

EFFECTIVENESS OF MULTIMEDIA PACKAGE ON LEARNING OUTCOME OF PROSPECTIVE TEACHERS IN RELATION TO ACADEMIC STREAM

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ABSTRACT

ICT empowering every field as education sector is also not untouched from it and at present lots of innovative technologies are present in education. But at practical level, use of technologies in teacher education programme is not so much. To inculcate knowledge of technological skills among prospective teachers, it is necessary to use new technology in teaching of prospective teachers. In this context, an attempt has been made for higher learning the effectiveness of multimedia package on learning outcome of prospective teachers in relation to academic stream (science, commerce & art). This is an experimental study with 2x3 factorial design. 60 prospective teachers selected through multi-stage stratified random sampling technique on the basis of their academic stream (science, commerce & art) were taken as a sample out of which 30 prospective teachers were taught through multimedia formed experimental group (EG) and 30 prospective teachers were taught through conventional method of teaching formed control group (CG). The self-developed achievement test applied to assess the learning outcome of the prospective teachers on unit-3 'Theoretical perspective to enhance learning among children and adolescent' in the course-1: Childhood & growing up of B.Ed. syllabus (B.Ed. 2-year programme (2016-18)). Lesson plans and formative assessments developed with the help of multimedia technology to carry out teaching learning process of experimental group for nine weeks only. Learning outcome per-test, post-test was collected before and after experimental treatment and after that, mean gain score was also computed. Then, data were subjected to analyzed by using ANOVA followed by t-test to determine the performance by comparing the mean scores. Results revealed that prospective teachers taught through multimedia package showed significant difference in their learning outcome than conventional method. Further, science, commerce & arts prospective teachers taught through multimedia package performed better than their counter parts. There was no significant interaction effect of instructional treatment and academic stream on mean gain learning outcome scores. In conclusion, this study had supported that teaching through multimedia instructional package improve the prospective teachers' learning performance.

KEYWORDS: Multimedia Instruction, Conventional Instruction, Learning Outcome, Academic Stream.

INTRODUCTION

Teacher is the strength of a nation, as teacher is the builder of intellectual and talented person, which will be exactly accountable for the development of a nation and would be represent the country in world. For considering the most important position of the teacher in education system, the professional teacher education programme should be inclusion of all the latest skills. It is obligate to forfeit appropriate care to fabricate teacher education more efficient and triumphant. Rastogi and Chanchal (2010) stated that pre-service

education of prospective teachers provides a wide variety of experiences designed to develop teaching competency. The crucial and substantial responsibilities are cooperated by the teachers in process of implementation of policies and articulated to attain the certain required aspiration in qualitative amendment of education. Pre-requisite to amalgamate soft skills as effective communication, decision making, critical thinking, interpersonal relationship; techno-pedagogical knowledge skills as media designing, media acculturation etc. in teacher education programme. It is possible only when the teacher education should improve in instructional delivery strategies and skill practice using the multimedia.

Multimedia in teacher education has the capacity to accelerate major changes in professional development as well acquaint with new technological skills. Now, it is the right time for the educational system in the country particularly teacher education to make teacher fully efficient to exploit the potential of information and communication technology especially multimedia to bring a qualitative revolution in the teaching-learning processes. Multimedia amalgamation in educational process is an effective instructional medium that has significant effect on learning outcome. Complex concepts of curriculum can be easily understood by the use of multimedia technology as technology provides a learners' friendly learning environment. Researches proved that multimedia instruction yields more learning as compare to other conventional instructional method. It is more inspirational than other instructional delivery modes. It maximizes learning of students by providing animated proxies supported by pedagogy space for different learning styles.

LITERATURE FRAMEWORK

Literature confirmed that the possibility to enrich the classroom teaching learning is intense by using the new technologies in classroom. (Fu, 2013). Technology provide new prospect to all the levels of education in developing, presentation, assessment and feedback of instructional materials. Eze & Olusole (2013) recommended that the effective technology integration must exemplify by disseminate in teacher education institutions, professional institutes and educational programme that answer professional development needs. Present time classroom has been equipped with new technology because it provides advantage to teachers in teaching students. The National Policy of Education (2016) has made several recommendations (5.2.7 & 5.2.8) to enhance to the excellence of education colleges as if no virtuous educators then forget the international level education standard. The NPE 2016 emphasis that the opportunities must be offered to prospective teachers to associate with the best intellects and to cultivate a disciplined mind as well as the excellence of indebtedness with information communication technology like multimedia teaching. Students who studied by multimedia have higher achievement than the conventional teaching students (Chavan, Patankar & Patil, 2017). The multimedia package developed was efficient in terms of achievement of class XI students in Economics. (Yudhister,2015). Nidhi (2010) reported that multimedia learning package helps in improving the achievement of B.Ed. learners. From the above discussion, it can be concluded, that every aspect of education needs technological transformation. It is very much necessary to integrate multimedia instruction method for higher teaching learning of the prospective teachers to give them theoretical as well as practical knowledge.

OBJECTIVES OF THE STUDY

- 1 To study the main effect of Instructional treatment [Multimedia Teaching Method (MTM) & Conventional Teaching Method (CTM)] on the mean gain learning outcome scores of the prospective teachers after experimental treatment.
- 2 To study the main effect of academic stream (science, commerce & arts) on the mean gain learning outcome scores of the prospective teachers after experimental treatment.
- 3 To study the interaction effect of Instructional treatment [Multimedia Teaching Method (MTM) & Conventional Teaching Method (CTM)] and academic stream (science, commerce & arts) on the mean gain learning outcome scores of the prospective teachers after experimental treatment.

HYPOTHESES OF THE STUDY

- H₀1 There is no significant main effect of instructional treatment [Multimedia Teaching Method (MTM) & Conventional Teaching Method (CTM)] on the mean gain learning outcome scores of the prospective teachers after experimental treatment.
- H₀2 There is no significant main effect of academic stream (science, commerce & arts) on the mean gain learning outcome scores of the prospective teachers after experimental treatment.
- H₀3 There is no significant interaction effect of instructional treatment [Multimedia Teaching Method (MTM) & Conventional Teaching Method (CTM)] and academic stream (science, commerce & arts) on the mean gain learning outcome scores of the prospective teachers after experiment treatment.

VARIABLES USED

Dependent Variable: Learning Outcome

Independent Variables: Instructional treatment (Multimedia & Conventional) and Academic stream (Science, Commerce & Art)

DESIGN OF THE STUDY

In the present study, pre-test post-test quasi-experimental research design was used.

SAMPLE

A sample of 60 prospective teachers were taken by using multi-stage stratified random sampling technique. The sample of 60 prospective teachers were stratified on the basis of instructional treatment (multimedia teaching / conventional teaching) and academic stream (science / commerce / arts). 60 prospective teachers of varied academic stream [science (09), commerce (08) and arts (13)] studied in G.B. College of Education, Rohtak were equally divided and formed as experimental (30 prospective teachers) and control group (30 prospective teachers). A schematic layout of the sample for the study of learning outcome on the basis of instructional treatment and academic stream of prospective teachers depicted below:

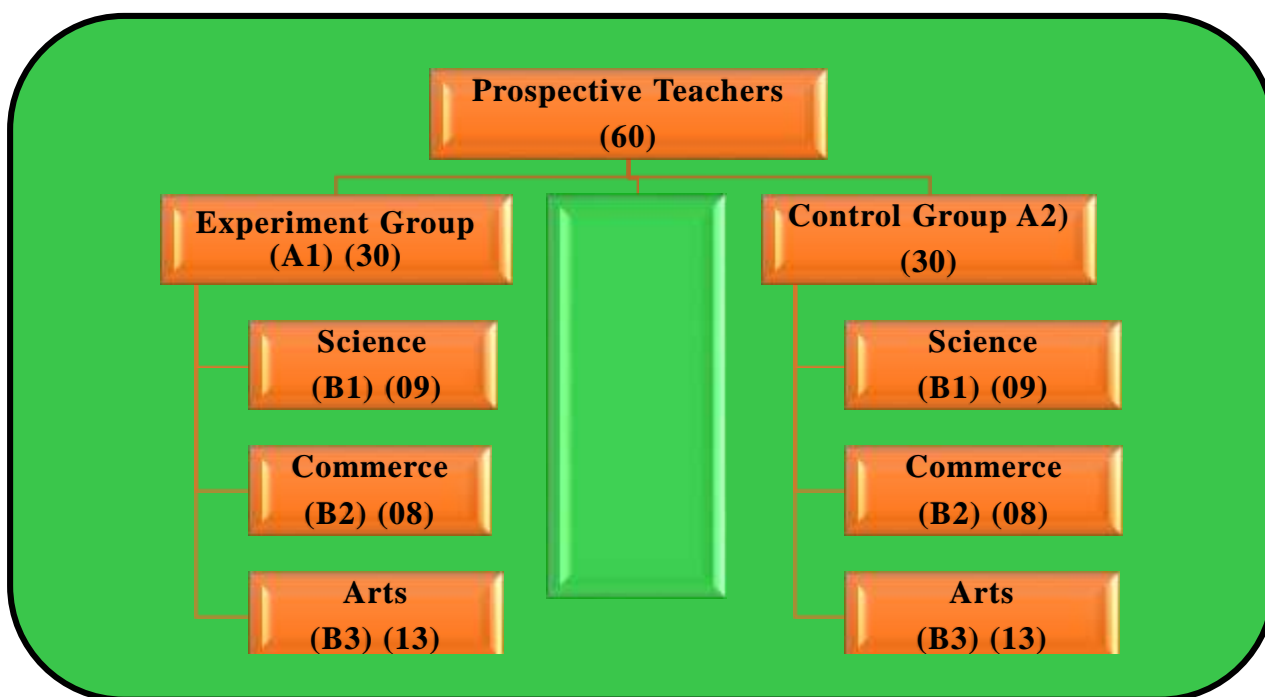


Fig. 1: Schematic layout of 2x3 factorial design and sample of prospective teachers for interaction effect of instructional treatment and academic stream on mean gain learning outcome
TOOL USED

Following tools were used for the purpose of collecting data related to different variables covered in the study

- Achievement test for prospective teachers developed by investigators was used to measure learning outcome of the prospective teachers. The test consists of 75 items with reliability of .87 (spearman brown formula) & 0.82 (K21 formula) and high content validity.
- Multimedia package for prospective teachers (MPPT) developed by investigators was used. This package was developed by using software such as Adobe Photoshop 0.7 version, EDIUS, Adobe sound booth, and Swish MX 2.0.

PROCEDURE OF THE STUDY

This study examined the effect of multimedia teaching method (MTM) on the learning outcome of prospective teachers. For this purpose, two groups were formed i.e. experimental group that taught through the multimedia teaching method (MTM) and control group that taught by conventional teaching method (CTM). To collect the data of prospective teachers' learning outcome, the investigators applied self-developed achievement test on topic unit-3 'Theoretical perspective to enhance learning among children and adolescent' in the course-1: Childhood & growing up of B.Ed. syllabus. The nine weeks experimental treatment was given with help of multimedia package developed by investigators to experimental group and conventional teaching given to control group and achievement test applied before and after experimental treatment to both the groups and collected pre-test, post-test and that helps to find mean gain learning outcome scores.

STATISTICAL TECHNIQUES USED

The data was analyzed by using descriptive as well as inferential statistic by SPSS-21 software. The Two - Way Analysis of Variance (ANOVA) with 2×3 factorial design was computed to study the main effect and interaction effect of the variables i.e. instructional strategies (multimedia & conventional) & academic stream (science, commerce & arts) on learning outcome of prospective teachers. The Levene's Test for Homogeneity of Variances was used to test the assumption of homogeneity of variance before applying Two-Way ANOVA. Wherever F-value was found significant, 't' test was employed for further investigation.

RESULT AND DISCUSSION

In order to study the main and interaction effects of instructional treatment and academic stream on mean gain learning outcome scores of prospective teachers, data was subjected to two-way ANOVA (2x3 design). In this section the first independent variables i.e. instructional treatment coded as 'A' was varied into two types of treatment: **A1:** Experimental Group (EG) taught with Multimedia Teaching Method (MTM); **A2:** Control Group (CG) taught with Conventional Teaching Method (CTM). Similarly, Academic Stream coded as 'B' was categorized as: **B1:** Science Stream Prospective Teacher; **B2:** Commerce Stream Prospective Teachers & **B3:** Arts Stream Prospective Teachers. The schematic layout of 2x3 factorial design for interaction effect of instructional treatment and academic stream on mean gain learning outcome scores of prospective teachers shown in fig.1.

Levene's test for Homogeneity of Variances has been applied on the data to test the assumption of homogeneity of variance as Two Way ANOVA with 2×3 factorial design is quite sensitive to homogeneity of variance. It has been calculated through Levene's Test for Homogeneity of Variances and reports that F_{Levene} is 2.16 with degrees of freedom Df 5, 54 ($p = 0.072$) which does not fall in the critical region this means no-difference in variances of six sub- groups ($\sigma^2A = \sigma^2B = \sigma^2C = \sigma^2D = \sigma^2E = \sigma^2F$). Therefore, the variance of six groups are homogenous i.e. the groups are assumed to have similar or equal variances.

The summary of descriptive statistics i.e. means and SD.'s of sub samples of 2x3 design for mean gain learning outcome scores of prospective teachers with respect to instructional treatment and academic stream have also been presented in the table-1 and fig. 2.

Table- 1

Summary of Descriptive Statistics i.e. Means and S.D.'s of Sub Samples of 2x3 ANOVA Design for mean gain learning outcome scores of prospective teachers

Groups	Experimental			Control			Total		
	Science	Commerce	Arts	Science	Commerce	Arts	Science	Commerce	Arts
N	9	8	13	9	8	13	18	16	26
Mean	17.22	22.13	18.31	8.56	10.75	9.46	14.39	16.44	13.88
S.D.	4.87	5.38	6.25	5.93	2.60	2.30	6.03	7.16	6.45

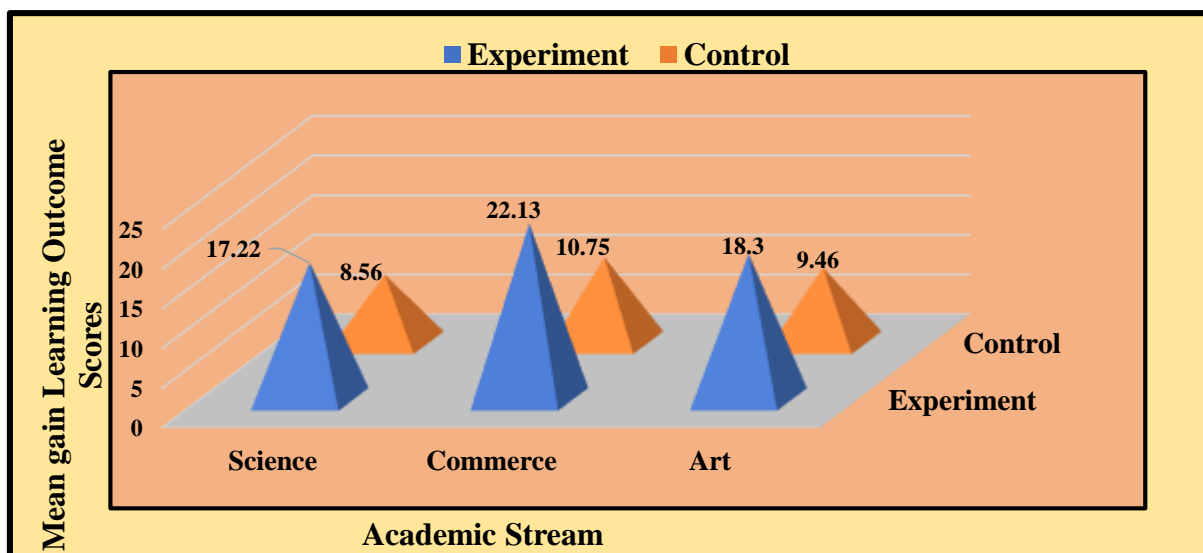


Fig 2: Mean gain learning outcome scores of subsamples of 2x3 design of instructional treatment and academic stream of prospective teachers

The Summary of two-way ANOVA (2x3) for mean gain learning outcome scores of prospective teachers with respect to instructional treatment and academic stream has been further presented in table- 2, which is analyze in terms of main effects and interaction effect.

Table- 2

Summary of Two-Way ANOVA (2x3) for mean gain learning outcome scores of prospective teachers in relation to instructional treatment and academic stream

Sources of Variation	Df	SS	MS	F-ratio	p-value
Instructional Treatment (A)	1	1070.46	1070.46	46.09	0.000**
Academic Stream (B)	2	67.31	33.66	1.45	0.244*
Treatment x Stream (A x B)	2	69.90	34.95	1.51	0.231*
Between Cells	5	1238.03			
Within Subjects	54	1254.15	23.23		
Total	59	2492.18			

*NS= Not Significant

**S= Significant at 0.01 level

MAIN EFFECT

INSTRUCTIONAL TREATMENT (A) (MTM & CTM)

On perusal of the Table-2, it is evident that F- ratio 46.09 for main effect of instructional treatment (MTM & CTM) on mean gain learning outcome scores of prospective teachers is found significant at .01 level of significance leading to the inference that experimental treatment yielded difference in mean gain learning outcome score of prospective teachers. Therefore, the null hypothesis H_{01} , 'There is no significant main effect of instructional treatment (MTM &CTM) on mean gain learning outcome scores of prospective teachers', is

rejected. To investigate further difference in group, the 't' -value was computed and has been given in table-3.

Table 3

t-values for mean gain learning outcome scores of prospective teachers with respect to instructional treatment i.e. MTM (Experiment group) and CTM (Control Group)

Variable	Group	N	Mean	S.D.	Df	't' value	Level of Significance
Mean-gain Learning Outcome	Experimental	30	19.00	5.79	58	6.77	Significant At 0.01 level
	Control	30	10.43	3.79			

Table-3 reveals that the t-value 6.77 for difference in mean gain scores of learning outcome of prospective teachers of experimental and control group is significant at 0.01 level. It is evident that experiment group realize higher mean score ($M= 19.00 \pm 5.79$) than the control group ($M= 10.43 \pm 3.79$) in mean gain learning outcome at post-test stage. Based on the result obtained from analysis of data, the group of prospective teachers taught through multimedia package attained a significantly higher mean gain learning outcome scores than the group of prospective teachers taught through the conventional method. The mean gain learning outcome scores for main effect of instructional treatment have been presented graphically in the form of bar diagram in fig. 3.

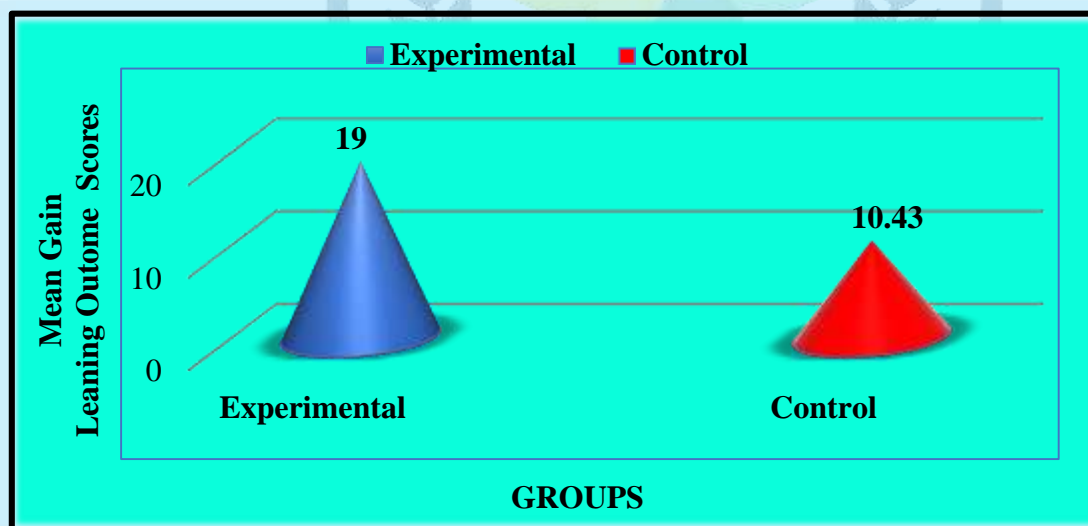


Fig. 3: Comparison of mean gain learning outcome scores for instructional treatment [experimental group (MTM) and control group (CTM)]

The finding as the examination of mean gain scores that prospective teachers exposed to multimedia teaching package exhibited better performance as compared to those taught by conventional teaching method are in tune with conclusions drawn by various researches abroad as well as in Indian. The findings are supported by

Aloraini (2012) who revealed that there is statistically significant increase in the academic achievement of the education college students in the experimental group that received the multimedia instructions. Ibrahim & Callaway (2014) found that the use of flipped teaching strategies on pre-service teacher shown higher mean learning outcome scores. So, it can be easily concluded that teaching through multimedia package is more valuable than conventional method of teaching in raising the learning outcome of prospective teachers.

MAIN EFFECT

(II) ACADEMIC STREAM (B)

It can be inferred from table 2 that F-ratio 1.45 on Df 2,54 for main effect of academic stream on mean gain learning outcome scores of prospective teachers was not significant at 0.01 level ($p=.244$) which indicates that different group of academic stream has no significant effect on the mean gain learning outcome scores of prospective teachers. Therefore, the null hypothesis H_{02} “*There is no significant main effect of intelligence on mean gain learning outcome scores of prospective teachers.*” is retained. It means that Science Stream, Commerce Stream, & Arts Steam groups do not show any difference in their mean gain learning outcome score after the experiment. In order to investigate mean difference between mean score of different stream further, the ‘t’-value was computed and has been given in Table-4. The mean gain learning outcome score for the different academic stream (science, commerce, arts) have been presented in fig 4

Table 4

‘t’-values for the mean gain learning outcome scores of prospective teachers with respect to academic stream

Groups of Intelligence	N		Mean		S.D.		t-value
Sc vs. Co.	18	16	14.39	16.44	6.02	7.16	0.89 NS
Co. vs. Ar.	16	26	16.44	13.88	7.16	6.45	1.17 NS
Sc. Vs. Ar.	18	26	14.39	13.88	6.02	6.45	0.27 NS

NS= Not Significant

(Sc=Science; Co = Commerce; Ar=Arts)

The table-4 illustrates that ‘t’-value 0.89 with df 32 for the mean gain learning outcome score between the science stream prospective teachers and commerce stream prospective teachers is not significant at 0.05 level. The ‘t’-value 1.17 with df 40 for the mean learning outcome score between commerce stream prospective teachers and arts stream prospective teachers is not significant at 0.05 level. The ‘t’-value 0.27 with df 42 for the mean score of learning outcome between the science stream prospective teachers and arts stream prospective teachers is not significant. Therefore, it is interpreted that different academic stream group teaching through multimedia package are equal in their learning outcome. In the context of mean scores, it

was found that difference in the mean gain learning outcome score of science stream (M=14.39) more than commerce stream (M=16.44); commerce stream mean learning outcome scores (M=16.44) than arts stream (M=13.88) and mean gain learning outcome score of science stream (M=14.39) more than arts stream (M=13.88). The mean gain learning outcome scores for main effect corresponding to academic stream have been presented graphically in fig. 4.

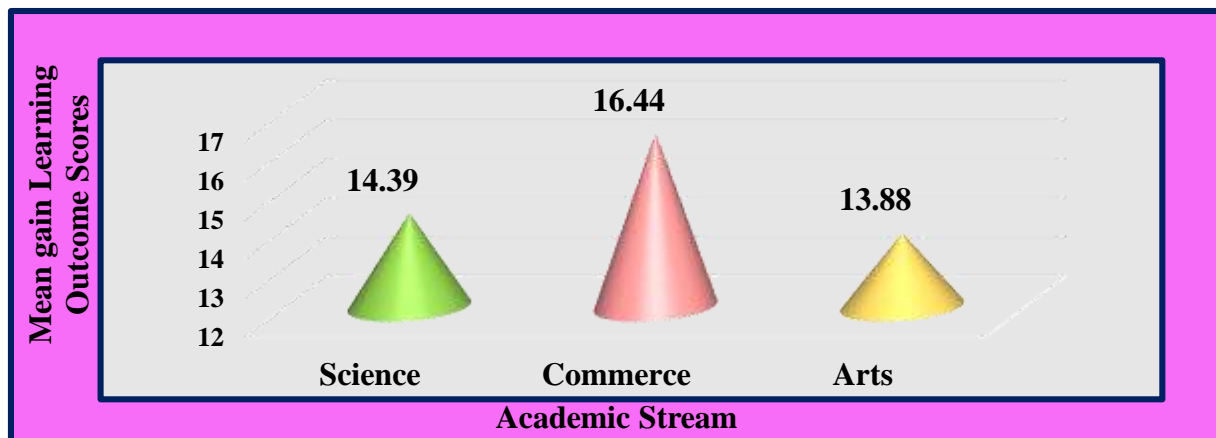


Fig. 4: Mean gain learning outcome score for different academic stream

INTERACTION EFFECT

INSTRUCTIONAL TREATMENT & ACADEMIC STREAM (A X B)

From table 2, the F_{AB} value is 1.51 for double interaction between instructional treatment (MTM & CTM) and academic stream (Sc, Co & Ar) with Df 2,54 which is not significant at 0.01 level leading to inference that there is no interaction between instructional treatment and academic stream in mean gain learning outcome scores of prospective teachers. Therefore, in pursuance of the objective 3, the null hypothesis H_{03} , "There is no significant interaction effect of instructional treatment and academic stream on mean gain learning outcome scores of prospective teachers" is **retained**. The Interaction effect of instructional treatment and academic stream on mean gain learning outcome score has been illustrated in fig. 5.

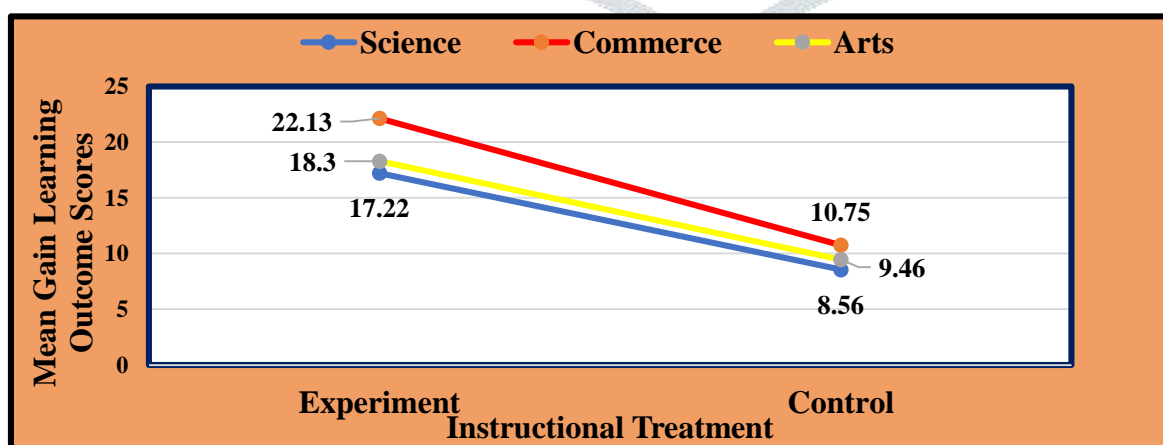


Fig. 5:

Interaction effect of Instructional Treatment and Academic Stream on mean gain learning outcome score of prospective teachers.

The graphical presentation for A×B do not interaction indicates that there is no significant interaction effect of Instructional treatment i.e. multimedia teaching method (MTM) & conventional teaching method (CTM) and academic stream i.e. Sc, Co & Ar on mean gain learning outcome score of prospective teachers as the three lines (blue line = science group; red line= commerce group; yellow line= arts group) do not interact on instructional treatment.

FINDINGS OF THE STUDY

- 1 There is significant main effect of instructional treatment on mean gain learning outcome of prospective teachers that is inference that experimental group prospective teachers that are expose to multimedia instruction showed much difference in their mean gain learning outcome after the experiment treatment than the conventional group prospective teachers
- 2 No significant main effect of academic stream on mean gain learning outcome of prospective teachers that is inference various academic stream does not show any difference in learning outcome due to experimental treatment. It exposed that science stream; commerce stream & arts stream prospective teachers did not show much difference in their mean gain learning outcome after the experiment treatment.
- 3 There was no significant interaction effect of Instructional treatment and academic stream on mean gain learning outcome scores of prospective teachers going to inference that mean gain learning outcome score of science stream prospective teachers, commerce stream prospective teachers, arts stream prospective teachers of control group (taught through conventional teaching method) and experimental group (taught through multimedia teaching method) do not show difference after experimental treatment. All are equally benefitted from multimedia instructional. It discloses that six groups did not show much difference in their mean gain learning outcome after the experiment.

EDUCATIONAL IMPLICATIONS

Combining research and theory with practical and useful ideas to our prospective teachers 'learning is a challenge for teachers with mission and vision. Teachers can help the learners to learn by providing the key to their individual learning styles. Still, teachers seem to be reluctant to switch over to new instructional strategies, because of their ignorance about the comparative effectiveness of these strategies even in the context of an ICT era. The findings of the present study are related to the effectiveness of multimedia package (software) based on classroom instructional strategies for prospective teachers. It also gives a view on the performance of the prospective teachers' in their achievement. Teachers are therefore able to select the most appropriate method for classroom teaching in accordance with the needs and caliber of the prospective teachers'

REFERENCES

- [1] **Aloraini, P. (2012).** Pre-service teacher's teaching with computers some factors influencing pre-service teacher's self-efficacy. In D. Watson et. Al. (eds.) *Networking the learner* (724-732) New York: Springer Science Business Media.

- [2] **Chavan,R., Patankar, P.S. & Patil, S. (2017).** Effectiveness of Multimedia Use in Teaching Food and Nutrition at Primary School Level. *6th Biennial International Conference of The Asian Association for Biology Education on Trends in Biology Education and Research: Practices and Challenges-* 20th To 24th SEPT. 2016 .
- [3] **Eskicioglu, A.M. & Kopec, D. (2003).** The Ideal Multimedia-enabled classroom: perspectives from psychology, education, and information science. *Journal of Educational Multimedia and Hypermedia*, 12(2), 199-221.
- [4] **Eze A. & Olusole L. (2013).** *The Teachers and use of ICT for professional development.* International Conference on ICT for Africa-2013, February, 20-23, Harare, Zimbabwe.
- [5] **Fu, J.S. (2013).** ICT in education: A critical literature review and its implications. *International Journal of Education and Development using Information and Communication Technology (IJEDICT)*,9(1), 112-125.
- [6]
- [7] **Ibrahim. M. & Watts, A. (2014).** Examining the effect of using voice-thread and edu-creations on pre-service teachers' self-efficacy and learning outcome in online course. *Arkansas Tech University, United States. Retrieved from http://SITE.com.*
- [8] **Khokhar, S. (2010).** Relative effectiveness of E-content strategy and conventional strategy of teaching Science. *Ph.D. (Education) Thesis*, M.D.U Rohtak.
- [9] **Khushir B., Manzhula P. & Valka I. (2013).** *New approaches of teaching ICT to meet educational needs of net students' generation.* Revised extended papers of ICT ERI2013, CCIS 347, 230-243, Springer Verlag, Berlin Heidelberg
- [10] **Kalia, A.K. & Sahu, S. (2012).** *Manual and tool of Socio-Economic Status Scale (Urban & rural) (SESS-UR-KASS).* Agra: National Psychological Cooperation.
- [11] **Lagasse, P. (2000).** *The Columbia Encyclopedia (6th ed.). USA: Columbia University Press.*
- [12] **Misra, K.S. & Pal, S.K. (2016)** *Manual and tool of Test of General Intelligence for College Students (TGI-MP) (Revised version),* Agra: National Psychological Cooperation.
- [13] **Nidhi. (2010).** Developing and Validating A Multimedia Learning Package in Educational Technology for B.Ed. Learners, *Ph.D. Education Thesis*, M.D.U Rohtak.
- [14] **Mao, C. & Hu Xiao (2013).** Teachers' use Intention of multimedia instruction resources among rural primary schools in China. *Creative Education*,4(9),620-625, Retrieved from <http://dx.doi.org/10.4236/ce.2013.49089>
- [15] **Mayer, R. E., Heiser, J., and Lonn, S. (2001).** Cognitive constraints on multimedia learning: When presenting more material results in less understanding. *Journal of Educational Psychology*, 93, 187-198.
- [16] **Misra, K.S. & Pal, S.K. (2016).** Test of General Intelligence of College Students (TGI). Agra: *National Psychological Cooperation.*
- [17] **Singaravelu, G. (2009)** http://www.infitt.org/ti2009/papers/singaravelu_final.pdf
- [18] **Suleman Q., Hassan D.A., Zulfiqar A.B., Ishita H., Azra F. & Sadia A. (2012).** Effectiveness of multimedia in development of teacher training institutes at tertiary level in Khyber, Pakhtunkhwa, Pakistan. *Journal of Learning & Development*,2(6),1-18.
- [19] **Yudhister (2015).** Development & validation of multimedia package for teaching Economics and its effect on learning outcome of senior secondary students. *Ph.D. (Education) Thesis*, M.D.U Rohtak.
- [20] **National Policy on Education (NPE) (2016).** Ministry of Human Resource Development, Government of India.