



## EFFECT OF MULTI-MEDIA APPROACH ON THE DEVELOPMENT OF SELECTED COMPETENCIES IN MATHEMATICS AMONG SLUM STUDENTS

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### ABSTRACT

Since Independence, UEE has been solitary imperative goal of educational progress in India. To achieve UEE, Government of India has initiated numerous programmes but it is sad that dropout rate is not declined. A foremost percentage of the dropouts comprises of socially underprivileged children. Most of the children have to effort very hard to earn their livelihood, and reside in slums.

Recent approaches in the education technology like applications of multimedia by computer technology prove to cater to the various requirements of students in the educational system. Multimedia is a sole medium with structures of quality, audio-visual recording, and sound effects. Using Multimedia Approach, in teaching-learning process, is a perceptual knowledge, and as outcome students acquires the concepts and skills effectively.

The present study was carried out with the objective to study the effect of the multi-media approach in relation to traditional approach in fostering selected Mathematics Competencies among Slum Students. The sample of the study was 40 slum students of standard six. The pre-posttest experimental design was followed for the present research study. The treatment for the Experimental group was given by the investigator for 40 sessions specifically to foster Mathematics Competencies using a specially designed instructional material. Analysis of the results revealed, that Multi-Media Approach was significantly more effective than of the traditional approach in fostering selected Mathematics Competencies among Slum students. Educational implications of the study were discussed in the study.

**KEYWORDS :** Multi-media Approach, Instructional Package, Slum Students, Mathematics Competencies, Sixth Standard Students

### INTRODUCTION

Since India's independence, one of the most important goals of educational growth has been UEE. Within ten years of the constitution's inception, Article 45 of the Constitution directs the state to provide free and compulsory education to all children up to the age of fourteen.

To achieve UEE, government of India, launched numerous schemes and at present Shikshaka Shikshana Kendra (SSK) is in progress. RTE Act, 2009, which represents the important legislation under Article 21-A, means that every child has the right to a full-time, satisfactory, and fair elementary education in a formal school that meets certain key norms and criteria. Article 29 (2) lays down that "no citizen shall be denied admission into any educational institution maintained by the state or receiving aid out of state funds on grounds only of religion, race, caste, language or any of them."

It is miserable condition that dropout rate is high in India. Numerous causes can be listed for this concern. Every sixth urban Indian lives in slums unfit for human habitation. Slums, in fact, are so common that they are found in 65 per cent of the Indian towns. Yet slum dwellers are the most overlooked section of society. Six out of 10 slum dwellers live close to unsanitary drains and almost four of every 10 do not get treated water (State of India's Environment 2019). It is a choice between fundamental requirements and intellectual development and most individuals prefer the former. In many households, both parents work, leaving the eldest child, and almost always the girl child, to care for the younger siblings. Furthermore, due to poverty, the minor child is enforced to add-on the family's income, resulting in child labor. In other circumstances, parents are unable to provide their children's basic needs in order to send them to school. More percentage of dropouts comes from low-income families and today's focus is on these children, where their parents are unable to offer even a single meal per day. The majority of the children are forced to work very hard for a livelihood and they reside in slums. In India, slum education has remained a neglected aspect of human resource planning.

### Need For The Study

Studies on slum students and their education reveal a dire necessity for the education of slum students as well as a varied and unique system of education for them (Sveta Dave Chakravarthy, 2005). Low achievement is a matter of serious concern and curriculum developers and translators must pay special attention to it. Another potential explanation of dropout could be low teacher motivation to teach children from low socioeconomic backgrounds, and mother's low status of education (Samajik Suvidha Sangam Society 2009). Lack of interest in studies and unfriendly environment in the school, make

them to leave the school. As a result, new approaches to educational technology, such as multimedia programmes based on computer technology have proven to meet the different demands of students in educational settings. Multi-media is an exceptional medium with high quality characteristics like audio-visual, recording, and sound effects. It's a simple way to deliver well-designed information with a variety of interesting effects. Classroom teaching through multimedia is perceptual learning which makes effective and meaningful (Andrew Laghos, 2010; Siew Pei Hwa, 2009; Eun Joon Um, 2008; Norhayati, A. M., and Siew, P. H., 2004 and Joan, D.R.R. & Denisia, S.P. 2012). A combination of multimedia audio-visual teaching method used, with newness, variety and curiosity, can be enjoyable, touching student's concentration in learning, better theoretical, practical and visual knowledge, highly effective, and interested in learning (Marina Milovanović, Đurđica Takači & Aleksandar Milajić 2011, Haftamu Menker GebreYohannes, Abdul Hadi Bhatti, Raza Hasan 2016). Teachers need to use multimedia technologies within the context of students' familiar, technology-rich living spaces to develop their own teaching skills and the technology skills of their students. In 21<sup>st</sup> century, teaching through the multimedia very essential (Gourav Mahajan 2012). Hence, Multimedia approach has been applied in the preparation and presentation of lesson plans for the package. This package was used to develop the expected competencies. Accordingly, investigator abstracted the results of multimedia approach through research studies and felt that this would applicably suitable in the perspective of education for slum children. Hence, the investigator endeavored to validate the effect of Multimedia Approach on developing selected Competencies in Mathematics among slum children.

### Statement Of The Problem

Effect of Multi-Media Approach Instructional Package on the Development of Selected Competencies in Mathematics among the Slum students of standard six of Mysore District.

### Objectives Of The Study

1. To find out whether there exist any significant difference between the pre-test scores of Slum students of experiment and the control group on Intelligence.
2. To examine the effectiveness of the designed Instructional Package (Experimental treatment) in relation to traditional approach in fostering **selected Mathematics Competencies** among Slum Students after adjusting for the initial differences in Intelligence and Mathematical Reasoning.

### Operational Definitions Of The Study

#### Multi-media Approach:

Multi-Media approach is the combination of various digital media

types such as the text, graphics, sound, animation and video into an integrated multi-sensory interactive application as presentation to convey a message or information to an audience (Neo and Neo, 2001). In the present study, Multi-Media approach is defined as an approach where more than one style of presentation (text, graphics, sound, animation, and video) is used in teaching-learning process, especially to develop selected Mathematics Competencies among slum students.

### Multi-Media Approach Instructional Package:

The Multi-Media Approach Instructional Package is the package validated by the investigator wherein Multi-media approach is used to deliver the content.

### Competencies:

Competencies are pre-determined specific learner behaviours based on a specific objective. In the present study, Competencies are the specific learner behaviours expected by the students of standard six, especially in Mathematics as defined by the Government of Karnataka under MLL (Minimum Levels of Learning).

**Selected Competencies in Mathematics** are the Competencies intended to develop among slum students in relation to Mathematics and they were: a) Competencies related to the Number System, b) Competencies related to properties of Numbers, c) Competencies related to Factors d) Competencies related to Fractions, e) Competencies related to Decimals;

### Effect:

It referred to substantial modification among the slum students in terms of Mathematics Competencies between the entry behaviours and the terminal behaviour as measured in quantitative terms.

### Traditional Method:

Traditional method used by the class teacher at present in schools to develop selected Competencies among the children. This, method was based on Herbatian steps. It was the treatment given for the control group.

### Slum:

A Slum is a dense settlement with a collection of poorly built dwellings, mostly of temporary nature, crowded with insufficient sanitary and drinking water amenities in unclean surroundings (National Sample Survey Organization, 2002).

### Slum Students:

For the present study the term means children living in slums of Mysore district and studying in standard six in Karnataka State Government schools.

### Non-Slum Students:

For the present study, the term means children residing in areas other than Slums of Mysore district and studying in the sixth standard in Karnataka State Government schools.

### Mathematical Reasoning:

Mathematical reasoning is the ability to identify, understand, generate, and evaluate logical, argumentative and quantitative information in order to use them in everyday situations (According to the Dean of Academic Affairs, Office of Evaluation of Student Learning, University of Puerto Rico Rio Piedras Campus). In the present study it is the cumulative scores obtained by the students of standard six on "Mathematical Reasoning test" validated by the investigator.

### Intelligence:

Intelligence is the aggregate or global capacity of the individual to act purposefully, to think rationally, and to deal effectively with his environment (Wechsler, 1937). In the present study it is the cumulative scores of sixth standard slum students on 'Dr. Prameela Ahuja's Group Test of Intelligence'.

### Methodology Of The Study Variables

#### Independent variables:

The independent variable in the experiment was a specially designed package validated by the investigator to foster Mathematics Competencies.

#### Dependent Variables:

The dependent variables of the experiment study involved fostering

selected Mathematics Competencies among the slum students of class six.

### Population

In the present study, the population consisted of all the slum students of elementary level in Mysore district who follow the Karnataka state syllabus.

### Sample

The sample consisted of 40 students studying in the sixth standard. To select students for the experimental group and the control group, 'Group Test of Intelligence' was administered to all the students of class sixth. The scores of the students were arranged in the ascending order and students with odd and even scores were assigned to two groups, namely, the experiment and the control group. In order to ensure the equivalence of the groups, further 'r' was calculated and found it to be 0.71. Thus group- I of twenty students was selected for the experimental group and the remaining students were considered for the control group. The students of the control group were allowed to be under the instruction of their school teacher while the students of the experiment group were taught by the investigator with the help of a specially designed instructional package based on Multimedia approach. Thus, the investigator employed the purposive sampling method in order to select the sample for the experimental study.

### Tools Employed

The facilitative tool was used in the Experiment Study, i.e., a **Multimedia Instructional Package** based on the Multimedia Approach to develop Mathematics Competencies among the slum students of class Six. The tools used at the Pre-test/treatment level of the study are given below: a) Group Test of Intelligence constructed and validated by Dr. (Mrs.) Prameela Ahuja. b) Mathematics Competencies test constructed and validated by the investigator, c) Mathematical Reasoning Test constructed and validated by the investigator.

### Research Design:

The present research was experimental in nature involving the Pretest-Posttest – Equivalent Groups Design. This design is considered to be the most effective and true experimental design, which minimizes the threats to experimental validity.

### Statistical Techniques Used

The investigator has used Descriptive Statistics-Mean, SD and, Inferential Statistics- 't' test and ANCOVA were used.

### Analysis Of The Objectives

**Analysis of the first objective** was to study whether there exist any significant difference between the pre-test scores of Slum students of experiment and the control group on Intelligence.

**Table 1: Shows The Number (n), Mean (m), Standard Deviation (sd) And 't-value Of Pre-test Scores Of Slum Students Of Experiment And Control Group On Intelligence.**

Types of students	N	M	SD	t-value	Result
Experimental group	20	33.45	6.72	0.0491	Significant at 0.01 level
Control group	20	33.35	6.16		

As the above value indicates, the t-value between the two means of experiment and control group on Intelligence is found to be 0.491, which is less than the table value (2.10). Thus, the null hypothesis was accepted. Thus, it can be concluded that there is no significant difference between the means of scores of pre-test scores of slum students of experiment and the control group on intelligence.

### Analysis Of Objective Two

Analysis of second objective was to study the effectiveness of the designed Instructional Package (Experimental treatment) in relation to traditional approach in fostering **selected Mathematics Competencies** among Slum Students after adjusting for the initial differences in Intelligence and Mathematical Reasoning.

**Table 2: Showing The Analysis Of Covariance For Differences In The Post-test Scores On Mathematics Competencies Between Experiment And The Control Group.**

Sources of Variation	df	Sum of squares	Mean squares	F	Significance of F
Between	1	4747.59	4747.59	43.298	Significant at 0.01 level

Within	36	3947.35	109.65		
total	37	8694.94	234.99		

As the above table indicates, the f-value for df 37 is 43.298 and this is more than the table value (7.42). Thus, the null hypothesis was rejected and research hypothesis 'there is a significant difference in the means of post-test scores of experiment, and the control group on fostering mathematics competencies' was accepted. Thus, it can be concluded that there is a significant difference in the means of post-test scores of experiment and the control group on fostering mathematics competencies. This implies that the experimental treatment was significantly more effective than of the treatment for control group in fostering mathematics competencies among slum students.

### Major Findings Of The Study

a. There is no significant difference between the means of scores of pre-test scores of slum students of experiment and the control group on intelligence.

b. Multi-Media Approach Instructional Package was significantly more effective than of the traditional method in fostering selected Mathematics Competencies among Slum students after partialling out the effect of Intelligence and Mathematics Reasoning.

### Educational Implications Of The Study

I. Multimedia approach can be followed to help students to foster their achievement level.

II. Teachers need to be trained to use multimedia approach rather than simple lecture demonstration method.

III. The teachers' prerequisite to be proficient to prepare instructional material based on multimedia approach.

IV. The text books should give enough guidelines to help teachers to use multimedia approach for different topics of the syllabus.

V. The school should be well furnished with appropriate and abundant amenities to use multimedia approach in classrooms.

### Limitations of the Study

The investigation has been designed with certain limitations that have been from the point of practicability that is, lost effort, time factor etc.

a. Instructional package based on multimedia approach can be applied to any school subject, at any level. In the present study, the investigator enabled its application to only one subject (Mathematics) at elementary level.

b. The study was limited to foster only selected Competencies of Mathematics based on multimedia approach.

c. The study was limited to only sixth standard Kannada medium Slum pupils of Mysore District.

d. The study was limited to only Arithmetic's branch in Mathematics.

e. Only two variables have been controlled in the study.

### Suggestions For Further Research

a. The effect of the present instructional material can be studied on non-Slum Students also.

b. Studies can be undertaken to train teachers and educational personnel in multimedia approach.

c. The effect of multimedia approach on Non slum students can be executed with more samples to establish better validity.

d. The study can be tried with other branches in Mathematics like Algebra, and Geometry.

### REFERENCES:

- Haftamu Menker GebreYohannes, Abdul Hadi Bhatti, Raza Hasan (2016), 'Impact of multimedia in Teaching Mathematics', International Journal of Mathematics Trends and Technology (IJMTT) – Volume 39 Number 1- November2016; ISSN: 2231-5373; <http://www.ijmtjournal.org>, Page 80-83.
- Gourav Mahajan (2012), 'Multimedia in Teacher Education: Perceptions & Uses', The International Institute for Science, Technology and Education (IISTE), Journal of Education and Practice [www.iiste.org](http://www.iiste.org) ISSN 2222-1735 (Paper) ISSN 2222-288X (Online) Vol 3, No 1, 2012 page no. 5 -12.
- Joan, D.R.R. & Denisia, S.P. (2012), 'Multimedia Approach and Its Effect in Teaching Mathematics for the Prospective Teachers', *Journal on School Educational Technology*, 8(2), 44-49. Retrieved September 21, 2021 from <https://www.learntechlib.org/p/176221/>.
- Marina Milovanović, Đurđica Takač & Aleksandar Milajić (2011) Multimedia approach in teaching mathematics – example of lesson about the definite integral application for determining an area, International Journal of Mathematical Education in Science and Technology, 42:2, 175-187, DOI: 10.1080/0020739X.2010.519800
- AminahAhmad, et. al (2010), 'Incorporating Multimedia as a Tool into Mathematics Education: A Case Study on Diploma Students in Multimedia University', International Conference on Mathematics Education Research 2010 (ICMER 2010), 1877-0428 © 2010 Published by Elsevier Ltd. doi:10.1016/j.sbspro.2010.12.082
- Svetlana Ilcheva (2005), 'Cognitive Function of Multimedia Learning', svetailcheva@gmail.com National Research University of Information Technologies, Mechanics and Optics (Russia) [https://conference.pixel-online.net/conferences/edu\\_future/common/download/Abstract\\_pdf/pdf/ITL98-Ilcheva.pdf](https://conference.pixel-online.net/conferences/edu_future/common/download/Abstract_pdf/pdf/ITL98-Ilcheva.pdf)

- Census of India 2011, Slum houses, Households Amenities and assets.
- Registrar General of India, Census of India 2011.
- State of India's Environment (In figures), 2019, Centre for Science and Environment (CSE).
- Pradhan Mantri Awas Yojana (Urban), Ministry Of Housing And Urban Affairs <http://ssakarnataka.gov.in/index.asp>.
- Samajik Suvidha Sangam- A status report <https://www.usp2030.org/gimi/Ressource/PDF.action.jsessionid=Clykiow8FxfJEGNqWXXbKkKBRF7GcLODayikgrw09uzlPBHkoi!-435584484?id=28868>