language among the students. (3) To study the extent of achievement motivation, imagery and achievement in English. (4) To study the sex differences with respect to (a) creativity in English, (b) achievement in English, (c) Imagery, and (d) Achievement in English. (5) To study the difference between the creative and non - creative with respect to: (a) achievement motivation, (b) imagery, and (c) achievement in English. (6) To study the relationship between creativity in English and (a) Imagery, (b) Achievement motivation, and (c) Achievement in English respectively.

The findings of study were: (1) Creative and non-creative pupils do not differ significantly with respect to achievement motivation. (2) Creative pupils differ significantly from non-creative with respect to imagery. (3) Creative pupils are highly superior to non-creative pupils in achievement in English. (4) The girls are superior to boys with respect to fluency component of creativity in English. (5) The boys and girls do not differ from each other with respect to flexibility component of creativity in English. (6) The boys and girls are not the same in their performance with respect to originality. (7) The girls are superior to boys with respect to elaboration. The elaborating capability is greater than the boys. (8) The boys and girls differ significantly with respect to creativity in English. The girls are superior to the boys in creative thinking. (9) The boys and girls do not differ significantly with respect to achievement motivation. (10) The boys and girls differ significantly with respect to imagery. The girls are superior to the boys in relation to imagery. (11) The boys and girls differ significantly with respect to achievement in English. The girls are better.

Polaniappan (1998) examined the relationship between figural creativity and cognitive preferences among Malaysian students. Data were drawn from 165, 23 to 27

years old undergraduate students, who completed the Torrance Tests of Creative Thinking and measures of recall, questioning, principle and application modes from the combined cognitive preference Inventory. Results revealed that figural creativity and its components were not significantly associated with the student's mode of cognitive preference or their factor scores.

Kim, Junghee and William (1995) conducted a study to investigate the relationship of creativity measures to school achievement and to preferred learning and thinking style among Korean high school students. Subjects were 92 male and 101 female 11^{th} grade Korean students. Findings revealed that measures of creativity translated from the Torrance Tests of Creative Thinking demonstrated little, if any, relationship to school performance. An investigation of possible gender differences indicated that females may be expected to demonstrate higher average levels of performance of creativity tests than will their male counter parts.

Yong (1994) studied the relations between creativity and intelligence of 397 Malaysian secondary school pupils. The Torrance Test of Creative Thinking, Figural Form A and Verbal Form A (Malay language version) and the Cattell Culture Fair Intelligence Test were administered to 181boys and 216 girls from five secondary schools located in the urban and suburban areas of Kuala Lumpur and Petaling Jaya in Malaysia. Analysis indicated that scores on verbal creativity were related to intelligence, while those on figural creativity were not.

Chadha and Chandna (1990) examined the correlation between creativity, intelligence and scholastic achievement. The sample of the study consisted of 79 students (42 boys and 37 girls) of grade XI under the 10+2+3 system from a reputed Delhi Administration school. The tools were used to collected the data included Torrance Tests of creative thinking and Raven's Advanced Progressive Matrices. Annual marks of class-XI results were taken from the school records, as a measure of scholastic achievement. Correlation and partial correlations were used for data analysis. It was found that the correlations were positive and significant between creative and intelligence, creativity and scholastic achievement and intelligence and scholastic achievement.

Prabhavthamma (1987) investigated into the creative writing ability of composing a poem and writing an imaginative story in English for student-teachers in India and in Nigeria. She had also studied the effects of achievement in English, sex, medium of instruction, economic status and parent's education on their creative writing ability. The sample selected was 752 B.Ed. students with English method from different cities: Bombay, Guntur, Calcutta, Madras, Delhi and 50 student teachers from Sokoto (Nigeria). The tools used were interview schedule and oppinionnaire for the creative writers to study the creative writing process; the student-teacher's questionnaire, composing a poem, and writing an imaginative story. The major findings were:

(i) Among the five cities, the student-teacher's of Bombay topped in creative writing ability.

(ii) The high achievers in English at graduate level were found to be more creative in the poem and story writing.

(iii) There was a significant difference in creative writing ability of the males and females.

(iv) The significant difference was found between the student teachers of two mediums: regional language and English.

(v) There was significant difference between high and middle and high and low economic groups.

(vi) The attitude and aptitude to creative writing of Indian student teacher's were higher than the Nigerian student teachers, but their experience in creative writing was not more than that of Nigerian student teachers.

Qureshi (1980), on a sample of 300 girls of high schools and intermediate classes, selected from Firozabad town, administering Mehdi's test of creativity, group test of mental ability (Jalota), STAT (Sharma, and singh, Hindi), Level of Aspiration Inventory (Patel) utilizing analysis of variance and coefficient of correlation, found that intelligence, manifest anxiety and aspiration indicated influence on creativity and

its components-fluency, flexibility, originality differently; intelligence, appeared to be significantly and positively correlated with creativity.

3.2.4 Studies Related to Personality, Environment and Creativity

Naik (2002) conducted a study of creativity among students in relation to their personality characteristics, motivational characteristics and school background.

Major aim of this research was to ascertain the gender differences in creativity and to ascertain the school type differences creativity.

The findings of the study were: (1) Boys and girls are not found to differ on self-esteem as well as school climate. However, girls were found to be significantly higher on total creativity. (2) There is a significant difference in the relationship between creativity and school climate and creativity with locus of control.

Rajnish (1998) did a research on scientific creativity of traditional, model and Navodaya School students in relation to certain psychological and socio – demographic variables.

The main aims of the study were: (1) To construct problem solving ability test for XI class. (2) To construct achievement test in science for XI class. (3) To study the relationship of psychological variables. i.e. intelligence, problem solving ability, science achievement, self – concept and personality characteristics with scientific creativity of Traditional, Model and Navodaya schools students. (4) To compare the differences in scientific creativity on the basis of sex, urban-rural areas, school and two levels of socio-economic status of Traditional, Model and Navodaya schools students.

The Survey Method was used. The sample consisted of 600 students of Class XI from Traditional, Model and Navodaya Schools. The sample was selected by Cluster Sampling Method. Scientific Creativity Test by Kalra, Group Test of General Mental Ability by Tandon, Self – Concept Questionnaire by Saraswati, An Indian Adaptation of 16 PF Questionnaire by Kapoor and Tripathi, SES Scale by Trivedi and Udai

Pareek, Problem Solving Ability Test (Test-retest reliability coefficient = 0.81), Achievement Test in Science (Test-retest reliability coefficient = 0.78) developed by researcher were used for data collection. The data were analyzed using Mean, Median, Correlation and t – test.

The findings of study were: (1) Intelligence correlates significantly and positively with both parts of scientific creativity in Traditional, Model and Navodaya Schools (2) Problem solving ability correlates significantly and positively with both the parts of scientific creativity in Traditional, Model and Navodaya Schools. (3) Both the parts of scientific creativity are found to be significantly and positively correlated with the science achievement in the entire three samples. (4) Self-concept is found to be insignificantly correlated with the criterion measures of scientific creativity part A and part B in Traditional as well as in Model schools sample whereas it is significantly and positively correlated with only scientific creativity - part A in Navodaya School sample.

Hota (1998) studied the impact of home environment and institutional climate on scientific creativity of high school students. A total sample of 190 students of 10^{th} grade (100 boys and 90 girls) of secondary school of Sundergarh district of Orissa was selected by using cluster random sampling. The tools used were Gupta's Test of Scientific creativity, Joshi's Institutional Climate Inventory and Family orientation scale of Sangeeta Gupta. Two-way and Three-way ANOVA were used for the analysis of data. It was found that family orientation, institutional climate, sex and family type, sex and sibling position respectively, in relation to creativity were found to be insignificant, whereas significant for type of family and sibling position was not found significant.

Khare (1994) conducted a study of creativity in Biology at +2 stage in the context of personal values and achievement motivation.

The main aim of the study was to study the personal values in low and high creative students in bioscience subject. For the study 800 students were selected by using random sampling technique. Tools used for data collection were: Test for

measuring scientific creativity developed by the investigator. The reliability coefficient was 0.84 by split-half method and criterion validity was found to be 0.80., Personal Value Questionnaire by Sherry and Verma, Performance Motivation Test by Gopal Rao. The data were analyzed by using mean, median, SD, t-test, mode, Pearson-Correlation and regression Analysis.

The findings of study were: (1) There is no significant difference between high and low creative groups in terms of religious, social, economic, cognitive, pleasant value, demographic, esthetic and family values. (2) Performance motivation was higher in boys than girls. (3) Creativity was higher in urban students. They were higher on fluency, flexibility, and originality than rural students. (4) Aesthetic and health values were high in rural than urban students while urban students were high on economic value. (5) On the basis of regression analysis, performance motivation, sex, health and value affected creativity in bioscience subject. (6) On the basis of regression analysis, region value, pleasant value, power value, social value, demographic value, family value, health value and sex variable affected performance motivation.

Prabasini Devi (1993) conducted a study of creativity and academic achievement in relation to mental health of tribal and non-tribal high school students from Kurukshetra University.

The main aim of the research was to study the effect of culture (tribal and non-tribal) on creativity of high school students. And to study the effect of mental health factors viz., (a) insecurity, (b) inferiority, (c) psychoticism, (d) neuroticism, (e) extraversion, (f) state-anxiety, (g) trait-anxiety, and (h) adjustment on creativity of high school students. The population in the present study consisted of tribal and non-tribal students. Tribal students were selected from Saora tribe, one of the most primitive tribes of Orissa state. The sample was not selected from Haryana state because there are no tribal areas in Haryana from where tribal students could be selected. However, a large number of tribal students are available in Orissa state. A sample of 200 tribal students was selected from the different schools of tribal areas of Ganjam district of Orissa state. The sample was selected by Stratified Random

Sampling Technique. For comparing their creative potential and academic performance, a sample of 320 non-tribal students was selected from five institutions situated in Paralakhemundi – a sub - division headquarter of same district of Orissa state. There were 160 Tribal male and 200 non-tribal Male (Total 360) and 40 tribal female and 120 non-tribal female (total 160) Grand total 520 students taken as sample. Culture as a single main variable showed significant difference on creativity of the students. The mean scores showed that non-tribal students had more creative potential than tribal students. Sex as a single main variable did not show significant difference on creativity of the students. Thus, male and female high school students did not differ in creative potential. Only one mental health factor had significant effect on creativity. Extroversion as a single main variable showed significant difference on creativity of the students. Extrovert students had been found to be more creative than introverts. The rest of the factors of mental health i.e., insecurity, inferiority, psychoticism, neuroticism, state-anxiety, trait-anxiety and adjustment as single main variables did not show significant difference on creativity of the students.

Katra (1993) did a research on scientific creativity in relation to intelligence, personality, cognitive styles and selected environmental catalysts from Punjab University.

Aim of this research was to study and compare the relationship of intelligence, personality, cognitive styles and selected environmental catalysts with scientific creativity of the urban and rural students. The sample comprised 500 senior secondary students from Punjab selected by multiple randomization technique. Intelligence correlated significantly with the scientific creativity part A and part B separately for rural students. Urban creative students were found to be stiff, cool, aloof, conscious, socially bold, skilful, and ingenious and having dexterous nature. Over all personality factors of rural sample were positively correlated with the total scientific creativity. Total scientific creativity was found to be significantly correlated with cognitive styles in case of rural sample. But in case of urban sample, the total scientific creativity was not significantly correlated with cognitive styles. All the factors of

catalysts of environment correlated significantly with total scientific creativity of students of both the samples.

3.2.5 Studies Related to Teaching Aptitude, Skills and Creativity

Pathak (2002) did a research on preparation of a creativity program for pre-service teacher trainees at primary level and study of its effectiveness at M.S. University.

The main aim of this study was to prepare pre-service teachers for creative program and check its effectiveness at primary level. The study was experimental and pretest-posttest design was used. Sample consisted of 46 pre-service teacher trainees (PSTTs) of I year pre-service teacher educator (PSTE) (1990-2000) of DIET-Rajapipla as experimental group and 43 pre-service teacher trainees (PSTTs) of DIET Santrampur as control group. The main effect of the treatment in terms of a creativity program on PSTTs was significant for the creativity and its components namely; fluency, flexibility, originality and elaboration respectively.

Lakshmi (1998) did a research on creativity, teaching skills and personality among student teachers of colleges of education affiliated to Andhra University.

Aim of this study was to check the creativity, teaching skills and personality of student teacher of Andhra University's educational colleges. Sample consisted of 493 student teachers belonging to different colleges of Andhra University. Creativity of student teachers had no relationship with the frequency and intensity of teaching skills. There was a positive relationship between creativity and personality of student teachers. Student teachers with high creativity possessed with ergogenic index, plasticity trend and social trend. The frequency and intensity of teaching skills were related to personality of student teachers. Student teachers who were more frequent in using teaching skills were possessing social ergogenic index, plasticity and social plasticity. Similarly, student teachers who were strong in using teaching skills were possessing social ergogenic index and plasticity.

Jain (1992) investigated about the factors such as pupil-teacher's creativity and its relation to their teaching aptitude, teaching skills and personality variables that may reveal useful and new facts which may have a direct influence on the teachability of creativity. 280 pupil-teachers from two colleges formed the sample of the study. The tools used were: (i) Torrance (1997) Test of Creative thinking (Verbal Form A), (ii) Classroom creativity observation schedule by Denny, (iii) Cattell's (1962) sixteen Personality Factors Questionnaire, (iv) Teaching Aptitude test by Prakash and Shrivastava and (v) Micro teaching Techniques and observation schedule prepared by the researcher. Mean, SD, coefficient of correlation and 't' – tests were used for the analysis of data. Positive and highly significant correlation was found between creativity and classroom creativity, teaching aptitude and teaching skills. Low but positive and significant relationship was found between teacher's classroom activity and teaching aptitude. Out of the sixteen personality factors, positive and highly significant relationship was found with the factors C (Emotionally stable), G (Conscientious) and Q1 (Experimenting).

3.3 Conclusion

Creative ability is a characteristic endowment of human being and has been mainly responsible for development of civilization and culture. Creativity is not a newly invented phenomenon. The spirit of the present the emergence of new responsibilities, new social and cultural necessities, deep and tumultuous changes in social norms and objectives have made creativity a rapidly expanding area of scientific interest. A great variety of studies have been designed and carried out in the area of creativity prediction and also in education and training. The most impressive feature characterizing the area of creativity research is a confluence of interests and its diversity. There are varied fields such as: nature of creativity; identification and measurement of creativity; intelligence, achievement and creativity; correlates of creativity; socio-cultural factors and creativity; nurturance of creativity; training of personnel's; and systems approach- in which investigators have carried out their studies.

Although many studies have been conducted to establish the relationship between intelligence and creativity, achievement and creativity, effect of gender, SES (Socio-economic Status), personality factors and environmental factors on creativity, very few studies have been reported at the level of Teacher Education. Teaching aptitude and creativity are essential for preparing effective and competent teachers. Hence, the research felt the need to investigate into the level of creativity of pre-service teachers which can help in planning of teacher educator curriculum and also serve as a guiding light to use different methods and techniques during classroom instruction so, as to enhance efficiency and competency of teacher trainees. Hence, the present study was undertaken by the researcher.

Chapter: 4

RESEARCH METHODOLOGY

4.1 Introduction

The present chapter deals with the planning and procedure adopted for the present study including data collection and data analysis. The description of the procedure followed has been mentioned below-

4.2 Research design

The present study has utilized the *descriptive method* of carrying out research. The descriptive method research studies are designed to obtain pertinent and precise information concerning the current status of phenomena and, whenever possible, to true valid general conclusions from the facts discovered. They are restricted not only to fact finding but may often result in the formulation of important principle of knowledge and solution of significant problems concerning local, state, national and international issues. Descriptive studies are more than just a collection of data; they involve measurement classification types of information: (1) of what exists with respect to variables or conditions in a situation; (2) of what we want by identifying standards or norms with which to compare the present conditions or what experts consider to be desirable and (3) of how to achieve goals by exploring possible ways and means on the basis of the experience of others or the opinions of experts.

Descriptive studies vary greatly in complexity. At one extreme, they constitute nothing more than frequency count of events to the study of local problems without any significant research purpose. At the other extreme, they attempt to ascertain significant interrelationships among phenomena.

4.3 Research Type

The present study is *survey type* research. Surveys represent one of the most common types of quantitative, social science research. In survey research, the researcher selects a sample of respondents from a population and then collects information from them. Using surveys, it is possible to collect data from large or small populations (sometimes referred to as the universe of a study).

4.4 Population

The population for the present study comprised of all the English medium B.Ed. Colleges of Sardar Patel University.

4.5 Sample and Sampling Procedure

The sample of the present study comprised of pre-service teachers of Waymade College of Education and H.M. Patel Institute of English Training and Research selected through Convenient Sampling Technique. The sample for the present study has been presented in a tabular form as under-

Table No. 4.1: Sample of the Study

Gender	Name of the College	
	Waymade College of Education (College A)	**H.M. Patel Institute of English Training and Research (College B)**
Male	**14**	**37**
Female	**45**	**48**
Total	**59**	**85**

4.6 Tool

For the collection of the data Dr. Baqer Mehdi's test of Creative Thinking was used as the tool for investigating creativity of the pre-service teachers. It is a verbal test of creativity and includes four sub-tests, namely, consequences test, unusual uses test, similarity test and product improvement test. Both the factor score and the total creativity score reliabilities obtained through test-retest method are considerably are considerably high. Reliability coefficient for fluency is 0.945, flexibility is 0.921, originality is 0.896 and total creativity score is 0.959. The validity coefficients are also high. It is 0.40 for fluency, 0.32 for flexibility, 0.34 for originality and 0.39 for total creativity score.

4.7 Data Collection

Data was collected personally by the investigator. It was collected through the administration of Verbal Test of Creative Thinking of Dr. Baqer Mehdi which is a standardised test. This test was used in both the colleges for the checking the level of the creativity of the pre-service teachers as per the instructions and procedures given in the manual.

After collecting the data from both the colleges, scores for Fluency, Flexibility and Originality were also calculated as per the instructions in the manual.

4.8 Data Analysis

After completing the above procedure the investigator got the raw scores for fluency, flexibility and originality. Then the raw scores were converted into 'T' scores as per the formula given in the manual.

After getting the scores for Fluency, Flexibility and Originality, the investigator got the final scores for Creativity for both the colleges. But the investigator found that

the norms for percentile given in the manual did not match the present group. So, he prepared his own norms for the scores of Fluency, Flexibility and Originality as well as for Total Creativity scores. For making the norms the investigator used the formula, M – SD and M + SD, where M – SD stands for low in creativity and M + SD stands for high in creativity, and others which fall in between these scores come in the category of average in creativity.

Percentage analysis was used to categorize the individuals into highly creative, average creative and low creative individuals.

Chapter: 5

DATA ANALYSIS, INTERPRETATION AND DISCUSSION

The present chapter is devoted to the analysis and interpretation of the collected data to achieve objectives and answer the questions presented in the initial chapter. The data analysed has been presented in tabular form as under-

Table No. 5.1: Level of Fluency amongst Pre-Service Teachers

Name of the College	Category	Low Creativity (%)	Average Creativity (%)	High Creativity (%)
College 'A'	Male (14)	0.00	13.55	10.16
	Female (45)	0.00	45.76	30.50
	Total (59)	0.00	59.32	40.67
College 'B'	Male (37)	0.00	29.41	14.11
	Female (48)	0.00	27.05	29.41
	Total (85)	0.00	56.47	43.52

The table no. 5.1 shows the description of data for 'fluency' component of creativity. As can be observed from the table, in college 'A', out of 59 students, 59.32 per cent were found to be of average fluency and 40.67 per cent students were found

to have high fluency. Out of the 59.32 per cent having average fluency, 13.55 per cent were boys and 45.67 per cent were girls. Similarly, out of the 40.67 per cent students having high fluency, 10.16 per cent were boys and 30.50 per cent were girls.

In college 'B', out of 85 students, 56.47 per cent were found to have average fluency and 43.52 per cent were found to have high fluency. Out of the 56.47 per cent having average fluency, 29.41 per cent were boys and 27.05 per cent were girls. Similarly, out of the 43.52 per cent students having high fluency, 14.11 per cent were boys and 29.41 per cent were girls.

Figure No. 5.1: Level of Fluency amongst Pre-Service Teachers

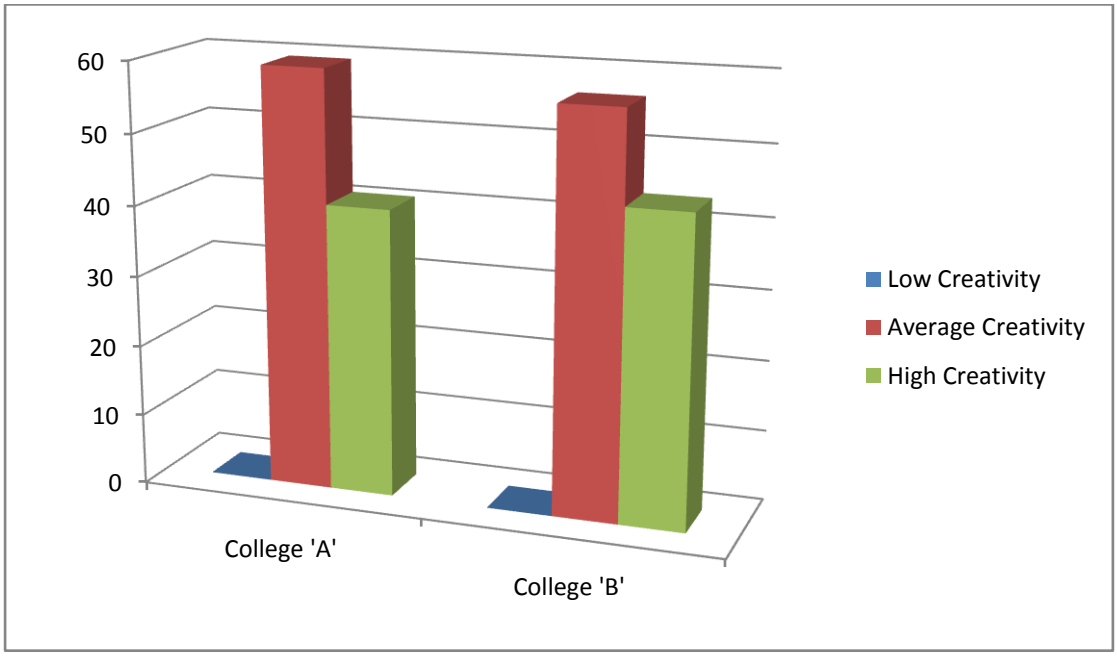


Table No. 5.2: Level of Flexibility amongst Pre-Service Teachers

Name of the College	Category	Low Creativity (%)	Average Creativity (%)	High Creativity (%)
College 'A'	Male (14)	0.00	3.38	20.33
	Female (45)	0.00	8.47	67.79
	Total (59)	0.00	11.86	88.13
College 'B'	Male (37)	0.00	3.52	40.00
	Female (48)	0.00	4.70	51.76
	Total (85)	0.00	8.23	91.76

The table no. 5.2 shows the description of data for 'flexibility' component of creativity. As can be observed from the table, in college 'A', out of 59 students, 11.86 per cent were found to be of average fluency and 88.13 per cent students were found to have high fluency. Out of the 11.86 per cent having average fluency, 3.38 per cent were boys and 8.47 per cent were girls. Similarly, out of the 88.13 per cent students having high fluency, 20.33 per cent were boys and 67.79 per cent were girls.

In college 'B', out of 85 students, 8.23 per cent were found to have average fluency and 91.76 per cent were found to have high fluency. Out of the 8.23 per cent having average fluency, 3.52 per cent were boys and 4.70 per cent were girls. Similarly, out of the 91.76 per cent students having high fluency, 40.00 per cent were boys and 51.76 per cent were girls.

Figure No. 5.2: Level of Flexibility amongst Pre-Service Teachers

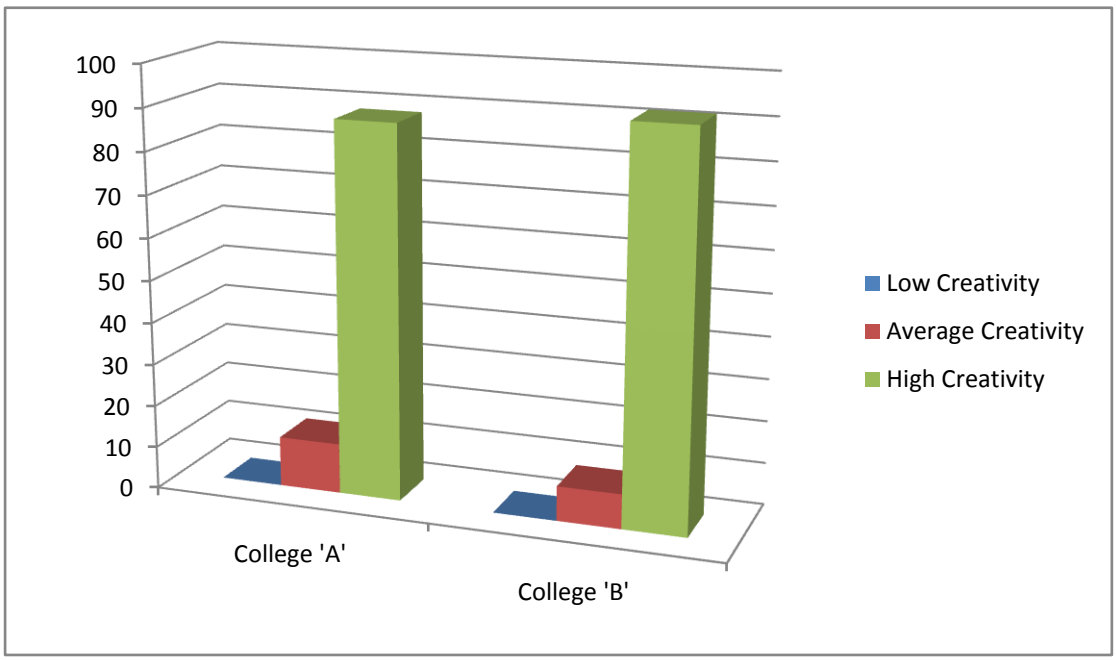


Table No. 5.3 Level of Originality amongst Pre-Service Teachers

Name of the College	Category	Low Creativity (%)	Average Creativity (%)	High Creativity (%)
College 'A'	Male (14)	8.47	0.00	15.25
	Female (45)	28.81	0.00	47.45
	Total (59)	37.28	0.00	62.71
College 'B'	Male (37)	21.17	0.00	22.35
	Female (48)	35.29	0.00	21.17
	Total (85)	56.47	0.00	43.52

The table no. 5.3 shows the description of data for 'originality' component of creativity. As can be observed from the table, in college 'A', out of 59 students, 37.28 per cent were found to be of lower fluency and 62.71 per cent students were found to have high fluency. Out of the 37.28 per cent having lower fluency, 8.47 per cent were boys and 28.81 per cent were girls. Similarly, out of the 62.71 per cent students having high fluency, 15.25 per cent were boys and 47.45 per cent were girls.

In college 'B', out of 85 students, 56.47 per cent were found to have lower fluency and 43.52 per cent were found to have high fluency. Out of the 56.47 per cent having lower fluency, 21.17 per cent were boys and 35.29 per cent were girls. Similarly, out of the 43.52 per cent students having high fluency, 22.35 per cent were boys and 21.17 per cent were girls.

Figure No. 5.3: Level of Originality amongst Pre-Service Teachers

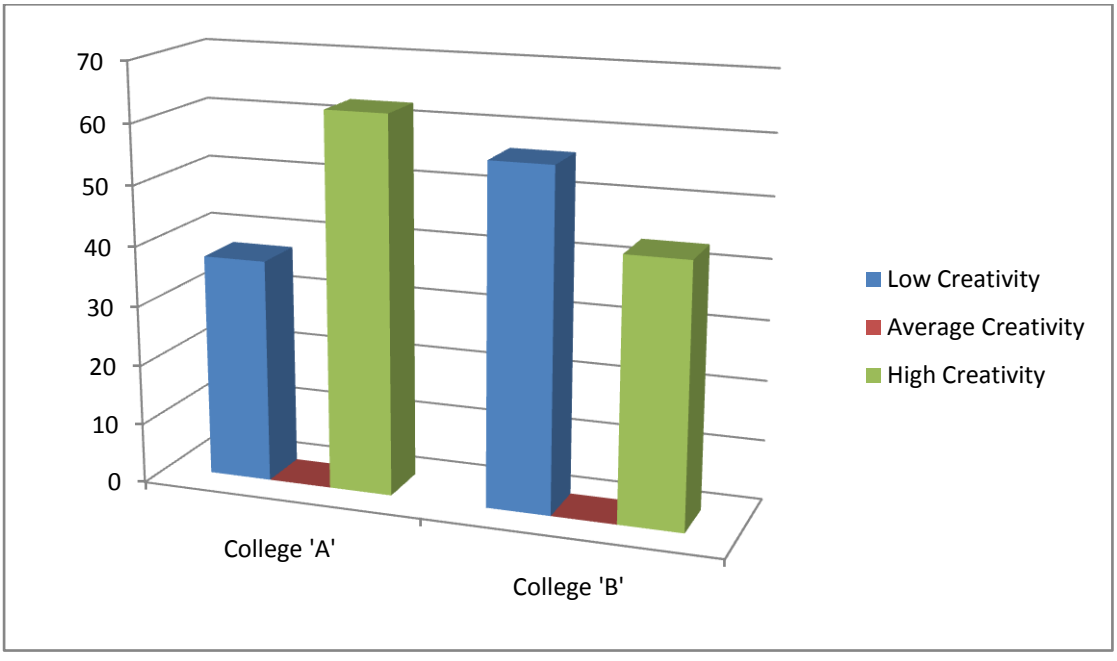


Table No. 5.4: Level of Total Creativity amongst Pre-Service Teachers

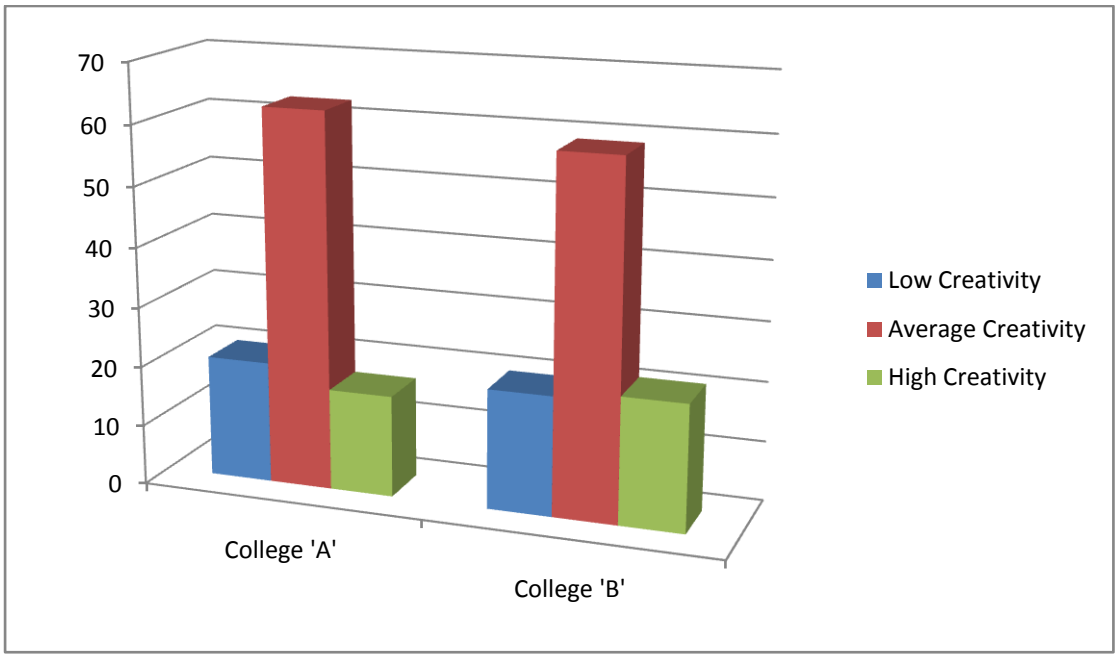
Name of the College	Category	Low Creativity (%)	Average Creativity (%)	High Creativity (%)
College 'A'	Male (14)	6.77	11.86	5.08
	Female (45)	13.55	50.84	11.86
	Total (59)	20.33	62.71	16.94
College 'B'	Male (37)	8.23	24.70	10.58
	Female (48)	11.76	34.11	10.58
	Total (85)	20.00	58.82	21.17

The table no. 5.4 shows the description of data for 'total creativity'. As can be observed from the table, in college 'A', out of 59 students, 20.33 per cent were found to be of low creativity, 62.71 per cent students were found to have average creativity and 16.94 per cent found to have high creativity. Out of the 20.33 per cent having low creativity, 6.77 per cent were boys and 13.55 per cent were girls. And out of the 62.71 per cent students having average creativity, 11.86 per cent were boys and 50.84 per cent were girls. Similarly, out of the 16.94 per cent students having high creativity, 5.08 per cent were boys and 11.86 per cent were girls.

In college 'B', out of 85 students, 20.00 per cent were found to have low creativity, 58.82 per cent were found to have average creativity and 21.17 per cent were found high creativity. Out of the 20.00 per cent having low creativity, 8.23 per cent were boys and 11.76 per cent were girls. And out of the 58.82 per cent students having average creativity, 24.70 per cent were boys and 34.11 per cent were girls.

Similarly, out of the 21.17 per cent students having high creativity, 10.58 per cent were boys and 10.58 per cent were girls.

Figure No. 5.4: Level of Total Creativity amongst Pre-Service Teachers



5.5 Discussion

On analyzing the above tables it was found that the majority of the pre-service teachers fall in the category of average creativity. Females are more creative than their male counterparts. On the component 'fluency', again maximum number of students of both the colleges falls in the category of average creativity. Only a few fall in the category of high creativity. None of the students are low in creativity in terms of fluency. In fluency, the females outnumber the males.

Regarding the component 'flexibility', it was found that majority of the students of both the colleges are highly creative in terms of flexibility which is a good sign. Teaching requires generation of new ideas every time even when one teaches the same lesson to bring about variety in classroom. Only few of them were average in

creativity while none of them were found to be low in creativity in terms of flexibility. For this component also, the females outnumbered the males.

As far as ‘originality’ is concerned it was found that either the students were low in creativity or high in creativity. The average ones were missing. The college ‘A’ had more number of creative individuals in terms of originality wherein again females outnumbered the males.

So, it can be concluded that the pre-service teachers are good in terms of flexibility but a little more attention can be paid towards developing their fluency and originality.

Different methods can be adopted in teacher training programme to enhance the fluency and originality of the pre-service teachers like brainstorming, storytelling, use of multimedia, repeatedly organizing competitions, etc.

Chapter-6

CONCLUSION, SUGGESTIONS AND EDUCATIONAL IMPLICATIONS

6.1 Conclusion

On the basis of the data analysis, the following conclusions have been drawn-

- Majority of the pre-service teachers are having average creativity.
- Females are more creative than their male counterparts.
- Majority of the teachers are having high flexibility
- Majority of the pre-service teachers are having average fluency.
- Pre-service teachers are either high on originality or low on originality.
- Fluency, flexibility and originality are more in female pre-service teachers than in male pre-service teachers.
- Attention is needed to develop the fluency and originality amongst pre-service teachers.
- Adequate measures should be taken in teacher training programme to nurture fluency and originality and thereby creativity of pre-service teachers.

6.2 Suggestions for Further Study

In view of the results obtained in the present study, following suggestions have been put forth to further carry out research in this particular area-

- A module to develop fluency in pre-service teachers can be developed and implemented.
- A module to develop originality in pre-service teachers can be developed and implemented.
- The effect of various methods such as brainstorming, discussion and group work, etc. On creativity of pre-service teachers can be assessed.

6.3 Educational Implications

The first thing which teachers can do with the help of creativity is to motivate the learners. If they get motivated then they will definitely pay attention to the study. And by using different type of innovative teaching aids, teachers can encourage the learners. While using the creative things in a class room or taking a creative lesson, we can generalize constellation of intellectual abilities, personality variables and also problem solving traits. By using creative lesson plan, teachers can give the learners facility to thing for something new and innovative. Classrooms are supposed to be fun learning centres, where the most important quality required is freedom of expression. By encouraging creativity in the classroom, a teacher is ensuring that the student has the ability to analyze a problem and think for her or himself, and is not swayed by orthodox and conventional rules. By promoting free speech, the students are more capable of expressing their thoughts and views regarding any anomalies.

Creativity is the life and blood of human civilization. The future of our nation depends upon the creative talents of the future citizens of our society. Therefore creativity has rightly become a chief psycho-social motif of the present century. Creativity is the highest type of mental functioning, multivariate and complex. Every child is creative to some extent. It is wide spread and it manifested in numerous ways. It is educable and its growth can be accelerated.

Eberle (1968) found that the influence of training in creative thinking processes is significantly reflected in the personality factors. Therefore, it is essential that the aims of education, curriculum and method of teaching, promotions and rewards should be remodelled according to the need of children. In order to promote and develop creative talent, the school programmes need modification. The teacher training colleges, selection and promotion procedures of teachers and the system of administration will have to be overhauled with a view to stimulate potentialities of teachers who would be real guides for the creative students. The ultimate goal being that of bringing improvement in functional role and group dynamics for promoting creative talent, teacher should be trained to identify these personality factors among the children and develop programmes to foster them among the children.

According to the report of the Indian Education Commission (1964) even the little talent enters school and succeeds in climbing the educational ladders, does not blossom fully because it is not discovered sufficiently early and is after engulfed in 'poor schools' poor with respect to the environment they provide to the children. Creative ability is a true barometer of our progress. Future progress needs to be identified early and nurtured properly. Creativity is more than word today. It is an incantation. It is a kind of psychic wonder (Singh, 1987). Creative talent makes history through reshaping man's world. Creative students are the most valuable national asset. Torrance (1962) has shown that both the educational system and teachers themselves are punitive towards children showing creative potential.

One of the main objectives of any system of education is to help unfold and promote to the maximal possible extent the inherent potentialities of its clientele. These potentialities include, among many other things, the creative abilities which keep man above the brute. These are abilities involved in becoming aware of problems, thinking possible, solutions and testing them. If their functioning is impaired, one's capacity for coping with life's problems indeed becomes marginal (Torrance, 1962).

There are individual differences in the degree of creative thinking. The period of early childhood is marked by the rapid occurrence of simple creative visions arising from naturalness. The creative images occur so rapidly that the children are unaware of them. Further every child realizes that each one of them can do some sort of original work, which is worthwhile in its own way. Therefore, the methods of teaching at primary level are to be thoroughly modified. The play way techniques, the project method, the heuristic method and the experimental method are to be given top priority. While teaching children which will pack the creative ability of the children and encourage them to manifest their inherent creative talent and develop self learning skills among them. The principles of APEP (Andhra Pradesh Primary Education Project) and DPEP (District Primary Education Programme) are developed only to achieve this goal of tapping the creativity among the children.

The teachers contact with the child is a very powerful agent in determining the way in which individuals will use their talents. Schools and colleges should endeavour to develop creativity of the student teachers. The student teachers should be urged to go further and do creative work.

Creativity is something like a pearl in an oyster and so has to be brought up. So we will have to make provision for more opportunities for creative learning, if it is considered a worthwhile objective.

The teacher educators should always give positive reinforcement to their thinking. New ideas should always be encouraged. Teachers should pose problems having more than one solution and encourage alternative solutions. Pre-service teachers should be encouraged to complete their assignments and experiments in their projects, they should be given ample time to think of all the alternative solutions. Through encouragements, acceptance and respect for the student's creative responses, an atmosphere could be created which would be generally responsive, that could build and sustain the students in creative work.

Colleges can chalk out programmes to nourish the creativity of pre-service teachers. It is within their reach because, it has been found that creativity is developable through flexible curriculum, the democratize administration through student's councils and committees. Scientific and recreational hobbies, magazines, writing competitions, painting competitions, debates, poetical symposia, excursions, tours etc., go a long way in developing the creative potential of one and all.

This will be possible only when the teachers are made aware of the creative teaching process and its effect on pupil's growth. This may necessitate in pre-service training courses in creative teaching practices. If teachers are trained in such techniques, they will have a significant influence on the productivity of the children in turns of fluency, flexibility, originality and other creativity factors which will definitely bring about qualitative improvement in our education system.

Bibliography

Aggrawal, J.C. (1994). *Essentials of Educational Psychology.* Vikas Publication House PVT. LTD., New Delhi.

Agrawal, K. P. (1992). *Development of Creativity in Indian Schools- Some related issues.* Concept Publishing Co., New Delhi.

Arieti, S. (1976). *Creativity: The magic synthesis.* Basic Books, New York.

Badrinath, S. and Satyanarayan, S.B. (1979). Correlates of Creative Thinking of high school students. *Creative News Letter, 7* (2), pp 16-23.

Baron, R.A. (2004). *Psychology* (5th ed.). Prentice-Hall of India Private Limited, New Delhi.

Buch, M.B. (Ed.) (1974). *First Survey of Research in Education.* C.A.S.E., M.S. University of Baroda, Baroda.

C.A.S.E. (1999-2000). *Research Methodology.* Faculty of Education and Psychology, The M.S. University of Baroda, Vadodara.

C.A.S.E. (1999-2000). *Teacher Education: Vision and Action.* Faculty of Education and Psychology, The M.S. University of Baroda, Vadodara.

Chadha, N.K. and Chandna, S. (2000). Creativity, intelligence and scholastic achievement: A residual study. Indian Educational Review, Vol. 25(3), 1990. *In Fifth Survey of Educational Research,* Vol. 11, NCERT.

Crabtree, Z. (1982). Teacher- pupil relations and creativity. *Research Abstract, Journal of Creative Behaviour,* Vol. 16, Nov. 1.

Deshmukh, M.N. (1984). *Creativity in Classroom.* S. Chand and Co. Ltd., New Delhi.

Dutta, G. (1982). Sex difference in creativity among the tribal of Meghalaya. *Journal of Institute of Educational Research,* 6:(2), pp. 23-26.

Fisher, Bradley, J.S. and Diana, K. (1999). Successful aging and creativity in later life. *Journal of aging studies,* Vol. 13, pp 457-72.

Guilford, J.P., and Merrifield, P.R. (1960). *The Structure intellect model: Its uses and implications.* Los Angles: University of Southern California.

Hota, A.K. (1998). A study of the impact of home environment and institutional climate on scientific creativity of high school students. *In Hota, A.K., Talent and Creativity.* Sarup and Sons., New Delhi, pp. 60-67.

Hota, A.K. (1998). *Talent and Creativity.* Sarup and sons, New Delhi.

Hussain, M.G. (1975). et al, Cultural rolls sex difference and Creativity, Educational Trends, 10(2), pp 141-45.

Kim, Junghee, M. and William, B. (1995). The relationship of creativity measures to school achievement and to preferred learning and thinking style in a sample of Korean high school students. *Educational and Psychological Measurement,* Vol. 55, pp. 60-74.

Koul, L. (1994). *Methodology of Educational Research.* Third Revised Edition, Vikas Publication House PVT. LTD., New Delhi.

Mangal, S.K. (1989). *Advanced Educational Psychology* (2nd ed.), Ludhiana: Prakash Brothers.

Mehdi, B. (1973). *Verbal and Non-verbal Tests of Creative thinking- Manual.* National Psychological Corporation, Agra (UP).

Morgan, C.T., King, R.A., Weisz, J.R., & Schopler, J. (1993). *Introduction to Psychology* (7th ed.). Lalit Offset Printer, Delhi.

Patel, D. V. (1994). A study of the effect of thinking programmes on the creativity of the students. *Journal of Educational Research and Extension,* Vol. 31, No. 1, July.

Prabhavathamma, K. (1987). An investigation into the creative writing process, and identification of the creative writing ability in English, in student teachers in the inter-cultural connotation. Ph.D., Edu., M.S. University, Vadodara.

Qureshi, A.N. (1987). A study of creativity in relation to intelligence, manifest anxiety and level of aspiration of high school girls. Ph.D., Psy., Agra University, 1980. In Buch, M.B. (Ed.) *Third Survey of Research in Education,* N.C.E.R.T.

Shair, B. (2000). A study of creative thinking among boys and girls in relation to socio-economic status. M.Phil., Ed., University of Kashmir, 1988. *In Fifth Survey of Educational Research,* Vol. 11, NCERT.

Yong, L.M.S. (1994). Relation between creativity and intelligence among Malaysian pupils. *Perceptual and Motor Skills,* Vol. 79, pp. 39-42.

APPENDIX

Name:-

Roll No:-

class:-

Age:-

Gender:-

College:

ACTIVITY 1 (कार्य 1)

INSTRUCTIONS

On this and the next page, you have been given some situations which will appear to you impossible. You have to think what would happen if such situations actually arise.

Give as many ideas as may come to your mind but try to think as many novel ideas as you possibly can. Ideas which you think no one else might have thought of what would be the best. Write your responses in the space provided for.

You will be given 15 MINUTES for this activity. After every five minutes you will be told the time so that you may move on to the next problem in the activity.

An example has been given which will help you to know what you have to do.

EXAMPLE

Question : **What will happen if birds and animals start speaking like man ?**

Responses : (i) This world will change into a different kind of society.
(ii) New leaders will emerge from amongst the animals.
(iii) It is possible that a donkey will become our leader.
(iv) It is also possible that he becomes our Prime Minister.
(v) Men may confide their secrets to their animal friends, etc.

निर्देश

इस कार्य में नीचे तीन असम्भव बातें दी गई हैं जो कि कभी सत्य नहीं हो सकतीं । आप केवल यह मान लें कि ऐसा हो गया है । तब आप सोचें कि ऐसा हो जाने पर क्या परिणाम हो सकते हैं ?

प्रश्नों का उत्तर देते समय अपने ध्यान और सोचने की शक्ति को पूरी तरह प्रयोग करने का प्रयत्न कीजिये और 15 मिनट में आप जितने उत्तर दे सकते हैं, दीजिये । ऐसे उत्तर देने का प्रयत्न कीजिये जो आपके विचार में आपके किसी साथी ने न सोचे हों ।

उत्तर छोटे-छोटे वाक्यों में देने का प्रयत्न कीजिये ताकि दिये हुये समय में आप अधिक से अधिक लिख सकें ।

यदि रखिये आपको 15 मिनट में इस कार्य की तीनों समस्याओं के विषय में लिखना है । जब पहले प्रश्न के विषय में कोई उत्तर समझ में न आये तो आप तुरन्त दूसरे प्रश्न को हल करना शुरू कर दीजिये । अगर बीच में या बाद में पहले प्रश्न के विषय में कोई नया उत्तर ध्यान में आये तो उसे भी पहले उत्तरों के साथ लिख दीजिये । आपकी सुविधा के लिये हर 5 मिनट समाप्त होने पर आपको बता दिया जायेगा ।

जब आपसे कार्य आरम्भ करने का कहा जाये तो तुरन्त शुरू कर दीजिये ।

नीचे एक उदाहरण दिया जा रहा है जिससे स्पष्ट हो जायेगा कि आपको क्या करना है—

प्रश्न— **यदि पशु पक्षी भी मनुष्य के समान बोलने लगें तो क्या होगा ?**

उत्तर— (a) यह संसार एक विभिन्न प्रकार का संसार दिखायी देगा ।
(b) पशुओं के राज्य में बहुत से नेता उत्पन्न होंगे ।
(c) सम्भव है कि एक गधा हमारा नेता हो जाये ।
(d) यह भी सम्भव है कि वह हमारा प्रधानमन्त्री बन जाये ।
(e) मनुष्य अपने पशु-मित्रों को अपना राजदार (विश्वस्त) बना लें ।
(f) पशु भी अपने भेद अपने मनुष्य-मित्रों से कह सकेंगे; आदि ।

Problems 1. What will happen if man flies like birds ?
समस्या 1. यदि मनुष्य पक्षियों की भाँति उड़ने लगे तो क्या होगा ?

Answer (उत्तर) –

Problems 2. What will happen if your school is put on wheels ?
समस्या 2. यदि आपके विद्यालय में पहिये लग जायें तो क्या होगा ?

Answer (उत्तर) –

Problems 3. What will happen if man does not require any food to eat ?
समस्या 3. यदि मनुष्य को खाने की आवश्यकता न रहे तो क्या होगा ?

Answer (उत्तर) –

ACTIVITY 2 (कार्य 2)

INSTRUCTIONS

On this and the next page, you have been given names of certain things which could be used in many different ways. You have to think in how many different and new ways the things may be used.

Write as many uses as you can, but to try to think also those which are novel, that is, those which you think no one else might have thought of.

You will be given 12 minutes for this activity. After every four minutes you will be told the time so that you may move on to the next item in the activity.

Below is given an examle which will help you to know what you have to do.

Example : News-paper

Uses :
(i) To read the news.
(ii) To make paper Toys.
(iii) To get protection from the sun.
(iv) To wrap something.
(v) To cover a dirty place, etc.

निर्देश

इस कार्य में तीन वस्तुओं के नाम दिये गये हैं जिनको कई नये और विभिन्न तरीकों से प्रयोग किया जा सकता है । आपको इनमें से प्रत्येक के नये-नये, विचित्र तथा रोचक प्रयोग अधिक संख्या में लिखने हैं । प्रयोग साधारण हों या असाधारण, आप सबको लिखिये । यदि आप नये-नये और असाधारण प्रयोग जिन्हें आपके साथ आसानी से नहीं सोच सकते, लिखेंगे तो उससे यह मालूम हो सकेगा कि आप में वस्तुओं को नये ढंग से सोचने की कितनी योग्यता है ।

प्रत्येक प्रश्न का उत्तर देना अनिवार्य है ।

तीनों वस्तुओं के बारे में लिखने के लिये आपको 12 मिनट का समय दिया जायेगा । जब आप एक वस्तु के प्रयोग लिख चुकें तो तुरन्त दूसरी वस्तु के प्रयोग लिखना आरम्भ कर दीजिये । बीच में या बाद में यदि कोई अन्य नया प्रयोग वस्तु के बार में याद आ जाये तो उसे भी लिख दीजिये उत्तर छोटे-छोटे वाक्यों में लिखिये ताकि आप अधिक से अधिक प्रयोग लिख सकें । हर चार मिनट समाप्त होने पर आपको बता दिया जायेगा ।

जब आपसे कार्य आरम्भ करने के लिये कहा जाये तो तुरन्त आरम्भ कर दीजिये ।

नीचे दिये उदाहरण में आपकी समझ में आ जायेगा कि आपको क्या करना हैं—

उदाहरण— समाचार-पत्र

प्रयोग— (a) समाचार पढ़ने के लिये
(b) धूप से बचने के लिये
(c) बच्चों के खेलने की चीजें बनाने के लिये
(d) लपेटने के लिये
(e) रद्दी कागज जमा करने के लिये
(f) गन्दे स्थान को ढकने के लिये; आदि

Problems 1. Piece of stone
समस्या 1. पत्थर का टुकड़ा

Answer (उत्तर) –

Problems 2. Wooden stick
समस्या 2. लकड़ी की एक छड़ी

Answer (उत्तर) –

Problems 3. Water
समस्या 3. पानी

Answer (उत्तर) –

ACTIVITY 3 (कार्य 3)

INSTRUCTIONS

On this and the next page, you have been given pairs of world which can be related to each other in many different ways. You have to think in how many different and new ways are they related.

Write as many relationships as you can, but also try to think those which are novel, that is, those which you think no one else might have thought of.

You will be given 15 minutes for this activity. After every 5 minutes you will be told the time so that you may move on to the next problem in the activity.

Below is given an example which will help you to know what you have to do.

Example : **Man and animal**

Relationship : (i) Both have life.

(ii) Both need food and water.

(iii) Both can fall ill.

(iv) Both are afraid of enemy.

(v) Both have the experience of feeling cold and hot, etc.

निर्देश

नीचे कुछ शब्दों के जोड़े दिये गये हैं जो आपस में कई प्रकार से सम्बन्धित हो सकते हैं। आपको यह सोचना है कि वे कितने प्रकार से आपस में सम्बन्ध रखते हैं। देखने में तो जोड़े के दोनों शब्द अलग-अलग मालूम होते हैं लेकिन यदि ध्यान से देखा जाये तो नये-नये प्रकार के सम्बन्ध समझ में आ सकते हैं। जितने भी सम्बन्ध आप सोच सकें उन्हें दिये हुये स्थान पर छोटे-छोटे वाक्यों में लिख दीजिये। देखना यह है कि आप कितने अधिक और नवीन सम्बन्ध सोचकर लिख सकते हैं।

आपको इस कार्य के लिये 15 मिनट का समय दिया जायेगा। आपको वस्तुओं के सभी जोड़ों के बारे में विचार लिखने है। अतः जहाँ तक सम्भव हो उत्तर शीघ्रता से दीजिये। हर पाँच मिनट समाप्त होने पर आपको बता दिया जायेगा। जब आपसे कार्य आरम्भ करने को कहा जाये तो तुरन्त आरम्भ कर दीजिये।

नीचे दिये उदाहरण में यह बात स्पष्ट हो जायेगी कि आपको क्या करना है—

उदाहरण— आदमी और जानवर

उत्तर— (a) आदमी और जानवर दोनों में जीवन होता है।

(b) दोनों को भोजन-पानी की आवश्यकता होती है।

(c) दोनों को रोग हो सकते हैं।

(d) दोनों को शत्रु का डर रहता है।

(e) दोनों को सर्दी-गर्मी का अनुभव होता है।

(f) दोनों अपने रहने की व्यवस्था करते हैं; आदि।

Problems 1. Tree and House
समस्या 1. पेड़ और मकान

Answer (उत्तर) –

Problems 2. Chair and Ladder
समस्या 2. कुर्सी और सीढ़ी (नसैनी)

Answer (उत्तर) –

Problems 3. Air and Water
समस्या 3. हवा और पानी

Answer (उत्तर) –

ACTIVITY 4 (कार्य 4)

INSTRUCTIONS

Just keep in mind a simple model of a horse. You have to imagine in what ways you can change this simple model into an iteresting and novel one for children to play with. You may think of adding any number of parts or accessories in order to make it really interesting and fascinating for children. Do not bother about the cost of the new parts or accessories that you would like to use in order to make the toy model interesting and fascinating for children.

Write all the ideas which come to your mind in a serial order in the space given below.

You will be given 6 minutes for this activity.

निर्देश

आपने घोड़े का खिलौना तो देखा ही होगा । अन्य जानवरों के भी खिलौने होते हैं जिनसे बच्चे बड़ी प्रसन्नता से खेलते हैं । साधारणतया ये खिलौने छोटे आकार के होते हैं ताकि बच्चे उनसे आसानी से खेल सकें । आप घोड़े के एक सादे खिलौने को ध्यान में रखिये और फिर आगे आप उन अनौखे तथा मनोरंजक तरीकों को लिखिये जिनके द्वारा आप इस खिलौने में ऐसे परिवर्तन ला सकें जिनसे बच्चों को इन खिलौनों से खेलने में अधिक आनन्द आने लगे । इस बात की परवाह मत कीजिये कि इस प्रकार के परिवर्तन पर क्या लागत आयेगी । आपको केवल यह सोचना है कि खिलौने को बच्चों के लिये किस तरह अधिक से अधिक मनोरंजक तथा विचित्र बनाया जा सकता है ।

जब आपसे कार्य आरम्भ करने को कहा जाये तो तुरन्त कार्य आरम्भ कर दीजिये । आपको इस कार्य के लिये 6 मिनट का समय दिया जायेगा ।

Please Start (आरम्भ कीजिये)

SCORING SHEET OF TCW

ACTIVITY I

Item	Fluency	Flexibility	Originality
1.			
2.			
3.			
Total			

ACTIVITY II

Item	Fluency	Flexibility	Originality
1.			
2.			
3.			
Total			

ACTIVITY III

Item	Fluency	Flexibility	Originality
1.			
2.			
3.			
Total			

ACTIVITY IV

Item	Fluency	Flexibility	Originality
1.			

SCORE SUMMARY

Activity	Fluency	Flexibility	Originality
I			
II			
III			
IV			
Grand Total			

• *See back page for further instructions regarding originality scoring*

ORIGINALITY SCORING FOR RESPONSES NOT MENTIONED IN THE RESPONSE LIST

For any novel response not mentioned in the response list given in the manual, first of all briefly note it down in the space provided below giving the number of the activity and the item to which it belongs. Then, after you have scored all the test scripts, give it a score according to the scheme given in the manual and note the score in the appropriate column in th Scoring Sheet. In all probability, there will be very few such responses.

Activity	Item	Response	Originality Score
I	1		
	2		
	3		
II	1		
	2		
	3		
III	1		
	2		
	3		
IV	1		