



## Effect of Program Based on Rivers Engineering Method on Mechanical Ability

Pravin Shashikant Rangole<sup>1</sup> & Dr. Seema Bhandare<sup>2</sup>

1. Research Scholar, Savitribai Phule Pune University
2. Senior Professor, Aadarsh Comprehensive College of Education, Pune

### Abstract:

*In present education many teachers, principles, government try to improve the method of teaching. Happy learning concept is now spread over all India. Government announced upto 14 years compulsory education by making right of education act. Some theorists require that education results in an improvement of the student while others prefer a value-neutral definition of the term. In a slightly different sense, education may also refer, not to the process, but to the product of this process: the mental stress and dispositions possessed by educated people. Education originated as the transmission of cultural heritage from one generation to the next. Today, educational increasingly encompass new ideas such as the liberation of learners, skills needed for modern society, empathy, and complex vocational skills.*

**Keywords:** Rivers Engineering Method, Mechanical Ability, Education, Compulsory Education.

### 1. Introduction

The main objective of the education is the holistic development of students. Education is a purposeful activity directed at achieving certain aims, such as knowledge transmission. Various researchers emphasize the role of critical thinking in order to distinguish education from indoctrination. Education is the manifestation of perfection already present in man. - Swami Vivekanand

In present education many teachers, principles, government try to improve the method of teaching. Happy learning concept is now spread over all India.

Government announced upto 14 years compulsory education by making right of education act.

Some theorists require that education results in an improvement of the student while others prefer a value-neutral definition of the term. In a slightly different sense, education may also refer, not to the process, but to the product of this process: the mental stress and dispositions possessed by educated people.

Education originated as the transmission of cultural heritage from one generation to the next. Today, educational increasingly encompass new ideas such as the liberation of learners, skills needed for modern society, empathy, and complex vocational skills.

Types of education are commonly divided into formal, non formal, and informal education. Formal education takes place in education and training institute, is usually structured by curricular aims and

objectives, and learning is typically guided by a teacher. In most regions, formal education is compulsory up to a certain age and commonly divided into educational stages such as kindergarten primary school and secondary school .

Non formal education occurs as addition or alternative to formal education. It may be structured according to educational arrangements, but in a more flexible manner, and usually takes place in community-based, workplace-based or civil society-based settings. Lastly, informal education occurs in daily life, in the family, any experience that has a formative effect on the way one thinks, feels, or acts may be considered educational, whether unintentional or intentional. In practice there is a continuum from the highly formalized to the highly informalised, and informal learning can occur in all three settings. For instance, home schooling can be classified as non formal or informal, depending upon the structure.

Activity base curriculum centres around active learning and presenting information to students in a fun and interactive way.

Traditional teaching is concerned with the teacher being the controller of the learning environment.

Power and responsibility are held by the teacher and they play the role of instructor as like lectures and decision maker. They regard students as having 'knowledge holes' that need to be filled with information

Now a days there are different types of innovative techniques and methods are used in education system such as e-learning program base learning activity based learning reverse engineering methodology etc.

Reverse engineering - Is a new concept in education. In reverse engineering students learn happily by doing activity, by learning mechanisms of different machines related to science subject especially physics. There are so many concepts students can easily learn by reverse engineering method such as lene related telescope, microscope etc.

In modern days students are quite handy with machines, instruments. In COVID situation students learn at home but there are some difficulty. That learning is a one way conversation, there was no chance to students to do something, or do activity. In short that learning was practical less learning. So there is lack of knowledge. Hence when students handle something that experience give them a active way how to learn. Also they can use their creativity, decision making ability in different conditions by handling the situation.

Reverse engineering is method in which students can break down machines, observe their mechanism, structure etc. so they can learn happily and easily. Also there is no need to recite or copy down something

## **2. Review of Related Literature**

Before deciding on the research topic when I reviewed the previous research, I realise that some research has been done on the topic.

Following research is found regarding present research

From Pacific University

Researcher –Suresh Batni

Guide – Prashant Sharma

Department – Engineering

Year - 2019

Modelling and analysis of engineering components using reverse engineering based on cloud data capture from 3D laser scanner.

No other research is found related to present research.

### **3. Need of the Research**

Educationist, guides, teachers principals, government, parents are all constantly striving for the overall development of students. Need for the present research is evident based on the following points

- To create a view of mechanical ability
- To develop interest about mechanical ability
- To develop interest about psycho motor ability
- To create a career based view about mechanical ability
- To develop activity based education
- To develop a happy learning method.

### **4. Statement of the Problem**

Effect of program based on reverse engineering on mechanical ability and psycho motor ability of students studying in 9th standard of Marathi medium school in Pune city.

### **Explanation of Problem**

Effect of program based on reverse engineering method on mechanical ability and psycho motor ability of 9th standard students in physics subject of New English school, Pune

### **5. Conceptual Definition**

1. Reverse engineering - it is the act of dismantling an object to see, how it works. It is primarily to analyse and gain knowledge about the way something works but often is used to duplicate or enhance the object.
2. Mechanical ability - It is connected with or produced by machines or relating to machinery or tools.
3. Psycho motor ability - it has a wide range of actions involving physical movement related to conscious, cognitive processing.
4. Program - educational programs is a group of educational activities that have common objective or back together achieve a singular goal. - Singh (1997)
5. A 9<sup>th</sup> standard student is primarily a person enrolled in a secondary school or other education institution and who is under learning.

### **6. Operational definition**

Reverse engineering- it refers to break down the machines and try to know the mechanism of the machines.

Mechanical ability- It refers to the ability related to machinery and students will learn their mechanism.

Psycho motor ability - It refers to the ability of students to handle carefully their physical movement, different things such as dexterity.

## Action Plan

A program is a researcher-made, purposeful, multifaceted plan of activities designed to engage students directly Rannback (2004)

9th standard student - A person who is learning in secondary school and he is pass in 8th standard.

## 7. Research objective

Research is conducted in an objective manner only when it is conducted to achieve an objective. Along with this research gets a new direction therefore objective are most important factor in there a serch. The objectives of the said research are as follows

- To study the status of present learning methodology and students mechanical ability and psycho motor ability.
- To develop lesson plans or program or various scientific concepts selected from science syllabus of class 9 through riverse engineering method.
- To study the effect of program based on reverse engineering method on mechanical ability and psycho motor ability of 9th standard students.

## 8. Scope

- The present research deals with students of class 9 studying in all educational institute of Maharashtra.
- The present research covers all the schools of secondary standard
- The present research includes all science subject teachers teaching at the secondary level.
- Present research will be useful by all the elements related to secondary education search as principles teachers parents society government etc.

## Delimitation

Delimitation of said research as follows

The present research is limited to Pune city only.

1. The present research is limited only to the class of 9 at the secondary level
2. Only Marathi medium school has been considered for the study of present research.
3. Only teachers and students of aided, unaided, permanent unaided and self finance schools of secondary education have been considered for the said research study.

## Limitations

Limitations of said research as follows

- 1) Instruments used for data collection of objective number 1 of present research are design by the researcher himself.
- 2) For the present research students of class 9th of New English school Tilak Rroad school in Pune city have been considered.

## 9. Hypothesis Research Hypotheses

Program based on reverse engineering method develops students mechanical ability and psycho motor ability.

### Null hypothesis

Program based on reverse engineering method does not develop students mechanical ability and psycho motor ability.

### Assumption

Assumptions of said research as follows

- Science is a compulsory subject to 9th standard students.
- Mechanical ability and psychomotorability are important ability of 9th standard students.
- 9th standard students know how to break down the machines.

## 10. Population, Sample

The aggregate of all units pertaining to a study is called a population. Population is the target group to be studied. It is the total collection of elements about which the investigator wishes to make inferences. The total population is unknown to the investigator. So, keeping in mind for the purpose of the present study, the investigator has purposively selected the children (students) of the of class IX of New English School, Tilak road, Pune, enrolled during the session 2022-2023.

Objective 1 - in the present research all the teachers of Marathi medium of secondary level teaching to class 9th students have been included in the population

Objective 2 - In the present research all the students learning in Marathi medium school of secondary level of class 9th have been included in the population.

Objective 3 - In the present research all the students learning in Marathi medium school of secondary level of class 9th have been included in the population

### Sample

Sampling is the process of selecting a sample from the total population. Selection of sample calls for a careful consideration of various factors such as the of the problem, the intention of the researcher, the geographical area covered by the study, availability or non-availability of population list, the extent of knowledge available about the population, the amount of fund and other facilities available of the study, the time factor, suitability of the various sampling techniques and so on (Krishnaswami, 1998). There are two types of sampling, namely-

### Probability sampling and Non-probability sampling Probability sampling may be of different types:

- a. Simple random sampling
- b. Stratified random sampling
- c. Systematic random sampling
- d. Cluster random sampling

e. Multi-stage random sampling

**Non-probability sampling is of four types:**

a. Quota sampling

b. Accidental sampling

c. Judgement sampling or purposive sampling

d. Snowball sampling

The present study has adopted purposive sampling technique. A sample is a small proportion of the population selected for observation and analysis, based on which one can make certain inferences about the characteristics of the population

**Sample**

Class IX students from Marathi medium school in Pune city have been included in the sample

**11. Assumption**

Assumptions of said research as follows

1. Science is a compulsory subject to 9th standard students.
2. Mechanical ability and psycho motor ability are important ability of 9th standard students.
3. 9th standard students know how to break down the machines.

**12. Tools of research**

In a research study, the investigator uses many data gathering tools which may differ in complexity, design, administration and interpretation. The research output of a research study depends on the quality of the tools. As human behavior is complicated to study, the researcher should be sincere in selection of appropriate tools for the study. From the review of various literatures, the researcher acquires the ability to select a good, reliable and standardized tool for the proposed study. So, for achieving the

- formulated objectives and hypotheses of the present study, the researcher has decided to use pre-test, post-test, mean, standard deviations and Innova tools are used.
- Percentage%

These tools were used to qualitatively analyze the answers to the questions of the questionnaire given to the teachers in the present research.

- Median.

Median means were used to see the growth in creativity according to the scores obtained in the pre- and post-test.

- Standard deviations

Standard deviation was used to perform t' test.

- Graph

In the present research, a graph was used to see the difference between the pre-test and post-test scores of the students in the study group.

### **13. Research Method**

Research methodology refers to a set of systematic procedure adopted to conduct a specific investigation. Methodology discusses planning of the study that is implemented with tools or methods like representative sampling design, standardized tools, mode of data collection and appropriate statistical procedure. It is a scientific plan in a definite direction with a particular intention for a specific problem. It aims to find out solution in a specific manner moving from one step after another in an order.

According to Emory, the research sequence consists of four major stages:

1. *Exploration of the situation:* In this stage, the investigator has to adopt two-stage approach; first to propose an exploratory study, second, to move to development of the main study after the exploratory study is over. The feasibility, the availability of data, etc. will be explored at this stage.
2. *Development of research design:* At this stage, the format research plan is developed.
3. *Data collection:* Data are collected by adopting appropriate methods of data collection.
4. *Analysis and interpretation of the results:* After the fieldwork is over, the data are processed, tabulated, and analyzed. Then the findings are interpreted. Based on the findings, the investigator has written the research report.

### **Research Type**

After defining the research problem, achieving the research objectives is the important goal of the research. To achieve this goal he has to use the right methodology. If the researcher has properly thought out the research methodology, it becomes easier to conduct the research.

### **Educational Research**

Educational research is action. The purpose of this action is the development of scientific knowledge in educational institutions. It suggests effective methods for the teacher to achieve his goals.- traverse Educational research is important for new ideas, to face practical problems, to gain a new or different vision about education or the educational process.

Following are the important types of research

- 1) Historical research
- 2) Descriptive research
- 3) Experimental research
- 4) Mixed research
- 5) Multivariate research

1. Historical research

In this research methods are called historical research methods for obtaining rational, balanced, objective, unbiased and well-organized knowledge of past events, describing and analyzing them.

## 2. Descriptive research

The main purpose of descriptive research is to present a descriptive analysis of the real facts, characteristics of a person, group, society, event or any subject or problem based on the available facts and data.

The basis of this type of research is reliable principle and reality. On this basis, the principle information is analyzed and the new information obtained from this analysis is interpreted.

## 3. Experimental research

Experimental research mainly studies causal relationships. In experimental research, the researcher studies the effects of at least one independent variable on another or more dependent variables. In scientific terms, this involves testing the hypothesis of causality.

## 4. Mixed method

In which the researcher collects qualitative and quantitative data for one or multiple studies and analyzes and integrates it. That method is called mixed method research.- Cross well.

## 5. Multiple research methods

An advantage of multimethod research development is that results from one method can be used to develop another method. Graney, Carkel, Gramm 1989. Research method has been chosen according to the main objective of the present research.

Objective1- To know the existing status of science subject of 9th standard for this objective. The survey method used in descriptive research is considered to be the need for survey program development.

Objective2- For development of the program based on reverse engineering method the experimental method is used.

Objective 3- To know to the effect of program based on reverse engineering method the experimental method is used.

## 14. Variable

An image, perception and concept that can be measured is called a variable. In the present study, there are two main variables. They are

1. Independent Variable - program based on reverse engineering metho is independent variables of the present research.
2. Dependent Variable – mechanical ability and psychomotoryability are the dependent variable of the present research.
3. Controlled variable
  1. Standard - All the students selected for the experiment are from class 9
  2. Age - all the students selected fo the experiment are of age 14 to 15 years.
  3. Test -Test selected for the study group for pre and post test are the same.
  4. Medium - The medium of study of all the students selected for experiment is English.

## 15. Research Design

Preparation of a research design is an important task of a researcher. Research design the blueprint of the study. The efficiency of a researcher to reach the conclusion of an investigation depends on the preparation of efficient design of the study. The objective of a research study is the starting point through which a researcher deciphers any logical outcome. A researcher drafts a design of research study based on the objectives. These objectives of the study, which helps researcher to choose the proper way, means and strategies to reach any conclusion. Thus, methodology becomes an imperative part of research. A researcher should select an appropriate method for the study, a total population or universe of the study and representative portion of the total population as sample. A research design guides a researcher to conduct the whole research work. In a research design, method of the study, total population or universe, sample, sampling technique, tools of data collection, data collection procedure and the statistical techniques used for analysis of data is planned in a systematic manner. The steps considered while conducting the research are as follows.

- Review of related literature.
- To make a questionnaire for survey.
- Completion of questionnaire by secondary school teachers.
- Creating a selection of instruments for actual program.
- Conducting pilot study.
- Creating tools for actual program.
- Planning the execution of the action program.
- To arrange pre – test.
- Pre-test to be given to students in study group.
- Implementation of the action program.
- Posters to be given to students in study group.
- Analysis of received data.
- Verify the effectiveness of the action program.
- Presentation of research findings.

## 16. Research Work at Glance

- Review of related literature.
- To make a questionnaire for survey.
- Completion of questionnaire by secondary school teachers.
- Creating a selection of instruments for actual program.
- Conducting pilot study.
- Creating tools for actual program.
- Planning the execution of the action program.

- To arrange pre – test.
- Pre-test to be given to students in study group.
- Implementation of the action program.
- Post - test to be given to students in study group.
- Analysis of received data.
- Verify the effectiveness of the action program.
- Presentation of research findings.

## 17. Contribution to the Field of Education

Significance of the present researchers follows

1. The present research is useful for development of careeristic view of students.
2. The present research is useful for teachers as students know easily the mechanism of different machines.
3. Students will know how the machines work.
4. Students will learn happily and easily by reverse engineering method.
5. The said research will help to identify the career outlook of the students.
6. The said research will be useful to increase the mechanical ability of the students
7. The said research will be useful to increase the psycho motor ability of the students
8. The said research will be useful for teacher to know the ability of students.
9. The said research will be useful for parents to know their Childs Carrier interest.
10. The said research will be useful for government to develop technical skills in students.
11. The said research will be useful for students, they learn happily.

## 18. Time Schedule

Sr. No.	Content	Time period
1.	Review of related literature	3 months
2.	To make a questionnaire for survey	1 months
3.	Completion of questionnaire by secondary school teachers	2 months
4.	Creating a selection of instruments for actual program	1 months
5.	Conducting pilot study	1 months
6.	Creating tools for actual program	1 months
7.	Planning the execution of the action program	2 months
8.	To arrange pre- test	1 months

9.	Pretest to be given to students in study group	15 days
10.	Implementation of the action program	6 months
11.	To arrange Post - test	15 days
12.	Analysis of received data	3 months
13.	Verify the effectiveness of the action program	3 months
14.	presentation of research findings	3 months

## 19. Chapterization

1. Introduction
2. Study of relevant literature
3. Research methodology
4. Statistical analysis and interpretation
5. Summary , conclusions and recommendations

## 20. Bilbography

- Best, J.W. and Khan J.V.9th edition (2009)Research in education, Delhi Prentice hall
- Joyee Bruce and Weil Marsha (2002) Models of teaching (5th Edition) Delhi.
- S.K.Mangal (2012) Statistics in psychology and education (2nd edition) Published PHI learning Private Limited New Delhi 11000.
- Wilkinson J.S. and Bhandarkar, P.L. (1984) Methodology and Techniques of Social Research

## Magazine

- University news weekly magazine
- Shikshansankraman etc.
- www.shodhganga.com

**Citation:** Rangole. P. S. & Bhandare. Dr. S., (2026) “Effect of Program Based on Rivers Engineering Method on Mechanical Ability”, *Bharati International Journal of Multidisciplinary Research & Development (BIJMRD)*, Vol-4, Issue-04(1), April-2026.