EFFECTIVENESS OF MODULE ON EDUCATIONAL TECHNOLOGY FOR B.ED. STUDENTS IN TERMS OF ACHIEVEMENT AND REACTION

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SUMMARY

"EFFECTIVENESS OF MODULE ON EDUCATIONAL TECHNOLOGY FOR B.ED. STUDENTS IN TERMS OF ACHIEVEMENT AND REACTION"

1.0   INTRODUCTION

The present discussion is devoted to the summery of the study entitled "Effectiveness of Module on Educational Technology for B.Ed. Students in Terms of Achievement and Reaction" under different captions namely Present educational System, Introduction of educational technology, Innovation in education, Modular approach, Rationale of the study, Statement of the problem, Key terms used, Objectives of the study, Hypotheses of the study, Delimitations, Sample, Tools, Procedure of data collection, Data analysis, Findings and Implications. These were discussed under the following different captions.

2.0   PRESENT EDUCATIONAL SYSTEM

The education system of every country has its own aims and objectives. It is extensively based on the sole objectives of the education system to change the student's behavior and to develop specific aptitudes among them. The changed behavior through teaching and learning would be helpful for the development and progression of that country on the overall circumstances. In India, education system has grown massively since National Policy on Education 1986 and Program of Action 1994 which has set out certain aims and goals for giving Education. Education has its three important sections for instance curriculum, instructions, and methods of teaching. The curriculum is the backbone of the educational system which is being planned on the basis of some specific objectives which are accomplished through instructional delivery by the teachers and thereafter assessment of these specific objectives is done through specific measurement and evaluation tools. In the 21st century, the education system in India has experienced important radical changes because of Sarva Shiksha Abhiyan and the Right to Education Act. Sarva Shiksha Abhiyan (SSA), Rashtriya Madhyamik Shiksha Abhiyan (RMSA), Rashtriya Uchchattar Shiksha Abhiyan (RUSA), University Grants Commission (UGC), NCERT, Consortium for Educational

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Communication (CES), and so forth are altogether reliably working for the quality education for different types of students in the country as determined by National Curriculum Framework 2005, which emphasizes the idea of training should be ensured for the attainment of objectives.

2.0 INTRODUCTION OF EDUCATIONAL TECHNOLOGY

The field of educational technology is as broad as education itself. It entails the systematic and integrated use of all educational resources, such as men, machines, methods, media, and materials (5M's) in order to achieve optimal results. In simple words, educational technology can be defined as the effective organization of any learning system, as well as the adaptation or adoption of methods, procedures, and products to meet specific educational objectives and goals. This would entail an organized identification of educational goals, taking into account national needs, system capacities, and the needs and potential of learners.

Educational technology as a field promotes communication skills and methods of teaching and learning via the careful use and integration of various media. Many people have turned to technology-integrated learning to help them to deal with the demands of the modern world. Information and communication technologies are being successfully employed to improve the quality of education, as well as to reform, reposition, and design it. Understanding of educational technology's role as a change agent in the classroom, impacting the teacher and the teaching-learning process, as well as its involvement in systemic concerns such as reach, equality, and quality. This respect should not be restricted to educators alone, but should also include educational planners and administrators, since micro and macro systems will be required to handle today's educational issues.

4.0 INNOVATIONS IN EDUCATION

Innovation in the field of education is nowadays a highly discussed and contentious topic. Education has a reputation for being one of the most conservative social systems and policy disciplines. When it comes to teachers, however, it gives the impression that they are being forced to make too many changes without adequate consultation or the required preconditions for change to be successful. Innovative change has been implemented in certain nations without the care and diligence required, as well as the necessary preceding testing, experimentation, and assessment. This consideration should not prevent us from examining the facts. And the data purely shows that

education systems are facing major issues that, if left unaddressed, might pose serious threats not only to education but also to future economic growth, social advancement, and well-being. Education systems have grown considerably since the mid-twentieth century, and human populations have never been more educated than they are now. Emerging economies and emerging nations are likewise aggressively expanding their educational institutions, recognizing education as a necessary component of modernization and prosperity. The advantages of increased education for people and communities are undeniable. However, while many policymakers may see sustained population growth as the best path ahead, a deeper examination of the statistics suggests that this might lead to problems.

When the present methodology with special reference to learning theory, learning task, teaching method, learning strategy, etc., is not working successfully, innovation in education may basically be characterized as the means of coming up with alternative ways of insuring behavioural change in individuals. The concepts "instruction" and "learning" appear to have been supplanted by the more recent terms "innovation" and "self-regulation". It is reasonable to assume that, in a world where humans are both evolving and being transformed by the global world, previous teaching practices, ideas, and methods will soon be obsolete.

5.0   MODULAR APPROACH

Teachers have used terminology like 'Lessons' and 'Units' to refer to the course of education for centuries, but in the age of science and technology, it has been considered differently and has given us a new way of looking at the course of instruction. To design a complicated electronic system, psychologists and technologists needed to conceptualize in terms of small replaceable units that could be readily plugged into and disconnected from the overall system. As a result, the concept of module emerged and gained popularity in the field of education. The modular approach/self-instructional material refers to a training modality in which training instructional materials are offered in the form of modules for independent and direct teachers training. These modules are planned and prepared by experts in the concerned filed and sent one by one to each student/trainee in order to acquire the appropriate training information at their own speed. A feedback mechanism is included into the module by attempting the formative test of each module, which allows the student to observe his/her progress and learning issues. These training modules requires maximum supervision and is simple to implement.

6.0   RATIONALE OF THE STUDY

The educational systems around the world are under increasing pressure to use the new educational technologies to teach students the knowledge and skills they need. Educational technology plays a crucial role in structuring day-to-day systems of the society and shaping the future of the quality of education. Educational technological programs are faced with the challenges of preparing a new generation of teacher educators to effectively use the new technological as well as learning tools in their teaching practices. Teacher Educators should have the knowledge and skills to use the new digital tools and resources to help the students. Educational technological programs are to prepare teacher educators in their competency that will equip them for becoming professionally effective. Educational Technology is a value addition to quality, relevance, appropriateness, and other such attributes, transforming education by making it dynamic and responsive to the passions that move the learners and arouse their curiosity and desire to learn.

Researchers developed different types of Self-Instructional Materials, Self-learning Techniques, Video Instructional Materials and Teaching Methods, and studied their effectiveness on the basis of development, achievement, reaction and comparison with other materials and methods in the subject. Some of the researches related to the development and effectiveness of module were conducted by Merwin et al., (1973), Lamb (1975), Ames (1981), Poecoraro (1982), Lampe (1984), Dhamija (1985), Couloun Stephen C. (1987), Knotts, Micheal (1988), Proctor & Richardson (1995), Joshi (1999), Aggabao (2002), Ali (2005), Pathak (2008), Puri (2009), Dubey (2011), Ahlawat, Monika (2012), Singla (2012), Danie et al., (2013), Pal, Sharma (2013), Gupta (2014), Anto & Jacob (2014), Badran (2016), Shinde (2016) and Tyagi, Sultan (2019). Some researchers conducted studies related to the development and effectiveness of other instructional methods such as Kumar (1981), Kaur (1981), Yadav (1988), Sidheshwar (1989), Shah (1992), Marthandavarma (1997), Kim (1998), John (2000), Sharma (2001), Balasubramanian and Meera (2002), Tripathi (2002), Joy & Shaiju (2004), Ise (2006), Patil (2006), Asthana (2007), Gupta (2008), Dhade (2008), Sharma (2009), Tiwari (2010), Karthikeyan and Jayaraman (2011), Aloysius and Cyprian (2012), Siddiqui, Naseha, (2014) and Upasana, Sharma, (2016). Some researchers conducted researches related to the comparison of module with other instructional methods such as Gabriel and Pillai (1981), Mukhopadhyay (1981), Barve (1986), Johnson, Ralph

Junken (1986), James (1988), Dubey (1990), Arunachalam (1991), Johnson (1993), Reddy and Ramar (1995), Mahen (2001), Rivet, J.R. (2001), Rastogi (2003), Shukla (2003), Arora & Singh (2005), Sameehm et.at. (2006), Shehnaz (2006), Shinde (2007), Tonke (2011), Bhatt (2012), Ikwumelu and Oyibe, (2014), Shukla (2014) and Ranjit Kaur et al., (2017).

Among the above mentioned studies conducted by the researchers, the studies such as Merwin et al., (1973), Lamb (1975), Poecoraro (1982), Lampe (1984), Dhamija (1985), Knotts, Micheal (1988), Joshi (1999), Mahen (2001), Shukla (2003), Ali (2005), Pathak (2008), Puri (2009), Dubey (2011), Ahlawat, Monika (2012), Bhatt (2012), Ikwumelu and Oyibe, (2014), Badran (2016), Shinde (2016), Ranjit Kaur et al., (2017) and Tyagi, Sultan (2019) highlighted that the self-learning modules and self-instructional methods were found to be more effective as compared to conventional mode of teaching. Also the studies conducted by James (1988), Aggabao (2002), Rastogi (2003), Arora & Singh (2005), Sameehm et.at. (2006), Shehnaz (2006), Shinde (2007), Tonke (2011), Singla (2012), Danie et al., (2013), Pal, Sharma (2013), Anto & Jacob (2014), Gupta (2014), Shukla (2014) suggested that the students as well as teachers have a positive attitude towards the use of self-instructional materials as a mode of instructions in in the process of teaching-learning. Not only this, the studies of John (2000), Aggabao (2002), Rastogi (2003) and Shukla (2003) showed that Self-learning Modules helped to increase the retention of students and the students also showed positive attitude towards the developed self-learning materials.

Traditional teaching and learning paradigms have been shaken by the impact of educational technology and ICT on educational practices. One of the greatest challenges which needs to be overcome on our way in the 21st century is to enable teachers and students to achieve competency and mastery in the use of technology. There is wave of information because of development in technology, leading to profound effects on education. Technology is revolutionizing teaching and learning. Quality of education should be improved for all round development of the child. Different Individualized instructional materials like module, Program learning materials, computer aided instructions, web based instructions, video instructional materials etc., found very useful in individualized learning and distance learning (Wilson, 1987). The University of Kashmir has also introduced the subject of Educational Technology at B.Ed. level by keeping in view its need and importance in day-to-day life and especially in the field of teaching and learning. As the subject is practical and technical in nature at this level, so the students felt it difficult to understand the

concepts and its implication in their educational carrier. After an intense study and the resources available, the researcher selected Module as a self-instructional material by keeping in view its effectiveness and reaction of the students. Students can learn by own pace & interest with the help of developed module. Module facilitates students to learn even in absence of teacher. Also due to present Corona Virus pandemic which break out in 2019 the whole system of education was hampered. Only the online mode of learning was prevalent, where the teachers use the modern methods of teaching and learning such as MOOCS, SWAYAM, ZOOM classroom, Teach mint, GOOGLE classroom, wise app etc. Module as a self-learning method is the best substitute of offline method of teaching and learning during such a pandemic situation which is self-paced, self-directed, self-explanatory, self-motivated, self-evaluating etc.

After going through intense study, various types of moderate variables were being used by various researchers. However, in the present study the researcher has taken the moderate variables such as gender, category, intelligence, personality, study habits, self-efficacy and level of aspiration in order to study its effectiveness on the treatment variables such as development of module and reaction of students. As no study was being conducted so far related to these variables collectively. These variables will help us in understanding their relationship with the treatment variables as these are correlated with one another.

From the review presented above, it can be said that self-Instructional Material and other Instructional Materials were found to be very effective by most of researchers alone as well as in combination with other Methods of Teaching. After going through related literature, the investigator realized that very few researches were conducted related to the effectiveness of developed module on different subjects at different levels and its comparison with traditional method in terms of students achievement and reaction and only one study was being conducted by Joshi (1999) who developed module on Educational Technology at B. Ed. Level in the district of Indore, MP and probably no study was being conducted so far on effectiveness of module on educational technology for B.Ed. students in terms of achievement and reaction especially in the UT of Jammu & Kashmir. In order to find out the effectiveness of developed self-learning module for B.Ed. students, the present research work is taken up. The students may excel in their related fields if they are provided Self-learning Modules for self-study purposes. This type of learning method will be proven to be very useful and beneficial for the students of Jammu & Kashmir which

is mostly disturbed nationally and internationally. Due to which the education sector has suffered a lot which mostly remains closed due to other circumstances such as shutdowns, strikes, communication blockade and other types of turmoil's. So there is a need to develop a module as a self-instructional material on educational technology at B.Ed. level which to some extent will play as a substitute role of offline mode of teaching and learning.

7.0   STATEMENT OF THE PROBLEM

The title of the present study has been stated as, "**Effectiveness of Module on Educational Technology for B.Ed. Students in Terms of Achievement and Reaction**".

8.0   KEY TERMS USED

The major key terms used in this study are as follows:

Effectiveness

In the present study, effectiveness is concerned with the achievement scores of students when taught through Self-learning Modules and Conventional Mode of Teaching.

Self-learning Modules

In the present study, Self-learning Modules are self-contained, self-paced and activity based instructional material developed by the researcher, where the students' progress through the learning tasks at their own speed.

9.0   OBJECTIVES OF THE STUDY

1   To compare the adjusted mean scores of achievement in Educational Technology of students belonging to experimental and control group by considering pre achievement and intelligence as covariate.

2   To study the effect of treatment, gender and their interaction on achievement in Educational Technology by considering pre achievement and intelligence as covariate.

3   To study the effect of treatment, category and their interaction on achievement in Educational Technology by considering pre achievement and intelligence as covariate

4   To study the effect of treatment, intelligence and their interactions on achievement in Educational Technology by considering pre achievement as covariate.

5   To study the effect of treatment, personality and their interaction on achievement in Educational Technology by considering pre achievement and intelligence as covariate.

6   To study the effect of treatment, study habits and their interaction on achievement in Educational Technology by considering pre achievement and intelligence as covariate

7   To study the effect of treatment, self-efficacy and their interaction on achievement in Educational Technology by considering pre achievement and intelligence as covariate

8   To study the effect of treatment, level of aspiration and their interaction on achievement in Educational Technology by considering pre achievement and intelligence as covariate

9   To study the reaction of students of the treatment group towards developed module on teaching of Educational Technology.

10.0   HYPOTHESES OF THE STUDY

1.   There will be no significant effect of treatment, gender and their interaction on achievement in Educational Technology by considering pre achievement and intelligence as covariate.

2.   There will be no significant effect of treatment, category and their interaction on achievement in Educational Technology by considering pre achievement and intelligence as covariate.

3.   There will be no significant effect of treatment, intelligence and their interactions on achievement in Educational Technology by considering pre achievement as covariate.

4.   There will be no significant effect of treatment, personality and their interaction on achievement in Educational Technology by considering pre achievement and intelligence as covariate.

5.   There will be no significant effect of treatment, study habits and their interaction on achievement in Educational Technology by considering pre achievement and intelligence as covariate.

6. There will be no significant effect of treatment, self-efficacy and their interaction on achievement in Educational Technology by considering pre achievement and intelligence as covariate.

7. There will be no significant effect of treatment, level of aspiration and their interaction on achievement in Educational Technology by considering pre achievement and intelligence as covariate.

11.0   DELIMITATIONS

The present study has been carried out by keeping in view the following delimitations:

1. The study will be confined to Baramulla district of the UT of J&K. The study is also limited to B.Ed. students of two colleges affiliated with university of Kashmir.

2. The content of module in Educational Technology was prepared by taking common B.Ed. syllabus of four units prescribed by Kashmir University.

3. The module will be developed in English language only.

4. The study was delimited to sampled 122 students of MTM College of Education and Green Valley College of Education Tangmarg Baramulla only.

12.0   SAMPLE

The population of the study was B.Ed. students studying in different B.Ed. colleges affiliated with the University of Kashmir, of the Union Territory of Jammu & Kashmir, India. The present study was Experimental in nature and was conducted in two B.Ed. colleges namely, MTM College of Education, Wussan - Kawarhama, Tangmarg, Baramulla and Green Valley College of Education, Dhobiwan - Tangmarg, Baramulla. A total of 133 students of the above-mentioned two B.Ed. colleges of Kashmir division of the UT of J&K were selected as sample by random sampling technique. 68 students were selected from MTM College and 65 from other college, but 4 students of MTM College and 7 students from Green Valley College dropped out during the course of treatment. Finally 60 students from two B.Ed. colleges formed experimental group and 62 students formed control group. College, Gender and Group wise distribution of sample is given in Table 12.1.

Table 12.1

College, Group & Gender wise Sample Distribution

S. No	Name of the College	Group	Gender		Total	
			Male	*Female*		
1.	MTM College of Education	Experimental	13	19	32	60
2.	Green Valley College of Education	Experimental	13	15	28	
3.	MTM College of Education	Control	15	17	32	62
4.	Green Valley College of Education	Control	14	16	30	
TOTAL			**55**	**67**	**122**	

13.0   EXPERIMENTAL DESIGN

The present study was experimental in nature. The Non-Equivalent Control Group Design as a type of Quasi-experimental Design will be used. According to Campbell and Stenly (1963), the layout of Non-equivalent control group design is as follow:

<div align="center">

O   X   O

-------------------------   (Campbell and stanely1963)

O   O

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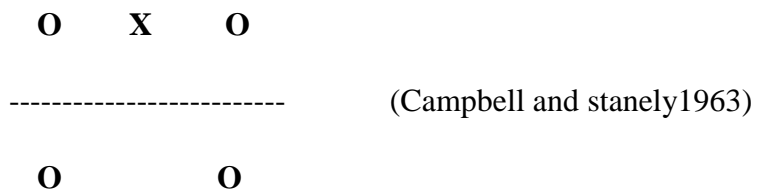
Where,   **X**   =   Treatment

------   =   Non equivalence

O   =   Observation

There were four groups; two were designated as Experimental groups and the other two groups as Control groups. The colleges were selected purposively but the groups were selected randomly. All the four groups were pre-tested by administrating the investigator made achievement test. This constituted the pre-achievement scores of students of all the four groups.

The experimental groups were exposed to treatment i.e., developed module on some chapters of Educational Technology while as the control groups were taught through the traditional method. The treatment lasted for 69 days. At the end of the treatment, the same achievement test that is to be administered before the treatment, was administered separately to all the students of experimental and control groups. The students of experimental groups were also administered investigator made reaction scale toward developed module on educational technology at the end of the treatment. The schematic representation of Experimentation is given in Table 13.1

Table 13.1
Schematic Representation of Experimentation

S. No	Activity	Experimental Group	Control Group	Duration
1.	Group Formation	• Students were selected randomly but not the colleges. • Random assignment of treatment to groups.		50 Min
2.	Pre-testing	• Administration of achievement test		70 Min
3.	Treatment	• **Capsule 1** Educational Technology: Nature, Scope & Objectives • **Capsule 2** Approaches to Educational Technology • **Capsule 3** Teaching Learning Aids • **Capsule 4** Radio & Television • **Capsule 5** Taxonomy of Educational Objectives • **Capsule 6** Micro-teaching • **Capsule 7** Simulated Teaching • **Capsule 8** Information & Communication Technology	Continued through traditional method on all working days	45 Min
4.	Testing of Independent Variables	i. Intelligence ii. Personality iii. Study Habits iv. Self-efficacy v. Level of Aspiration		60 Min 90 Min 60 Min 20 Min 60 Min
5.	Post-testing	Administration of Achievement Test.		70 Min

6.	Reaction	Administration of Reaction Scale to find out the reactions of students towards developed module	-------------------	30 Min

14.0 TOOLS USED

In the present study the details of tools used for measuring different variables are as under:

14.1 *Achievement Test*

The investigator developed the Achievement Test to assess student's achievement in Educational Technology. This test comprised a variety of Educational Technology topics, including the Concept of Educational Technology, scope, approaches, forms, teaching-learning aids, innovations in teaching, ICT in education, and so on. Following several steps, numerous items were included. The investigator extensively studied the curriculum and textbooks of Educational technology recommended by the University of Kashmir for B.Ed. students, as well as other relevant references, and chose units from Educational Technology of B.Ed. 2nd Semester in particular. The investigator choose the material for the test development after assessing the content of the units. For this aim, the investigator has taken the assistance from subject experts, and the opinions and comments of students regarding the items were also gathered. After consulting the opinions from the subject experts and students, some items were retained and some were deleted or modified. Multiple-choice, match the column, fill in the blanks, write one word, true/false, and very short answer type questions were among the different types of questions mentioned among the test items of the achievement test.

14.2 *Intelligence Test*

Raven's Standard Progressive Matrices (2005) was used to assess the intelligence of B.Ed. students. J. C. Raven developed this test for a target group ranging in age from 12 to 65 years. The medium of the test is non-verbal. The test consists of 60 items divided into five sets: A, B, C, D, and E. According to the manual of the test, each set has 12 items. Each correct response receives a '1' score while each incorrect response receives a '0' score. At the end, the total scores obtained by the students are calculated by adding all of the scores. The test-retest reliability of the test was found to range between 0.83 to 0.93 for participants of various ages. The reliability coefficient

through split-half was 0.90. The test's coefficient of correlation with the Terman-Maril scale was determined to be 0.86.

14.3   Personality Inventory

Eysenck's Personality Questionnaire-Revised (EPQ-R) (1985), initially designed by H. J. Eysenck and his colleagues, and was used to measure student's personalities. This questionnaire may be used by both children and adults. It was been designed to give rough and ready measure of three important personality dimensions: Psychoticism, Neuroticism, Extroversion and latter was added the Lie Scores. Each of these four dimensions is measured by means of 90 questions and two choices as Yes & No. The reliability coefficient mostly lying between 0.80 to 0.90.

14.4   Study Habits Scale

Study Habits Scale of students was assessed with the help of study habits scale standardized by Mukhopadhyaya and Sansanwal (1983). This scale consists of 9 different kinds of study behavior. These were comprehension, concentration, tasks orientation, study sets, interaction, drilling, supports, recording and language. The test consists of both positive and negative items. Total number of items were 70 out of which 52 items were positive and 18 items were negative. The scoring procedure for positive items was 4, 3, 2, 1, 0 and while for negative items the scoring procedure was 0, 1, 2, 3, 4 as per the manual. After scoring and finding out the raw scores for each area, they were totaled for getting the raw scores for the whole scale. The reliability of the whole scale was worked out by using Split Half Method. The reliability coefficient was 0.91.

14.5   Self-Efficacy Scale

In the present study, self-efficacy level of B.Ed. students was assessed by using Self-Efficacy Scale standardized by Singh and Narain (2005). This scale has been designed for use with 12 years of age group and above. This scale consists of 20 items with 16 positive items and 4 negative items. Each dimension consists of 5 items. The scoring of positive items of the scale was done by giving a score 5, 4, 3, 2 or 1 for Strongly Agree, Agree, Neutral, Disagree and Strongly Disagree respectively and negative items were scored as 1, 2, 3, 4 and 5 respectively. The concurrent validity of the Self-Efficacy Scale is 0.92, which is quite noteworthy. The test re-test reliability is 0.80, while the split-half reliability is 0.74.

14.6 Level of Aspiration Scale

The Level of Aspiration of students was assessed in the present study by using the Level of Aspiration Scale, a standardized tool developed by Dr. Mahesh Bhargava and Late Prof M. A. Shah (1987). As per this scale, in order to assess one's future expectation in a given task, i.e. level of aspiration, the subject has to perform some activities. There are eleven (11) performance sheets (including one practice trial sheet) in total, grouped in the sequence of trial numbers from 1 to 10. Each performance sheet has 50 circles (1 cm in diameter) organized in five rows (ten circles in each row). Here the investigator provides these performance sheets to the respondents one by one and asks them to draw four straight lines in these circles. The time duration for each performance sheet is 30 seconds. The scoring procedure of Level of Aspiration scale is simple. It provides three types of scores: (a) Goal Discrepancy Score (GDS), (b) Attainment Discrepancy Score (ADS), and (c) Number of Times the Goal Reach Score (NTRS). According to the recommendations of the author of the scale, only the Goal Discrepancy Score (GDS) was used in this study because it is an index of level of aspiration. The Reliability coefficients of the Goal Discrepancy Score (GDS) of the Level of Aspiration scale was found to be 0.72 using the test-retest method and 0.77 using the split-half method.

14.7 Reaction Scale

The students Reaction towards treatment given for the self-instructional material in the form of developed module was assessed with the help of Reaction Scale developed by the investigator. The scale comprises of 30 statements, of which 20 statements were positive and 10 statements were negative. The statements are related to different aspects of developed module such as the content, presentation of the content, the content coverage, the learning objectives, characteristics of the developed instructional material, the language used, examples cited, pictures, time allotment for module completion, interact questions, check your progress, font size, recap of main points, glossary, suggested readings, etc. Each statement is rated on a 5-point rating scale. These are Strongly Agree (SA), Agree (A), Undecided (UD), Disagree (D), and Strongly Disagree (SDA). Every student is asked to read the statement and make a check mark ($\sqrt{}$) next to one of the five possibilities that indicate the student's reactions. For positive statements the weightage 5, 4, 3, 2, 1 were assigned to SA, A, UD, D, SDA, while as for negative statements the weightage 1, 2, 3, 4, 5 were assigned to SA, A, UD, D, SDA respectively.

15.0 PROCEDURE OF DATA COLLECTION

The present study was Experimental in nature. The data of 122 students was collected from two B.Ed. colleges affiliated with University of Kashmir of Baramulla district of the Union Territory of Jammu & Kashmir. Permission was obtained from the principals of the selected two colleges. There were four groups; two were designated as Experimental groups one from each college and the other two were Control groups one from each college. The students selected for experimental groups were taught with the help of experimental method by the investigator, while as the concerned teacher of the college used the traditional method to teach the students in the control groups. The students selected for the experiment were briefed about the objectives of the experiment in order to build rapport with them. The data was collected with respect to variables such as, achievement, intelligence, personality, study habits, self-efficacy and level of aspiration. To obtain valid and reliable data, the instructions in the respective manuals were followed. Furthermore, not more than one test was given on any given day. The treatment was given for 69 days at the rate of 45 minutes per working day by the Investigator.

The treatment was given for 69 days at the rate of 45 minutes per working day by the Investigator. The students were free to discuss and allowed to clear their doubts. After completion of treatment the post-test i.e. Criterion test in Educational Technology for B.Ed. students of Baramulla district was administered on all the four groups who were taught by experimental method and traditional lecture method. After the completion of treatment, the investigator used the self-developed Reaction scale to assess student's reactions towards the developed module of the experimental groups only. Following that, each test was scored. The scoring procedure was followed according to the instructions given in the manual by the developer of standardized tests, while as for criterion test and reaction scale scoring was done as decided by the investigator. The data were computed and analyzed using the appropriate statistical techniques.

16.0 STATISTICAL TECHNIQUES USED

Keeping in view the objectives as well as the design of the study, the following statistical techniques were applied to analyze the data:

1) One way analysis of covariance (ANCOVA) was used to compare the adjusted mean scores of achievement in Educational technology of students belonging to experimental and control group by considering pre achievement and intelligence as covariate.

2) 2 x 2 Factorial design (ANCOVA) was used to study the effect of treatment, Gender and their interaction on achievement in Educational Technology by considering pre achievement and intelligence as covariate.

3) 2 x 2 Factorial design (ANCOVA) was used to study the effect of treatment, Category and their interaction on achievement in Educational Technology by considering pre achievement and intelligence as covariate.

4) 2 x 2 factorial design (ANCOVA) was used to study the effect of treatment, intelligence and their interactions on achievement in Educational Technology by considering pre achievement as covariate.

5) 2 x 2 Factorial design (ANCOVA) was used to study the effect of treatment, personality and their interaction on achievement in Educational Technology by considering pre achievement and intelligence as covariate.

6) 2 x 3 factorial design (ANCOVA) was used to study the effect of treatment, study habits and their interactions on achievement in Educational Technology by considering pre achievement and intelligence as covariate.

7) 2 x 2 factorial design (ANCOVA) was used to study the effect of treatment, self-efficacy and their interactions on achievement in Educational Technology by considering pre achievement and intelligence as covariate.

8) 2 x 2 Factorial design (ANCOVA) was used to study the effect of treatment, level of aspiration and their interaction on achievement in Educational Technology by considering pre achievement and intelligence as covariate.

9) Mean, Percentage, Standard deviation and Coefficient of Variation were used to study the reaction of students of the treatment group towards developed module on teaching of Educational Technology.

17.0   FINDINGS

- The adjusted mean scores of Achievement in educational technology of students belonging to experimental group were found to be significantly higher than that of control group by considering pre achievement and intelligence as covariates.

- The adjusted mean score of achievement in Educational Technology was found to be independent on the basis of gender of students when pre achievement and intelligence were taken as covariates.

- The adjusted mean score of achievement in Educational Technology was found to be independent of interaction between treatment and gender of students when pre achievement and intelligence were taken as covariates.

- The adjusted mean score of achievement in Educational Technology was found to be independent of category of students when pre achievement and intelligence were taken as covariates.

- The adjusted mean score of achievement in Educational Technology was found to be independent of interaction between treatment and category of students when pre achievement and intelligence were taken as covariates.

- The adjusted mean score of achievement in Educational Technology was found to be independent of intelligence of students when pre achievement was taken as covariate.

- The adjusted mean score of achievement in Educational Technology was found to be independent of interaction between treatment and intelligence of students when pre achievement was taken as covariate.

- The adjusted mean score of achievement in Educational Technology was found to be independent of personality of students when pre achievement and intelligence were taken as covariates.

- The adjusted mean score of achievement in Educational Technology was found to be independent of interaction between treatment and personality of students when pre achievement and intelligence were taken as covariates.

- The adjusted mean score of achievement in Educational Technology was found to be independent of study habits of students when pre achievement and intelligence were taken as covariates.

- The adjusted mean score of achievement in Educational Technology was found to be independent of interaction between treatment and study habits of students when pre achievement and intelligence were taken as covariates.

- The adjusted mean score of achievement in Educational Technology was found to be independent of self-efficacy of students when pre achievement and intelligence were taken as covariates.

- The adjusted mean score of achievement in Educational Technology was found to be independent of interaction between treatment and self-efficacy of students when pre achievement and intelligence were taken as covariates.

- The adjusted mean score of achievement in Educational Technology was found to be independent of levels of aspiration of the students when pre achievement and intelligence were taken as covariates.

- The adjusted mean score of achievement in Educational Technology was found to be independent of interaction between treatment and levels of aspiration of the students when pre achievement and intelligence were taken as covariates.

- The reaction of students of the treatment group towards developed module on teaching of educational technology was found to be effective.

18.0   EDUCATIONAL IMPLICATIONS

18.1   Students

At levels of education such as under-graduate, post-graduate, B.Ed. and M.Ed., Educational Technology is a core and compulsory subject. As we know that the whole training program of B.Ed. wholly and solely depends on the subject Educational technology. Due to its technological and practical nature, it is also considered as the most difficult subject. According to the latest insights as to how exactly modern students prefer to use technology, modern methods of

teaching and how does their learning get an impact if they use these technologies and methods, it was revealed that the use of modern equipment technology, methods and tools, the learning and interactivity of students increases. Many times the students could not score high marks in Educational Technology due to scarcity of quality books and trained teachers in their institute. This self-instructional Material on Educational technology is in English medium and the technical words and definitions were given under the caption Glossary with respect to teaching and learning. In it lots of examples, learning activities and interact questions were provided to the students related to the content of the material. This makes the self-learning material most interesting and activity based. As from different studied conducted by the researchers, the reaction of the students towards developed module was mostly found to be effective. This makes the self-instructional material more effective and fruitful than other types of traditional methods and teachings. The students can use this material at their own pace at any place and time they like. Students can also learn even in the absence of teacher.

18.2   Teachers

In the present study, the Self-instructional Material in the form of Module was found to be very effective in teaching educational technology thus teachers can use this Material to teach B.Ed. students. Teachers can also use Self-instructional Material in other subjects also along with classroom teaching. It is the fact that the expansion of Teacher Education in India is unplanned. In the past few years large number of colleges of Teacher Education has come up in all the states. Most of these colleges belongs to private sector, where there is scarcity of trained and skillful teacher educators. As we recently observed during the COVID-19 pandemic that many teacher educators were neither able to deliver lectures through online platforms nor were in a position to develop their own self-learning material. Due to which the large number of student population get suffered during the pandemic. Thus the foremost implication of the present study is to make teacher educators able to develop the self-instructional material. As Self-instructional Material was found to be very effective than other traditional methods and techniques. The teachers can use the developed material at their own pace as many times as they like and they can go a long way in improving the quality of teaching especially in the field of Educational Technology. Self-instructional material can be used for training of teacher trainees.

18.3   Curriculum Developers

Self-instructional Material should be made a part of curriculum. Along with books and other study material curriculum developers may develop self-instructional Material and may keep it in curriculum. As it was found effective in enhancing achievement of student. Hence when it will be kept in curriculum; student's achievement will be definitely improved.

19.0   References

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