Development of Multimedia E-book on Value Education for B.Ed. Pupil Teachers

INTRODUCTION:

Teacher education is an area that is deliberately proposed for teacher training. The teacher training institutes are established in our country to educate teachers. There are different courses developed by different universities for training of the teachers. B. Ed. course is one of the courses for pre-service teacher education. The B.Ed. course includes theoretical part and practicum part of teacher education. B. Ed. Part I is a theory part and B. Ed. Part II is a practicum part. There are seven theory papers of 100 marks each in revised B.Ed. syllabus of Solapur University, Solapur. The Paper V semester II is a Value Education.

It is observed that the theory courses are completed by lectures. The teacher educators rarely use other methods of instruction. Instructional materials are also used rarely in teaching learning of these theory courses. It results in memorization for examination purpose and it is also observed that the pupil teachers forget the pedagogy and rarely apply it in their day-to-day in-service career.

It is said that we live in the Information Age. We are bombarded by information-related technology. Timely, integrated and good quality communication of information is needed for effective change. Communication is an interactive process. In this age of information, computer-based multimedia technology is a tool for communicators of all trades and an effective catalyst for change. Multimedia technology is a tool – not an end in itself. Because multimedia technology is a tool, applications are practically limitless and people from a wide variety of fields are encouraged to learn how to plan and develop multimedia applications in their fields of interest.

STATEMENT OF THE PROBLEM

The statement of the problem for research on hand was, therefore, stated in the following words.

"Development of Multimedia E-book on Value Education for B.Ed. Pupil Teachers"

OPERATIONAL DEFINITIONS OF THE TERMS

The operational definitions of the terms used in the statement of the problem were defined for the sake of clarity and also for delimiting the scope of study as follows:

Development: The term development includes the planning, designing, constructing and testing of an instructional system.

Multimedia E-book: A system designed for and dedicated to instruction, i.e. human instruction, is an instructional system. An instructional system is defined, as an integrated set of methods, media, equipment and personnel performing efficiently, the functions required for accomplishing one or more instructional objectives. The term Multimedia refers to the integration of multiple media – such as visual imagery, text, video, sound and animation – which together can multiply the impact of message. Multimedia E-book is an instructional system developed through multimedia technology.

Value Education: The term Value Education is a vast term. It is one of the courses at B. Ed. Level. Value Education is the value oriented education by which different types of values can be inculcate among B.Ed. pupil-teachers.

SIGNIFICANCE OF THE STUDY

The significance of the present study is as follows:

1. As far as the knowledge of investigator is concerned, no study of such kind has been done earlier.

2. The study will deeper the understanding of the Value Education course to be taught in B. Ed. colleges.

3. The developed E-book will help the teacher, educators and the pupil-teachers in teaching and learning of Value Education. They will not depend only on textbook. The study will enable the pupil teachers to understand the nature and purpose of Value Education develop communication skills and enable to use modern information technology for school purposes.

4. The deficiency of unavailability of multimedia CD-ROM on Value Education will be removed to some extent.

5. It is observed that the multimedia instructional system is more significant than traditional teaching learning approach. This multimedia instructional system will help in revising the Value Education course.

6. The system will be helpful for the distance learning mode and in-service training.

SCOPE AND DELIMITATION'S OF THE STUDY

1) This study was limited to B.Ed. syllabus Value Education course only.

2) This study was restricted to the units from Value Education course in B.Ed. revised syllabus of Solapur University, Solapur.

3) The development of multimedia E-book was restricted to marathi medium Colleges of Education only.

4) The experiment was restricted only to the pupil teachers admitted in College of Education, Barshi affiliated to Solapur University, Solapur.

5) The development of a system included designing, developing and evaluating stages. The evaluating stage includes large-scale try-out of the system, but the study was confined to experimental try-out in one College of Education. The results of the evaluation of developed system were limited to this institute only.

OBJECTIVES OF THE STUDY

The study was undertaken with the following objectives.

1) To analyze the conventional approach of teaching Value Education.
2) To plan multimedia instructional system for Value Education.
3) To design and construct multimedia E-book for Value Education.
4) To test the effectiveness of constructed multimedia E-book.
5) To compare the effectiveness of constructed multimedia E-book with the conventional system of instruction.
6) To validate multimedia E-book in terms of their effectiveness over conventional system of instruction.
7) To equip the pupil teachers and teacher-educators with reliable system to overcome the difficulties in instruction of theory course of Value Education

HYPOTHESES OF THE STUDY

Following were research hypotheses of the study.

R.H.1: The present setting of teaching of Value Education in B.Ed. Colleges is unsatisfactory for better learning of the pupil-teachers.

R.H.2: An instructional system for Value Education instruction through multimedia technology can be planned, designed and constructed.

R.H.3: The total pupil-teachers perform differently on achievement in their groups irrespective of the system used in instructing them.

R.H.4: The conventional instructional system and the developed multimedia E-book for Value Education Instruction differ in their effectiveness on the performance in achievement of the total pupil - teachers.

R.H.5: The total pupil-teachers perform differently in retention of achievement in their groups irrespective of the system used in instructing them.

R.H.6: The conventional instructional system and the developed instructional system for Value Education Instruction differ in their effectiveness on the performance in the retention of achievement of the total pupil- teachers.

The research hypotheses R.H.3 to R.H.6 were stated below into null form for sake of experiment and for testing purpose.

Ho.1: There is no significant difference between the performance of the pupil-teachers from control and exp. group in pre test.

Ho.2: There is no significant difference between the performance of the pupil- teachers from control and exp. group in posttest.

Ho.3: There is no significant difference between the performances of the pupil- teachers from control group in pre over post testing.

Ho.4: There is no significant difference between the performances of the pupil- teachers from exp. group in pre over post testing.

Ho.5: There is no significant difference between the gains in achievement in terms of scores in pre over posttest of the pupil-teachers from control and exp. group.

Ho.6: There is no significant difference between the performance of the pupil- teachers from control and exp. group in retention test.

PHASES AND STEPS FOLLOWED IN DEVELOPMENT:

Successful development of the method of multimedia-based communication requires careful planning, mastery of multimedia technology, as well as comprehensive and effective production management. It is the result of the integrated work of a team.

The production of interactive multimedia applications is a complex one, involving multiple steps. This process can be divided into the following phases:

1) Survey
2) Development
3) Preproduction
4) Production
5) Post production

1) SURVEY

The investigator surveyed the present setting of Value Education instruction with the help of questionnaire and interview schedule. For that purpose he selected twenty teacher educators of

different colleges of education affiliated to Shivaji University, Kolhapur & Solapur University, Solapur.

2) **DEVELOPMENT:**

In this phase the investigator did the following activities.

a) Supported the application concept into a presentable manner.

b) Supported the process of building a team that would potentially pull together the application.

c) The multimedia application concept, goals and objectives are clearly stated.

3) **PREPRODUCTION:**

Once the multimedia application concept, goals and objectives are clearly stated and financing is secured, the preproduction phase is initiated. This is a very hectic stage. The investigator did the following activities.

a) Hired all specialists involved in the process.

b) Equipments were purchased.

c) Software was installed.

d) Developed the multimedia application outline, logic flow charts, scripts and video and audio files, production scripts and schedules.

4) **PRODUCTION:**

Once all the preproduction activities have been completed, the production phase initiated. The investigator done the following activities:

1. Content was analyzed.

2. 2-D graphic developed.

3. 3-D graphic developed.

4. Sound recorded.

5. Musical background and recordings were selected.

6. Computer animation was developed.

7. Authoring tool was decided as Director 7.

5) POST PRODUCTION:

In this phase the multimedia is tested and revised, it enters the packaging stage. For this purpose investigator did the following activities.

a) Testing of the application was coordinated.

b) Coordinated the communication with the focus group to request their feedback about the application.

BETA TESTING: THE EXPERIMENTATION

This is the last function of the development of the instructional system. The data received after experimentation is analyzed and interpreted which is fully explained in the next chapter, viz. 'Analysis and Interpretation of the Data obtained in Beta testing'. The analysis of the full-scale try-out data helped the researcher for overall assessment and evaluation of the newly developed instructional system.

1. EXPERIMENTATION:

The investigator had the revised model. He decided to use this model to the experimental group and check the effectiveness. This was an experimental study. The experimentation was used in testing of the prototype as a large scale try out.

The investigator selected two Colleges of Education affiliated to Solapur University, Solapur. In the year 2012-13, out of 160 pupil-teachers, the 60 pupil-teachers were called for expt. Sixty pupil teachers from two Colleges of Education was the sample of the study. The investigator called the thirty pupil-teachers from College of Education, Barshi as an experimental group and thirty pupil-teachers from Mahatma Phule College of Education, Akluj as a control group. The investigator administered a pre-test on both the groups and applied a treatment of

developed multimedia E-book to an experimental group, the control group was treated with traditional system. He then administered a post-test and compared the result. The investigator administered a retention test on both the groups and compared the results. The data is analyzed and interpreted and the effectiveness of the system was tested.

The investigator administered a pre test on half of the pupil teachers (15) from both the groups and gave a treatment of developed multimedia E-book to an experimental group; the control group was treated with traditional system. He then administered a posttest on both the groups and compared the results. The data was analyzed and interpreted and the effectiveness of the system was tested.

A pretest of 50 marks for pupil-teachers was administered on the sample. The answer-scripts were assessed; the scores were collected, analyzed and interpreted.

A posttest of 50 marks for pupil-teachers was again administered on the sample. The responses of the pupil-teachers were collected in terms of scores. The data was analyzed and interpreted.

'Is the developed system used in experimental group of pupil-teaches proved helpful to the pupil-teachers fro the group?' was a question to be answered. A comparative analysis and interpretation of the gains both in achievement was done to answer the question.

'Is the developed system used in experimental group of pupil-teachers proved helpful to retain the content?' was a question to be answered. Hence a retention achievement test was administered on the pupil-teachers from the sample after three months of the treatment to collect the information of the pupil-teaches about their retention in treatment. The data was collected, analyzed and interpreted.

Conclusions were drawn about the effectiveness of the developed instructional system and suggestions were stated.

2. VARIABLES IN THE EXPERIMENT:

The dependent and independent variables in the study were located and listed. They were-

Dependent Variables:

The dependent variables were achievement of the pupil-teachers in terms of scores, ability of learning, behavioral changes of the pupil-teaches. These dependent variables were combined into one i.e. scores achieved in the pre over post test pupil teachers.

Independent Variables:

Sex, socio-economic status, intelligence and ability of the pupil-teachers, college atmosphere, facilities of instruction, equipments used in instruction, instructional materials, time and period of exposure to a particular condition, reward and punishment during instruction, evaluation procedure, were the independent variables.

Though there were so many independent variables, the investigator had decided to consider only two independent variables in his experiment viz. sex and system of instruction. The effects of remaining independent variables on dependent variables were controlled by randomization.

3. CONTROL OF THE EXPERIMENT:

Randomization technique was used in controlling the extraneous variables. Two groups of the pupil-teachers selected from colleges of education affiliated to Solapur University, Solapur which helped the investigator in controlling socio-economic status, age, classroom situation, intelligence, reward and punishment effects, abilities of learning.

It was decided to complete all the units in same month helped in controlling time of instruction variable.

The equivalency of the two groups was checked by statistical measures.

4. **THE EXPERIMENTAL DESIGN:**

   The investigator decided to use the **Solomon Four-Group Experimental Design** for Beta testing also. The investigator had decided to use this design because it provided equivalency, accuracy with less labor and such is a source of economy. The hypothesis formulated by the investigator can be resolved with the help of this design.

$R_1 \rightarrow O_1 \rightarrow X \rightarrow O_2$

$R_2 \rightarrow O_3 \rightarrow C \rightarrow O_4$

$R_3 \rightarrow \quad\quad X \rightarrow O_5$

$R_4 \rightarrow \quad\quad C \rightarrow O_6$

In this design:

1) Pupil-teachers were randomly assigned to four groups. There were fifteen (15) pupil-teaches in each group.
2) Two groups received the experimental treatment (X), which was implementation of the systems.
3) One experimental group received a pre test (O_1).
4) Two control groups were not received treatment (X).
5) One control group received a pre test (O_3).
6) All four groups received posttests (O_2, O_4, O_5, O_6).

5. SAMPLING DESIGN USED IN BETA TESTING
   (EXPERIMENT):

   The investigator used following samples in his study.

- A Sub sample of pupil-teachers used 30 pupil-teachers from Mahatma Phule College of Education, Akluj in the year 2012-13 as a control group.
- A Sub sample of pupil-teachers used 30 pupil-teachers in College of Education, Barshi in the year 2012-13 as an experimental group.
- The sample was of 60 pupil teachers selected randomly from the pupil teachers in respective colleges having elective paper Value Education.

6. TOOLS USED IN BETA TESTING (EXPERIMENT):

The investigator revised the tools used in data collection for the present study:

DESCRIPTION OF TOOLS:

1) Achievement Tests (Pre and Post) for Pupil-teachers:

The achievement test was constructed and administered on two equivalent groups of the pupil-teachers. The same achievement test is used as pre and post test in experiment.

The main objective of the pre test was to examine the achievement level of the pupil-teachers before the treatment. The same test was administered on two groups as a posttest. The main objective of the posttest was to examine the achievement level of the pupil-teachers after the treatment.

Pre test was consisted with 50 multiple-choice objective questions.

2) Retention Test:

The retention test was consisted with 50 multiple-choice objective questions.

RELIABILITY AND VALIDITY OF THE TOOLS:

1) Validity and reliability of the achievement tests:

The achievement test was one of the tools which was used in the study and have face and content validity. Five experts confirmed the face validity of the achievement test through careful observation. Five experts established the content validity of achievement test through careful analysis of objectives and actual subject matter. The

investigator explained the main purpose of the achievement test, content involved in the test, objectives to be tested and asked the experts to evaluate various items in the test for their validity against purpose, content analysis and weightage, language, difficulty level, weightage to objectives and types of question. In this way content validity of the achievement test was established and it was found high.

Administering the test to the small sample of pupil-teachers and comparing the scores of the pupil-teachers in the sample at a pretest estimated the concurrent validity of the achievement test used for pupil-teachers. Following raw score formula was used.

The formula used in estimating the validity coefficient was:

$$r_{xy} = \frac{N\sum xy - \sum x \sum y}{\sqrt{\left[N\sum x^2 - \left(\sum x\right)^2\right]\left[N\sum y^2 - \left(\sum y\right)^2\right]}}$$

It is a new raw score formula where r_{xy} means coefficient of correlation between x and y scores. N means number of students.
The validity coefficient of the achievement test was found 0.62, which was high enough.

The researcher also estimated reliability of the achievement test by using the same spilt – half method. The formula is given below.

$$r_{11} = \frac{2r_{\frac{1}{2}}}{1 + r_{\frac{1}{2}}}$$

Where r_{11} is the reliability coefficient of the whole test, $r_{\frac{1}{2}}$ is reliability coefficient of the half test.

The reliability coefficient of the achievement test was found 0.73, which is passable and good enough to justify some individual predictions.

Question wise analysis was done for each question in the achievement test. The difficulty value and discriminating power of 100

questions were found and from those 50 questions selected for final achievement test. The values were found by following formulae.

$$Difficulty\ value = \frac{No.\,of\ pupil\ teachers\ with\ correct\ answers}{Total\ no.\,of\ pupil-teachers} \times 100$$

$$Discriminating\ power = \frac{U-L}{\frac{1}{2}N}$$

Where,

      U =   No. of correct answer students from upper group.

      L =   No. of correct answer students from lower group.

      N =   Total no. of students from upper and lower group.

The questions, which had discriminating, power 0 or less than 0 were deleted.

The reliability and validity of retention test is also determined as like as reliability and validity of achievement test.

ANALYSIS AND INTERPRETATION OF DATA OBTAINED THROUGH EXPERIMENT:

The data was analyzed with the help of statistical and non-statistical measures. The techniques of t test, F test were used to test the hypotheses. The investigator tabulated the collected data and calculated the t- values and F- values to compare achievement of pupil teachers from control and experimental group.

CONCLUSIONS:

Conclusion 1:

  The research hypothesis No.1 is accepted. The present setting of teaching of Value Education in B.Ed. Colleges is unsatisfactory for better learning of the pupil-teachers.

Conclusion 2:

  The research hypothesis No.2 is accepted. An instructional system for Value Education instruction through multimedia technology can be planned, designed and constructed.

Conclusion 3:

  The null hypothesis No.1 is accepted. There is no significant difference between the performances of the pupil-teachers form control and experimental group in pre test.

Conclusion 4:

  The null hypothesis No.2 is rejected. There is significant difference between the performances of the pupil-teachers from control and experimental group in posttest. Developed Multimedia E-book helped the all 30 pupil-teachers in performing better than the all 30 pupil-teachers from the control group.

Conclusion 5:

  The null hypothesis No.3 is rejected. There is significant difference between the performances of the pupil-teachers from control group in pre over post testing. Conventional Instructional System helped the all 30 pupil-teachers from control group in performing better pre over posttest.

Conclusion 6:

  The null hypothesis No.4 is rejected. There is significant difference between the performances of the pupil-teachers from experimental group in post

testing. Developed Multimedia E-book helped the all 30 pupil-teachers from experimental group in performing better in pre over posttest.

Conclusion 7:

The null hypothesis No.5 is rejected. There is significant difference between the gains in achievement in terms of scores in pre over posttest of the pupil-teachers from control and experimental group.

Conclusion 8:

The null hypothesis No.6 is rejected. There is significant difference between the performance of the pupil-teachers from control and experimental group in retention test.

SOME RECOMMENDATIONS:

From the responses of the respondents and the experience in this study, following are some recommendations:

1. The teacher-educators should understand the concept of development of multimedia E-book on Value Education.
2. The teacher-educator should have complete understanding of the subject Value Education. Without proper understanding of the subject one cannot explain multimedia technology approach.
3. The teacher-educators and the pupil-teachers should develop multimedia instructional materials helpful in teaching of Value Education.
4. It is suggested that self learning material be developed on the lines as discussed in this study.
5. The Colleges of Education should rethink over the method they are teaching and following in their Value Education course. One has to develop steps and correlate the same with day-to-day lecture planning.

6. Multimedia Instructional System is the necessity of the Colleges of education. A joint effort in this direction will be highly appreciated.

7. The preparation of audio, visual and audio-visual teaching aids workshop should be part and parcel of Educational Technology paper.

TOPICS FOR FURTHER RESEARCH:

While conducting the present research work, the researcher came across some problems that he feels needed further elaborate exploration through research. These problems were not directly related to the problem under investigation, and hence the investigator has not explored them any further. However, for the benefit of the researchers in this field as well as for the better understanding of the present research, the investigator has enumerated them here below.

1) The present research work was related to B.Ed. pupil-teachers. The investigator feels that studies related to B.P.Ed. Pupil-teachers and also higher education be conducted w.r.t. multimedia technology.

2) The investigator feels that such type of studies can be conducted in papers of B.Ed. other than Value Education.

3) The experimentation phase was done in College of Education, Barshi in the present study, the investigator feels that the developed multimedia E-book may be implemented in various colleges of education on a large scale and the effectiveness of the system can be tested.

4) The investigator used compact disk multimedia E-book in his study, he feels that other materials and media can be used and it will be a good problem for further study.

5) Different types of programs can be developed for teaching Value Education course to B.Ed. pupil-teachers.

6) The Value Education course of B.Ed. syllabus may be improved by involving multimedia technology and can be tested accordingly.

ORGANIZATION OF THE REPORT:

The instructional system so developed and experimented and inferences and conclusions based on the experimentations have been systematically presented in seven chapters as below.

Chapter I: Introduction

This chapter includes background of the research, statement of the problem, objectives of the study, hypotheses of the study, methodology and significance of the study, scope and limitations.

Chapter II: Value Education & Multimedia Instruction

This chapter is devoted to the theoretical aspects of Value Education which includes a brief history, meaning, definitions, major aspects, characteristics, functions, divisions, scope, and advantages of Value Education. The Chapter also includes the present status of Value Education instruction at B.Ed. level and new trends and techniques of instructions. Multimedia Technology is discussed in deep along with review of related studies in Value Education and Multimedia.

Chapter III: Development of a Multimedia E-book – A Theoretical Aspect

This chapter is mainly devoted to theoretical background of development of a multimedia E-book. It also includes the development procedure of multimedia E-book.

Chapter IV: Development of Multimedia E-book on Value Education –A Practical Aspect & Research Procedure.

In this chapter investigator explained the procedure he used in the development of a multimedia E-book. This chapter is devoted to the survey of present setting of Value Education instruction. It also includes details of external evaluation of the MIS and revision of the developed model.

Chapter V: Analysis & Interpretation of Beta Testing Data

The data obtained through experimentation in beta testing was analyzed and interpreted accordingly. The analysis and interpretation of the data in the form of tables, graphs and figures and statistical measures was given in this chapter.

Chapter VI: Conclusions & Recommendations

In this chapter investigator discussed the result of the experiment and the conclusions based thereupon. This chapter also includes recommendations based on conclusion and topics for further research.

Chapter VII: Summary

This chapter includes the summary of the study.

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