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1.0 INTRODUCTION:

In view of the challenges of the twenty first century, the students will have to learn how to think rather than what to think. Thinking process is an important task in learning but to develop the process of thinking is an art. Thinking is a skill and like any other skill it can be developed and improved if one knows two basic types of thinking:

(1) Divergent thinking
(2) Convergent thinking.

Divergent thinking is undoubtedly the distinguishing characteristic of creative thinking. The future of our civilization depends upon the quality of creative thinking and imagination.

According to Funks and Wenell's (Standard Dictionary) creative thinking means, "The quality of being able to produce original work or idea in any field."

Of all individual attributes the creative urge is human as well as mysterious. In day-to-day work, the students are probably making creative contributions regularly
but like any creative people they may be creating insti-
tutively without the knowledge of creative process. This
is so because the present education system provides training
mainly in analytical and deductive, judicial and evaluating
thinking.

Development of creativity and concern for it, is not
only a social reality but an individual also. Creativity
assumes a new urgency at a time when the philosophical hori-
zon is consolidated more closely around man. The factor of
boredom the challenge of space, the need to transcend daily
life as defined in established configurations, has made clear
the need for the search of excellence in man and information
about positive aspects of human nature and its interior
regions.

Studies on the improvement of man's health, happi-
ness and social situations, show that there are certain
"effective properties" which make man equal and not their
physical, social and intellectual abilities. These "effec-
tive properties" stimulate life and in long run manifest
creativity in all humanbeings. Thus all humanbeings to a
greater or lesser degree possess the creative ability.
Arastch and Arastch state very clearly that:
"The degree of awareness of creativity and the
quality of product may vary from individual to
individual but men are related through a common
endeavour which manifests itself in creativity."

Thus creativity is not a rare commodity from the
analysis of all the psychological tests ever made, it is
concluded that the creative talent is normally distributed
among all because creativity is a field of knowledge which
explains common man individually or collectively to reach
solutions that are both novel and useful.

The talent or indirect thinking can be developed by
practice and training as is seen from the result of different
researches. The point is that the student can be trained to
use more productively that talent which he innately possesses.
This training is subject to disciplines similar to those
applicable to the mastery of any subject. Incidentally crea-
tive imagination is itself a basic tool in the acquisition
of knowledge, for knowledge becomes more usable when imagi-
natively sympathized and dynamically extended.

The children are born with unlimited imagination.
Hence they have ability to create numbers of fanciful illu-
strations up to the age when they enter the educational

1. A.R. Arastech; and J.D. Arastch: Creative and Human
institutions. His creative ability is increasing in terms of imagination, ingenuity and curiosity but as he goes through the educational system i.e. Primary School to College, his creative ability may be influenced by the internal conditions viz. intelligence, memory, aptitude and motivational factors and external conditions such as home environment, school climate, parents education.

Keeping in view the above facts the investigator has decided to undertake this research study.

1.1. **THE CONCEPT OF THINKING:**

Thinking defined as "Mental ability is correct, since it covers everything. But it is not very helpful." On the other hand definition of thinking as, "Logic and reason," is correct but it covers only one aspect. According to Edward de Bond: "Thinking is the deliberate exploration of experience for a purpose." That purpose may be understanding, decision-making, planning, problem solving, judgement, action and so on.

The education trinity is: knowledge, intelligence and thinking. Intelligence is an innate quality that may depend on genes, early environment or a mixture of the both.

Intelligence is regarded as the speed of processing within the brain which gives an intelligent child a larger scan to evaluate over the same period of time.

Thinking is a skill through which intelligence acts upon experience. More will be said later on about the relationships between thinking and intelligence, but knowledge or information is the basic material handled by thinking.

It is true that at one extreme, thinking is impossible without some information on the subject. At the other extreme perfect information would make thinking unnecessary. In between these two extremes both thinking and information are required.

In school-subjects it is often assumed that information is more important than thinking. Thinking is regarded only as a tool for assimilating information, classifying it and putting it in its proper place. Information is very much easier in teaching rather than thinking.

It is a common experience in the academic world to find persons who are so well informed within their own speciality that they can be classed as brilliant. However high their ability is for information it can no longer be a substitute for thinking.
To aim at getting information is always admirable but to await perfect information is impractical because in the ordinary world, where information is usually imperfect, it has to be supplemented by good thinking.

Textbook problems are usually close-ended. This is to say there is a definite known solution and all the required information is provided. Real life problems are more often open-ended. That is to say there is no definite solution and much of the required information is missing.

It is best to remember that information is no substitute for thinking and thinking is no substitute for information. There is a need for the both.

1.2 DIVERGENT AND CONVERGENT THINKING:

In present trend of education system the students are expected to have convergent thinking rather than the divergent thinking. In the common stock of our examinations the problems are such that there is only one right answer or at best a few right answers and these answers can easily be discriminated from many wrong ones. The divergent thinking is actually unregarded by the teachers too. According to them it is time-wasting, irrelevant and merely related to wrong. The common routine 'don't guess' acts as a bias to divergent thinking.
Now-a-days most of the competitive examinations are conducted on the objective type instead of subjective type questions. Therefore, we can conclude that, the present trend of education is convergent where there is only one correct answer.

Though divergent thinking is undoubtedly the distinguishing characteristics of creative thinking, there is a place for convergent thinking too. In grasping what an unclear problem is, a good deal of logical convergent thinking is needed, once the divergent thinker makes some critical choice. Once he or she establishes an original line of inquiry or line of thinking, a good deal of convergent thinking ability must come into play. Categorisation, logical thinking analysis, comparing, evaluation and so forth the stock in trade of convergent thinking becomes critical in this phase of problem solving. Indeed quite often creative thinking consists of alternating phase of imaginative (divergent) and rational (convergent) thinking.

Psychologists have, during the last decade, developed an intense interest in creativity as a topic for research. This interest has lead to the development of theories about the nature of creativity, questionnaires and other instruments to measure creativity and experimental techniques, designed to encourage foster or stimulate creativity.
Most of these researches have been initiated as a result of a paper published by J.P. Guilford (1959) in which he differentiated convergent and divergent thinking processes. Mostly education, he pointed out, is concerned with promoting convergent thinking, the kind of thinking in which students are encouraged to find the "right answers" to a problem. Such a process assumed that there is a single right answer and that exists somewhere, usually in the next book or in the course of study. Divergent thinking is concerned with approaches such as speculation, imagination, heuristics, and invention, processes that are based on the assumption that there may be several good ways to solve a problem. Creativeness depends on an individual's ability to innovate and to perceive new relationships and therefore it demands some divergent thinking.

This state of affairs has lead some psychologists and educators to criticise teaching methods and measures that paralyse creativeness and thus place the more creative student at a disadvantage. In one study, Jacob W. Getzels and Philip W. Jackson (1962) elicited teacher's reactions to student scoring high on tests of intelligence and creativity. Students who scored high on one measure tended to score high on the other, but there were some students who scored high on intelligence but not so high on creativeness and others who scored high on creativeness and not so high on intelligence. Both of these groups did equally well on standardized intelligence.

tests of academic achievement but teachers reported that they preferred to work with the high intelligent group rather than the high creative group, indeed the later group could qualify as "under achievers" if we apply the criteria discussed earlier.

1.3 **NEED OF THE PRESENT STUDY:**

There is no doubt that a good deal of research work in the field of creativity has been done outside India. Researchers like Guilford and Torrance are trying hard to explore the field more extensively. Indian researchers like Baramesh, Rania, Mehdi Ahmed etc., are also trying to study the rich area of original thinking and other distinct cognitive abilities.

In United States of America, the need in education and psychology was realised around 1950. Before the second world war there were seventy researches of this kind. Thurstone C.W. and Taylor, J.P. Guilford, and other associates have been the pioneers stimulating researchers in the field of creativity. By 1960 "education for creativity" became a very important issue throughout America. Since then considerable amount of research work has been done in the field of creativity by individual researchers as well as by teams of researchers and specialised research agencies. Such agencies have supported and fostered large scale research in
this field. Their efforts have begun to yield fruitful dividends in the form of the changing pattern of educational system in the country.

For a developing country like India the utility of research in the field of creativity cannot be denied.

Ray Chaudhri submitted first doctoral thesis of the kind to the Calcutta University in 1962. Ray Chaudhuri pointed out, "there seems to be a growing interest among researchers to probe into this area eventhough resources, particularly financial are limited."^4

1.4 SCORE OF THE STUDY:

It is obvious that creativity has wider connotations. Creativity is not just painting a picture. In its fullest sense, it stands for 'capacities to accept challenges' 'freedom to exercise choice' and readiness to change self and environment. A creative person stands up against deamy dead for tride.

The field of creativity is as vast as the ocean. It embraces many horizons. If we go into enumerating various theories; it will throw a flood of light on the scope of the field of creativity.

1.5 **PROBLEM AND STATEMENT:**

The problem for the present study is: "A study of creativity of higher secondary school children in relation to their environment and teachers' creativity."

1.6 **KEY WORDS:**

Before proceeding further, it is quite essential to clarify the meanings and concepts of certain significant terms in the research problem with reference to the present study.

These terms are:

(A) A Study
(B) Creativity
(C) General Ability
(D) Higher Secondary School
(E) Environment

1.6.1. **A study:**

Study means to get necessary information about any subject and to analyse such collective information into proper meaning and to get knowledge on that subject. Thus, we can say that study is the knowledge which is gained or collected by our own experiences.
Application of mind to books, acts or any subject for the purpose of acquiring knowledge:
- Any act of attention consideration
- Study means devotion of time and thought for getting knowledge, it means things to be investigated.

1.6.2. Creativity:

Good⁵ defines creative thinking as below:

"Creative thinking that is inventive, that explores novel, situations or reaches new solution to old problems or that result in thoughts original with the thinker."

Creativity is a term derived from the word 'create' which means to find out something, strange and at once useful to bring about a change in the society.

Creativity is one type of energy of a man to contribute artistically or scientifically to the society. From this meaning, it is obvious that the process of creativity is substantially identical in art or science.

Some others have stressed the creativity process\textsuperscript{6} in this view: \textquotedblleft Creativity is divergent thinking, the seeking of relationships between previously unrelated concepts or frame or reference of exploring the undertaken. The outcome of this effort may or may not be creative, but the effort reveals the characteristics of the creative process: wide search of exploration, leaps of imagination, incubation, some times strikingly fresh insights.	extquotedblright

1.6.3. General Abilities: (Intelligence)

General Ability is an abstract concept. The terms "intelligence", "general ability", "Mental ability", "learning potential", "school and college ability" and "educational ability" are used to designate essentially the same type of test. In the psychometrician's vocabulary, these terms are synonymous and interchangeable.\textsuperscript{7}

Intelligence is a capacity to learn and profit by experience.

According to Wechsier: "Intelligence is the aggregate or global capacity of the individual to act purposefully, to think rationally and to deal effectively with his environment."\textsuperscript{8}

\textsuperscript{8} David Wechsier, The Measurement of Adult Intelligence, (Baltimore: Williams and Wilkins, 1944), p. 3.
1.6.4. **Higher Secondary School:**

Higher secondary school means a school imparting education from Standards XI to XII.

Now according to the \((10 + 2)\) pattern, the higher secondary school unit includes standards from XI to XII after schooling.

1.6.5. **Environment:**

According to encyclopaedic dictionary of education:

"Environment means all the objects, conditions and factors around an individual having the power to influence him." It is the first concern of the school to provide for its pupils a rich, pleasant and stimulating environment which will evoke their manifold interests and make life a joyful experience.

When a child is under the constant influences of a good work and a good thought there grows in him a tendency to become a good.

Derek Rowntree's statement in a dictionary of education is as under:

"Environment means a term much used in educational discussion (e.g. in talk of a child's intellectual growth through interaction with his environment). It refers to things, events and people in the real world around the child that they might perceive or that might have some effects on him".
Environment studies means "An inter-disciplinary study of man's social and physical surroundings which seeks to determine his relationships with them. It may utilise concepts and methodologies from history, biology, literature, architecture etc."

1.7 OBJECTIVES:

The chief objectives of the present investigation are:

(1) To provide a reliable and valid tools to measure the creative thinking ability of students.

(2) To assess the nature of creativity of the students studying in various higher secondary streams.

(3) To investigate the trends of creative thinking among the various streams.

(4) To study the impact of intelligence of pupils on their creative levels.

(5) To study the influence of environment in which the pupils are brought upon their creative levels.

(6) To study the interactive effects of the independent variables 1, 2, 3, 4,..... under study upon the pupil's creativity.

(7) To study the trend analysis of the creativity score of students of three different streams.
(8) To study the trend analysis of the creativity scores of teachers of three various streams.

(9) To suggest recommendations based upon the pupils creativity.

1.8 LIMITATIONS:

(1) There are main five streams at (10 + 2) level, out of which only three streams viz., Science, General and Technical are restricted for this study.

(2) This investigation has been undertaken only for the pupils of Gujarati medium schools.

(3) This investigation has been conducted on the pupils of only Mehsana District.

1.9 SCHEME OF CHAPTERIZATION:

I. Introduction:

The first chapter deals with the introduction of the topics with specific reference to the need of such study in the field of education. The investigator has described the key words of the problem and objectives and limitations of the study.

II. Creativity: Its Theoretical Perspectives

In this chapter the investigator has made an attempt to describe and discuss the concept of creativity component
and some important theories of creativity, hurdles of creativity, various component of environment etc.

III. Review of Past Researches

In the third chapter the investigator has made an attempt to review the researches done in the related problem in India as well as in foreign countries.

IV. Design of study:

Chapter four concerns with the planning for the creative ability test construction and procedure for data collection and statistical techniques used for the study.

V. Test construction:

This chapter deals with the process of the test construction and standardizing creative ability test for the study. This chapter also concerns with environmental inventory both translated in Gujarati keeping in view the Indian culture.

VI. Data Analysis - Main Study:

This chapter deals with the statistical analysis and interpretation. The various hypotheses are tested by using statistical method - ANOVA.

The factorial design (3 x 2 x 2) has been used to interpret the results.
VII. DATA ANALYSIS: CORRELATIONAL STUDY:

In this chapter, the correlation \( r \) between teacher-creativity and their students' creative level (more creative/less creativity) was found by and interpreted.

VIII. OBSERVATION AND CONCLUSION:

A brief summary of complete work is given with the observations made during the process of data collection and its analysis.

The conclusions drawn on the basis of analysis have been stated briefly in this chapter.

The investigator gives suggestions and recommendations for future research work in the field of education with a view to motivate researchers in the area of creativity.