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Integrating ICT In Cooperative Learning: Its Effect On The Achievement Of B.Ed. Trainees.

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Abstract

The main aim of the study was to integrate Information and Communication Technology into a Cooperative Learning Instructional Strategy and find out its effect on Achievement and retention of knowledge among B.Ed. trainees while learning Educational Technology. This study was experimental in nature, and a post-test only control group design was used. A self-made "Achievement test of Educational Technology" was used to collect the data from the sample, which consisted of 72 B.Ed. Trainees. The two treatment groups had a strength of 36 students each; both groups were matched on pre-achievement scores (the t value is not significant). The objectives and related hypotheses were analyzed by applying the t-test. The findings of the study indicated that: i) ICT-integrated Cooperative Learning Instructional Strategy is more effective than the Conventional Strategy in improving Achievement of B.Ed. trainees in Educational technology. ii) The B.Ed. trainees have retained their achievement in educational technology, which is improved through an ICT-integrated Cooperative Learning Instructional Strategy.

Keywords: ICT-integrated Cooperative Learning, Achievement, Retention, B.Ed. Trainees, Educational Technology.

Introduction

Integrating Information and Communication Technology in Cooperative Learning is the practise of combining digital learning tools with cooperative learning. ICT can promote cooperative learning, which is an effective teaching strategy where small groups are composed of students of different levels of ability. Here, the students use cooperative learning activities, especially jigsaw puzzles, to improve their understanding of a subject and to enhance achievement. This strategy is designed for the purpose of achieving mastery in learning, to increase students' skills, increase interaction, and increase self-esteem among students. The jigsaw technique is an effective method of organizing classroom activity that asks a group of students to become "experts" on a specific text or body of knowledge and then share that material with another group of students. Group processing, face-to-face interaction, positive interdependence, individual accountability, interpersonal skills, and as well as communication devices, the Internet, networking devices, and data transfer media are the elements of ICT-integrated Cooperative Learning. This strategy provides a way to help students understand and retain information.

Recent studies have emphasized that ICT can play a central role in a teaching environment based on cooperative learning. The overall benefits of this technique are that it fosters depth of understanding; students gain practise in self-teaching and peer teaching; they speak the language of the discipline and become more fluent in the use of discipline-based terminology. Each student develops an expertise and has something important to contribute to the group, which promotes discussion, problem-solving, and learning; encourages cooperation and active learning; and promotes valuing all students' contributions. It is used in vocation development and training settings. It can also result in high levels of student achievement and be more effective than traditional learning. A review of related literature revealed that very few studies on ICT-integrated Cooperative Learning strategies in various subjects have been conducted. Thus, the investigator felt it was necessary to investigate the effect of ICT-integrated Cooperative Learning. on the achievement of B.Ed. trainees in educational technology.

In the present study, "ICT-integrated Cooperative Learning " involves B.Ed. trainees discussing each other in a particular group on a particular subject, using ICT to enhance their achievement and retention of knowledge in educational technology. "Achievement in educational technology" refers to the acquired learning outcomes in terms of instructional objectives, namely knowledge, understanding, application, and skill objectives, as a result of instruction provided to preservice teachers through the ICT-integrated Cooperative Learning strategy. In the present study, it refers to the score obtained by a student in the "Achievement Test in Educational technology" constructed by the investigator. In the present study, an ICT-integrated Cooperative Learning Instructional Strategy is used to enhance the achievement and retention of knowledge in B.Ed. trainees in Educational Technology.

Review of related literature

Cooperative Learning has been extensively used in different disciplines.

Wang, Y. P., and Wu, T. J. (2022) conducted a study on the "Effects of Online Cooperative Learning on Students' Problem-Solving Ability and Learning Satisfaction." This study was aimed at evaluating the effect of online cooperative learning on students' problem-solving abilities and learning satisfaction. Online cooperative learning as applied to 360 college students in Fujian Province as the research sample. The research results showed positive correlations between online cooperative learning, problem-solving ability, and learning satisfaction.

Kibirige, I and Lehong, M. J. (2022) conducted a study on "The Effect of Cooperative Learning on Grade 12 Learners' Performance in Projectile Motions, South Africa." The major objective of the study was to find out the effect of cooperative learning on Grade 12 learners' performance in projectile motions. A quasi-experimental research design with a non-equivalent control group was used. Two schools were purposefully selected from the Maleboho Central Circuit in South Africa based on their performance in the Physical Sciences Grade 12 results of 2011. The sample consisted of 49 students from two schools. School A was used as the experimental group and was taught using cooperative learning technique while school B was the control group and was taught using traditional teaching methods. Pretest, post tests were used to collect and analyse the data. Data were analyzed using descriptive statistics: arithmetic means and standard deviations; and inferential statistics: the independent student t-test, the ANCOVA, and Cohen's d. Results show that the experimental group outperformed the control group, suggesting that cooperative learning technique enhanced learners' performance more than the traditional teaching approach.

Buenaventura, M. E. (2022), conducted a study on the "Effect of the Utilization of Cooperative Learning on Student Performance." The purpose of the study was to investigate the impact of cooperative learning on the science achievement of Grade 11 students in the three senior high schools in the province of Bulacan that offer Earth and Life Science. The researcher constructed a 20-item questionnaire on the effectiveness of cooperative learning. A descriptive-correlational design was used and t-test was employed for data analysis. In their classroom teaching strategies, the teachers used cooperative learning strategies such as Jigsaw, Role-Playing, and Group Problem Solving. The results showed that the cooperative learning approach was very effective in teaching science concepts.

Algani, Y. M. A., and Alhajja, Y. F. A., (2021). conducted a study on "The Effect Of The Cooperative Learning Method On Students' Academic Achievement In Mathematics." Main aim of the study was to determine the effect of cooperative learning on elementary school students achievement in mathematics (northern Israel). The study sample consisted of 130 male and female students in elementary school mathematics and 40 students in the sixth grade in Arab schools in northern Israel. The experimental group studied using the cooperative learning method, while the control group used the traditional learning method. A questionnaire was used to examine the impact of cooperative learning on students' academic achievement. The results showed that the students' academic achievement in mathematics using the cooperative learning method was better than their academic achievement using the traditional learning method.

Kailasrao, B. A. (2016), conducted a study on "A Study of the Effect of Cooperative Learning Strategy on Adjustment and Attitudes of B Ed College Trainees at Pune University." The main aim of the research was to find out the effect of a cooperative learning strategy, i.e., Student-Teams Achievement Division (STAD), on the adjustment and attitudes of B.Ed. trainees. The researcher chose a random sample of 100 B.Ed. trainees from the two B.Ed colleges (New College of Education and Samarth College of Education) in the Nashik region. 50 trainees were assigned to the experimental group, and 50 trainees were assigned to the control group. The purposive sampling method was used in conjunction with a pre-post-test control group in a quasi-experimental newline design. The experimental group Newline was taught using a cooperative learning strategy, i.e., STAD, whereas the control group Newline was taught using traditional methods. For newline In the present study, the researcher developed the STAD strategy for module headings, instructional strategies,

and models. The STAD consists of: teaching, newline team study, tests, and team recognition. The researcher created online tools like an adjustment inventory and an attitude scale that were used to collect data. A questionnaire and interview were also used for the collection of qualitative data in support of the cooperative learning strategy. The collected data was analysed by using the t-test, the standard t-test, and newline ANOVA to measure the difference in mean scores of attitudes and adjustment of B.Ed. trainees according to their gender, geographical region, and faculty in the control and experimental groups. The results of the study revealed that there was a significant difference between the post-test mean scores of attitudes and adjustment of B.Ed. trainees in the control and experimental groups. The trainees of experimental group showed more positive attitudes and a greater increase in adjustment as compared to the trainees of control group.

Muniyandi, D. (2016), conducted a study on the "Effectiveness of Information and Communication Technology on B.Ed. Trainees' Achievement in Educational Psychology." The main purpose of the study was to evaluate the effect of ICT on B.Ed. trainees' achievement in educational psychology. An experimental method was adopted, and a sample consisting of 30 student teachers was selected through a purposive sampling technique at the Usha Latchumanan College of Education, Thirukkanur, Puducherry, UT. Self-prepared achievement tests were used as a measuring tool to collect the data. The standard deviation, and t-test were employed to analyse the data. The experimental group achieved higher mean achievement scores than the control group.

Altun, S. (2015). Conducted a study on "The Effect of Cooperative Learning on Students' Achievement and Views on the Science and Technology Course." The study addresses the effect of cooperative learning on students' achievement and their views about the 'Systems in Our Body' unit of Science and Technology lesson of grade 6th. For this purpose, mixed method was used. The study was conducted in the second term of the 2013-2014 academic year, on a study group consisted of a total of 20 students among these 7 girls and 13 boys, of a private middle school in Istanbul. An achievement scale was employed for the quantitative data and focus group interviews were hold for the qualitative data. While t-test was used analyse the data. The result of the study indicated that cooperative learning method had a favorable effect on learning. The cooperation based learning-teaching supported permanent learning, contributed to the development of social and personal skills.

Gull F., Shehzad S. (2015). conducted a study on "Effects of Cooperative Learning on Students' Academic Achievement." The main aim of the study was to determine effect of cooperative learning method on students' achievement. Qusi experimental design, with pre/post test of control and experimental group was employed. Sample consisted of 63 female students of grade 12 of a public college. On the basis of scores in pre-test, students were divided in to experimental and control groups. Multiple cooperative learning activities including STAD, TGT and Jigsaw II were performed for 8 weeks with experimental group. Afterwards post test was administered on both groups in order to identify difference in achievement. Independent sample t-test was applied to find difference between two groups before and after intervention. The results showed that there was a significant difference in scores of control and experimental group in post-test. Paired sample t-test was run to compare effect of intervention on achievement scores of experimental group. The results showed that there was significant difference between scores of experimental group before and after intervention ($p=.000$). It can be concluded from results that cooperative learning activities had a positive effect on academic achievement of students enrolled in the subject of Education.

Sulisworo, D. and Suryani, F.(2014). conducted a study on "The Effect of Cooperative learning, motivation and information technology literacy to achievement." The weakness of student understanding on physics (or science in general) at high school is one reason of the low of sciences research achievement in the higher education. In other words, the achievements and motivation of high school students in science learning will influence the advances in science. The aim of this research is to determine the effect of motivation, IT literacy and cooperative learning strategies to learning achievement of high school students. This research used two stay-two stray approach as cooperative learning model. The statistical analysis used ANCOVA with motivation and IT literacy as covariates. The result showed that learning strategy affected the learning achievement. Motivation could be used to explain the learning achievement, but not for IT literacy.

Tran, D. V. (2015), conducted a study on "The Effects of Cooperative Learning on Academic Achievement and Knowledge Retention." This experimental study was conducted on 110 first-year primary education students' attitudes toward the psychology subject over the course of eight weeks of instruction at An Giang University. These students were divided into two matched groups of 55 to be taught by the same lecturer. In the experimental group, cooperative learning was employed, and in the control group, the lecture method was used. The results showed that after 8 weeks, students who were taught through cooperative learning achieved significantly higher scores and knowledge retention post-tests than did students who were instructed using lecture-based teaching.

Sulisworo, D., and Suryani, F. (2014), conducted a study on "The Effect of Cooperative Learning, Motivation, and Information Technology Literacy on Achievement." The aim of this research was to evaluate the effect of motivation, IT literacy, and cooperative learning strategies on the learning achievement of high school students. As a cooperative learning model, this study used a two-stay, two-strike approach. An ANCOVA was used for statistical analysis. The result concluded that the cooperative learning strategy positively affected achievement. Motivation could be used to explain learning achievement, but not IT literacy.

Hossain, A. & Tarmizi, R. A. (2013) conducted a study on "Effects of Cooperative Learning on Students' Achievement and Attitudes in Secondary Mathematics". The main aim of this study was to find out the effect of cooperative learning on students' achievement in mathematics subject and attitude towards mathematics of secondary schools in Bangladesh. A total of 80 students among them 40 Boys and 40 Girls of grade nine. where quasi-experimental design was employed. Data were analyzed by using independent-sample test. The results revealed that a great improvement in mathematics achievement and attitudes towards mathematics. From the synthesis of the reviewed studies it is observed that, majority of studies employed experimental. Cooperative learning is undoubtedly an effective practice for Achievement.

Objectives

1. To study the Effect of ICT integrated Cooperative Learning Instructional Strategy and Conventional Strategy on the Achievement of B.Ed. trainees in Educational Technology.
2. To study whether the B.Ed trainees retained the Achievement in Educational Technology improved through ICT integrated Cooperative Learning Instructional Strategy.

Hypothesis

H₀₁: There is no significant difference between the ICT integrated cooperative learning Instructional Strategy and the conventional strategy in improving the achievement of B.Ed. trainees in educational technology.

H₀₂: Immediate and delayed post-test scores of the B.Ed. trainees taught through the ICT integrated cooperative learning instructional strategy do not differ significantly with reference to achievement.

Research design

Post test-only control group design was used. It is diagrammatically represented below.

Table 1: Schematic Representation of Treatments

Groups	Treatment	Post test	Delayed Post test
Experimental Group	Cooperative Learning Instructional Strategy. (X1)	O1E	O2E
Control Group	Conventional Instructional Strategy. (X2)	O1C	

In the above table, O1E refers to the post test conducted for the experimental group, O2E refers to the post-test conducted for the control group, and O1C refers to the delayed post test conducted for the experimental group.

Sample

The sample included 72 B.Ed. trainees from the K. B. College of Education in Kumta (U.K.) Karnataka during the academic year 2022. Based on their pre-achievement scores, matched pairs were identified and distributed into two treatment groups, with 36 cases in each group.

Tools used

A self-made "Educational Technology Achievement Test" was used to collect the data from the sample, consisting of 72 B.Ed. trainees. The validity of the content was established by expert judgment. The coefficient of consistency by the split-half method was found to be 0.95.

Procedure of the study

This research was experimental in nature, and a post-test-only control group design was used. The 72 B.Ed. trainees were randomly selected from a B.Ed. college, which is randomly selected among eight colleges in the Uttara Kannada district of Karnataka, in the year 2022. The sample was divided into two treatment groups with a strength of 36 in each; both groups were matched on pre-achievement scores. Treatments were conducted for both experimental and control groups by a single teacher who had competence in both strategies. B.Ed. trainees were randomly assigned into clusters during cooperative group work in the experimental group, and content was successively given to each cluster in accordance with the lesson objectives. Information and communication technologies were used to treat the experiential group. The

experimental treatment involved in the teaching of "educational technology" Each lesson lasted for one hour. A total of fifteen lessons were taught using the cooperative learning instructional strategy to the experimental group. Meanwhile, students in the control group were taught the same lessons using the traditional strategy. The treatment was done for five weeks. Instantly after the completion of the treatment, both groups were post-tested on their achievements in educational technology. After four weeks, a delayed post test was conducted for the experimental group to test whether they retained the achievement in educational technology improved through a cooperative learning instructional strategy. The objectives and related hypotheses were analyzed by applying the t-test.

Delimitation's

- ✓ ICT integrated Cooperative Learning Instructional Strategy can be applied to any subject area, at any level of teaching. In the present study, the background of the Researcher has enabled its application to educational technology at B.Ed College.
- ✓ ICT integrated Cooperative Learning Instructional Strategy can be applied for different types of instruction. In the present study, it is applied to Group instruction as it is appropriate to the Indian context.

Results

H₀1: There is no significant difference between the ICT integrated cooperative learning Instructional Strategy and the conventional strategy in improving the achievement of B.Ed. trainees in educational technology.

To test this hypotheses t-test was applied and the results are presented in the following table.

Table-2: Shows the post test scores of B.Ed. Trainees (Experimental and Control group) achievement in educational technology.

Treatments	N	Mean	S.D	t- value	Result
ICT integrated Cooperative Learning	36	36	6.86	9.6983	Significant at 0.05
Conventional Strategy	36	26.5	27.69		

The calculated t-value 9.6983 is greater than the table value at 0.05 Significant level. The result is significant. hence, the null hypothesis (H₀1) is rejected. Thus, the alternative hypothesis H₁ is accepted.

H₁: There is a significant difference between the achievement scores of the experimental group and the control group of B.Ed. trainees in educational technology improved through ICT integrated cooperative learning strategy and conventional strategy.

From the above Table 2, it is revealed that "there is strong evidence at the 0.05 level that the experimental group and the control group of B.Ed. trainees' achievement scores in educational technology differed in how effective they were." The t-value indicates a statistically significant difference, but it did not indicate which group of students (the experimental group or the control group) led to better test scores. Observing the overall means, the achievement scores of the experimental group of B.Ed. trainees have a grand mean score difference of (36-26.5=9.5) 9.5 units higher in comparison with the achievement scores of the control group of B.Ed. trainees in educational technology. This indicates that the experimental group of B.Ed. trainees achieved better test scores than the control group of B.Ed. trainees in educational technology, which taught through the cooperative learning instructional strategy.

H₀2: Immediate post-test and delayed post-test scores of the B.Ed. trainees in educational technology taught through the ICT integrated cooperative learning instructional strategy do not differ significantly with reference to achievement.

To test this hypothesis, a t-test was applied, and the results are presented in the following table.

Table-3: shows the t-test results of the immediate post-test and delayed post-test scores of the achievement of B.Ed. trainees in educational technology improved through cooperative learning.

Experimental group	N	Mean	SD	t-value	Result
post-test	36	36	6.86	3.592.	Significant at 0.05
delayed post-test	36	37.92	3.39		

The calculated t-value 3.592. is greater than the table value at 0.05 Significant level. The result is significant. hence, the null hypothesis (H_0) is rejected. Thus, the alternative hypothesis H_2 is accepted.

H₂: There is a significant difference between the immediate post-test scores and the delayed post-test scores of B.Ed. trainees achievement in educational technology taught through ICT integrated cooperative learning instructional strategy.

From the above Table 3, it is revealed that "there is strong evidence at the 0.05 level that the immediate post-test scores and the delayed post-test scores of preservice teachers' achievement in educational technology differed in how effective they were." The t-value indicates a statistically significant difference, but it did not indicate which test scores (immediate post-test scores or delayed post-test scores) led to better test scores. In educational technology, the achievement scores of the delayed post test of B.Ed. trainees have a grand mean score difference of (37.92 - 36= 1.92), 1.92 units higher than the achievement scores of the immediate post test of preservice teachers. This indicates that the delayed post-test scores are better than the immediate post-test scores of B.Ed trainees in educational technology, which was taught through ICT-integrated Cooperative Learning Instructional Strategy..

Major findings

1. ICT-integrated Cooperative Learning Instructional Strategy is more effective than the Conventional Strategy in improving Achievement of B.Ed. trainees in Educational technology.
2. The B.Ed. trainees have retained their achievement in educational technology which improved through ICT-integrated cooperative learning instructional strategy.

Conclusion and Implications of the study

Integrating Information and Communication Technology in Cooperative Learning is the practise of combining digital learning tools with cooperative learning. This is an innovative instructional strategy that is helpful for pre-service teachers and teacher educators. This method allows pre-service teachers to understand the concept deeply. Cooperative Learning Instructional Strategy also valuable tool for teacher educators to teach and train effectively.

The present study has proved that the cooperative learning instructional strategy is more effective when compared to the conventional strategy in improving the achievement of pre-service teachers in educational technology. This study has implications for student-centered learning. It has been found to be an effective strategy to improve classroom instruction in various disciplines, and its inclusion in the teacher education curriculum will be a major step in making its application possible. The teachers of all levels need sufficient training to use Information and Communication Technology integrated Cooperative Learning Instructional Strategy to improve Achievement in their students. Efforts in this direction will definitely improve student performance.

References

Muniyandi, D. (2016). Effectiveness of Information and Communication Technology of B.Ed. Trainees " Achievement in Educational Psychology. *Research Tracks*, 3(2). Retrieved from, https://www.academia.edu/28194366/Effectiveness_of_Information_and_Communication_Technology_of_B.Ed._Trainees_Achievement_in_Educational_Psychology.

Buenaventura, M. E. (2022) effect of utilization of cooperative learning in student's Performance. *Globus*13(2) Retrieved from, <https://globusjournal.com/wp-content/uploads/2022/05/GMIT-132-JJ22-Mary-Cris-E.-Buenaventura.pdf>

Altun, S. (2015). The Effect of Cooperative Learning on Students' Achievement and Views on the Science and Technology Course. *International Electronic Journal of Elementary Education*, 7(3). Retrieved from, <https://files.eric.ed.gov/fulltext/EJ1068065.pdf>

Kibirige, I and Lehong, M. J. (2022) The Effect of Cooperative Learning on Grade 12 Learners' Performance in Projectile Motions, South Africa. *Eurasia Journal of Mathematics, Science & Technology Education*, 12(9), Retrieved from, <https://www.ejmste.com/download/the-effect-of-cooperative-learning-on-grade-12-learners-performance-in-projectile-motions-south-4617.pdf>

Hossain, A. & Tarmizi, R. A. (2013). Effects of Cooperative Learning on Students' Achievement and Attitudes in Secondary Mathematics. *Procedia - Social and Behavioral Sciences*. 13. Retrieved from, <https://www.sciencedirect.com/science/article/pii/S1877042813033259>

Tran, D. V. (2014). The Effects of Cooperative Learning on the Academic Achievement and Knowledge Retention. *International International Journal of Higher Education*, 3(2). Retrieved from, <https://files.eric.ed.gov/fulltext/EJ1067568.pdf>

Sulisworo, D. and Suryani, F.(2014). The Effect of Cooperative learning, motivation and information technology literacy to achievement. *International Journal of Learning and Development* 4(2). Retrieved from, <http://dx.doi.org/10.5296/ijld.v4i2.4908>.

Algani, Y M. A., and Alhajja, Y. F. A., (2021)The Effect Of The Cooperative Learning Method On Students 'Academic Achievement In Mathematics. *Multicultural Education*, 7(3)Retrieved from, <http://ijdri.com/me/wp-content/uploads/2021/03/35.pdf>

Wang, Y. P. & Wu, T. J. (2022). Effects of Online Cooperative Learning on Students' Problem-Solving Ability and Learning Satisfaction. *Front Psychol*. 93. Retrieved from, <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9226778/>

Gull F., Shehzad S. (2015). Effects of Cooperative Learning on Students' Academic Achievement. *Journal of Education and Learning*. 9(3). Retrieved from, https://www.researchgate.net/publication/281102103_Effects_of_Cooperative_Learning_on_Students'_Academic_Achievement.

