



EFFECTIVENESS OF COLLABORATIVE LEARNING STRATEGY ON MOTIVATION IN SCIENCE, METACOGNITION, CRITICAL THINKING AND ACHIEVEMENT IN BIOLOGY OF XI STANDARD STUDENTS

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ABSTRACT :

The present experimental study was undertaken with the objectives (i) to study the effectiveness of learning XI standard biology through collaborative learning on motivation in science, metacognition & achievement in biology, (ii) to study the relative effectiveness of collaborative learning strategy in biology in terms of (a) level of achievement (b) gender. For the study two groups were constituted from two different colleges. One being the control group who will be taught by traditional or conventional method the other experimental group with collaborative learning strategy which involved the active learning strategies, like think-pair-share, jig saw and fish bowl activity & lecture method. The experiment was conducted for a period of three months at the rate of 90 minutes per day in the evening hours and selected units were covered through collaborative learning strategy. The control group was taught by conventional method during the same time period. The obtained results show that the collaborative learning strategy was more effective than the conventional method in teaching and learning of biology at college level and it has enabled the students to improve in the motivation level to a considerable extent.



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KEYWORDS : Collaborative Learning Strategy, Motivation, Metacognition, Critical Thinking, Achievement in Biology.

COLLABORATIVE LEARNING STRATEGY

Collaborative learning strategies used by the researcher was amenable to their learning they could seek out the required help from the facilitator as this strategy is unlike the conventional teaching where it is teacher centered and the concept is taught by lecture method where the student gets rare chance or no chance to interact with the teacher. Where as in the collaborative learning strategy the researcher here is the facilitator where she provides personalized learning and makes the student responsible for their own learning which would not be possible in a regular class room teaching. Students have embraced the collaborative learning strategies and perceive benefits from the same.

Collaborative learning strategy can provide a valuable experience for the faculty as well as for the students and potentially increase the student satisfaction as a result of a perception of increased support.

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THINK PAIR SHARE

Think-Pair-Share strategy is one of group discussion strategies falling within curved structural and it is a method of diverse, method of learning collaborative.

This method was developed by Kagan (1991) through provide the teacher flexible ways to implement cooperative learning especially after Kagan made a repertoire of free content activities as the teacher works to choose appropriate content, and it is the whole lesson preparation and formulation of cognitive objectives, the cooperative which form the basis, fall into this way (Think-Pair-Share) strategy which in turn will help learners to think by giving them time to think, then involved with another colleague and look at the different point of view, they may be more willing and less apprehensive about sharing with a larger group, and it gives them time to change their response if needed and reduce the fear of giving the wrong answer and is encouraging them to participate cooperative, mutual learning between individuals, and ensure that the contribution of each student's work.

Think-Pair-Share strategy is one of the active cooperative learning strategies where they are used to activate the students' previous knowledge.

JIGSAW

This is one of the learning strategies under cooperative learning in which, just like in a jigsaw puzzle, the content of the lesson is subdivided into different parts of information and then given to groups of students who would later explain to each other their parts and results in the whole jigsaw puzzle to be completed (Aronson & Patnoe, 1997). The jigsaw instructional procedure is a highly structured cooperative learning method, which was originally created by Aronson (see Aronson, 2005; Aronson & Patnoe, 1997; Heden, 2003). In the application of the Jigsaw method, the teacher introduces a topic and its subtopics. The students are then divided into 'home' groups where they are each given a different subtopic in the group. The next step requires the students to break out of their 'home' groups to form the 'expert' groups where these students focus on one subtopic, researching and discussing it. Therefore, the students become experts on the subtopic that they have been assigned to. Following their discussion, the students from all of the 'expert' groups must return to the 'home' groups and teach their peers based on their findings and discussions. Eventually, all the members of the 'home' groups will have learnt from each expert group discussion and will have benefitted from each other.

FISH BOWL

Fishbowl is an engaging and student-centered strategy that builds comprehension while developing group discussion skills. The fishbowl structure lends itself well to discussions. By providing all students both a speaking and listening role and a stake in the discussion, a fishbowl sets up students to be both consumers and producers of ideas and to find a balance in how they "speak up" and "step back." The observation aspect of the activity gives students a forum for establishing appropriate ways to participate in discussions. If used on a consistent basis, fishbowl discussions can establish boundaries and norms critical for effective conversations. Research supports the use of fishbowls as a particularly effective way to engage students with a range of abilities and in multiple settings.

OBJECTIVES

- To study the effects of collaborative learning strategy on motivation in science and achievement in science.

- To study the relative effectiveness of collaborative learning strategy in biology in terms of level of achievement and gender.

HYPOTHESES

1. There is a significant effect of collaborative learning strategy on the scores in achievement in biology among the students of XI standard.
2. There is a significant difference in the scores of post-test in motivation in science among the students of XI standard.
3. There is a significant difference between male and female with respect to motivation in science among students of XI standard.
4. There is a significant difference between male and female in the post-test scores of achievement test among the students of XI standard.

METHODOLOGY

The effectiveness of teaching learning process in any subject depends mainly on the use of teaching learning strategy by the teacher in the class room whether it is teacher centered passive learning or child centered-active learning. There is a growing need for the innovative teaching strategy in our schools & colleges today. The days have gone where the student use to listen to the teacher chalk/talk memorise the concepts & reproduce the same in the examination & score marks. Now it's time for the teachers to become more innovative & make the students involve actively in the teaching learning process & make them responsible for their own learning in the classroom as well as outside.

SAMPLE

This is an experimental study and the experiment was conducted by using two groups design with XI standard students of Bangalore South. Students of Vijaya Bifurcated Pre-University College R.V. Road, Bangalore as control group. The size of the sample is 50 and B.E.S Pre-University College Jayanagar, Bangalore. As experimental group and the size of the sample is 50.

TOOLS

- Motivation in Science Scale by Shawn M. Glyann (2011).
- Achievement in Biology developed and validated by the investigator. The tool consists 85 items from the concepts like morphology of flowering plants, anatomy of flowering plants, digestive system & circulatory system. All the items are objective type the test is validated in a pilot study. The reliability is established by using Cronbach Alpha test & the content validity is established. The test included all the cognitive domain parameters and also considering the different levels of difficulty.

ANALYSIS OF DATA

Table 1: t-test for Comparing the Effectiveness of Collaborative Learning Strategy on Achievement in Biology

Group	N	Mean	SD	t-value
EXPERIMENTAL GROUP B.E.S Pre-University College Jayanagar, Bangalore	50	49.90	12.907	8.543
CONTROL GROUP Vijaya BIFR Pre-University College R.V Road, Bangalore	50	31.10	8.093	

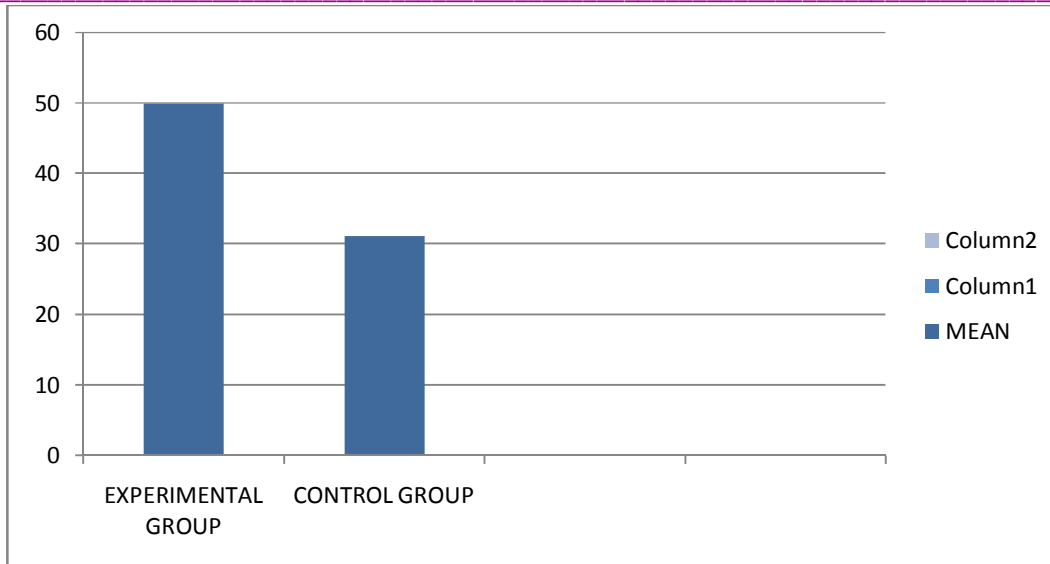


FIGURE-1

Table-1 shows that achievement of B.E.S. College/experimental group is significantly higher than achievement of Vijaya Bifurcated Pre-University College/control group. This is due to the experimental intervention. It means that there is a significant influence of collaborative learning strategy on achievement among the students of B.E.S. College, Bangalore/experimental Group.

Table 2: t-test for the Differences in Motivation in Science in Experimental and Control Group

Group	N	Mean	SD	t-value
EXPERIMENTAL GROUP B.E.S Pre-University College Jayanagar, Bangalore	50	92.84	10.383	-6.282
CONTROL GROUP Vijaya BIFR Pre-University College R.V Road, Bangalore	50	80.16	12.754	

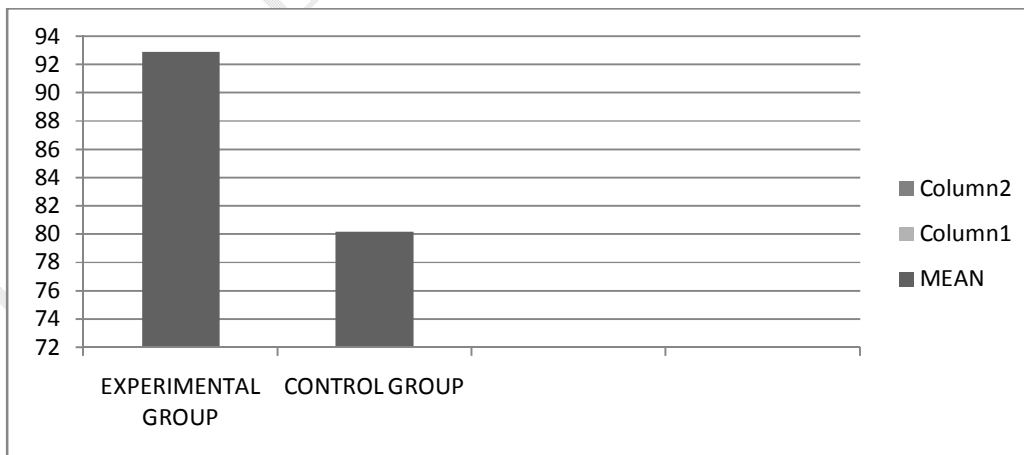


FIGURE-2

Table-2 depicts that the mean value of motivation in science as the mean scores are higher for the experimental group when compared to the control group. Hence the influence of collaborative learning strategy has the effect on motivation level of students in the experimental group.

Table 3: t-test for the Differences of Mean in Motivation in Science for Male and Female Students of B.E.S. Pre-University College, Bangalore

Gender	N	Mean	SD	t-value
Male	22	93.50	9.211	0.395
Female	28	92.32	11.360	

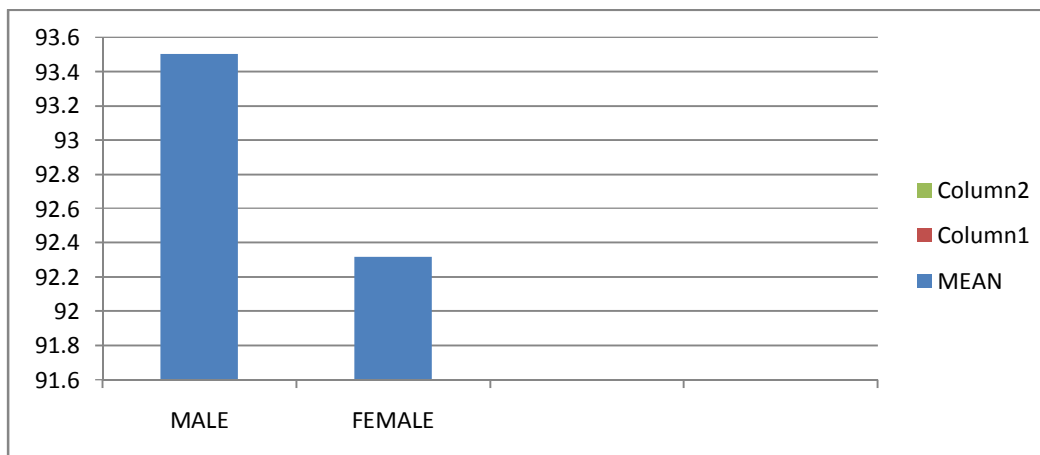


FIGURE-3

Table-3 reveals that the mean value of male students in motivation in science is not much greater than that of the female students. From the results; it is clear that the collaborative learning strategy has equal effect on male and female on motivation in science.

Table 4: t-test for the Difference of Mean Value of Achievement in Biology by Male and Female Students of B.E.S. Pre-University College, Bangalore

Gender	N	Mean	SD	t-value
MALE	28	52.32	12.266	2.318
FEMALE	22	46.82	13.323	

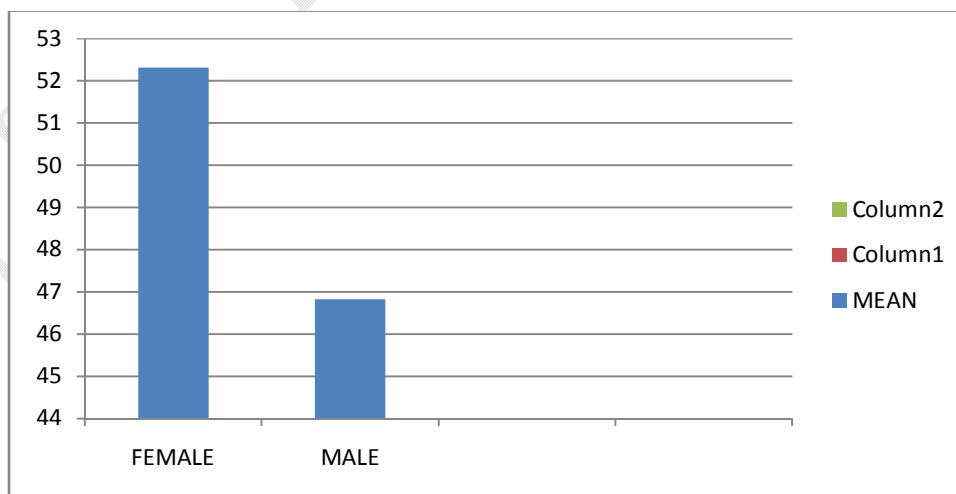


FIGURE-4

From Table-4, the mean value of achievement in biology in female is greater than the male students of B.E.S. Pre-University College, Bangalore. From the results, it is very clear that the female students have performed better than the male students of B.E.S. Pre-University College, Jaynagar, Bangalore. This indicates that collaborative learning strategy has significant impact on the female students than the male students in achievement in biology.

DISCUSSION OF RESULTS

- There is a significant difference between the pretest and the posttest mean scores of the experimental group which was taught by collaborative learning strategy when compared to the control group which was taught by conventional method.
- The collaborative learning strategy is significantly Influence on the achievement of biology and motivation in science.
- There is a significant difference between the scores of male and female students with respect to achievement in biology.
- There is a significantly difference between the mean scores of male and female students with respect to motivation in science.

The present study was carried out to find out the effect of collaborative learning strategy on motivation in science and achievement in biology of XI standard students. It has clearly demonstrated that the collaborative learning strategy has provided ample scope for the learner to improve in motivation and achievement. It is recommended that this technique should be employed in the real classrooms for the other subjects for all categories of learners.

Ahmad (2016) in his research aimed at identifying the effect of (think-pair-share) and (sequenced questions) strategies on fifth primary student's achievement and retention at sciences in favour to the experimental groups.

Dr. Ribhi khaleel Ahmad Hamdan (2017) analysed the effect of (think-pair-share) strategy on the achievement of third grade student in sciences in the educational district of Irbid. The findings of the study show that there are statistically differences in grades of students due to group variable at the significance level (0.05), and the differences were in favor of the experimental group and there are statistically differences due to gender at the significance level (0.05) in favor of females. The study recommended to entry (think-pair-share) strategy within the teaching strategies used by students during the teaching and the involvement of teachers in training courses on (think-pair-share) strategy.

Salman (2015) this research aims to know the effectiveness of strategies in each "active learning role playing, strategy (think-pair-share) in collecting pupils grade 5 in Arabic grammar material "researcher has formulated that there is statistically significant difference at the level indication (0.05) between average pupils first pilot group who studied strategy role-playing and the average and rewarded the researcher groups search, and use appropriate statistical methods, the researcher found the effectiveness of strategy role-playing in grade 5 pupils collection of Arabic grammar, and their impact on the left to choose the role of pupils and strengthened language abilities and self-confidence. The effectiveness of the strategy (think-pair-share) in improving the collection of the pupils and retaining them and instilled in their minds through individual reflection and sharing with others.

RECOMMENDATIONS

- Collaborative learning strategy can be used as a teaching learning strategy in different schools/colleges in different subjects.
- Collaborative learning strategy can be used a active learning strategy in the regular class room teaching in place of lecture method as it is yields better results.
- Collaborative learning strategy helps the students develop certain social skills like co-operation and communication among the peer which has impact on their learning.

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