

Dialogue embedded synectics model of teaching: a hybrid model for promotion of creativity

Dialogue
embedded
synectics model
of teaching

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Received 27 August 2023
Revised 17 November 2023
Accepted 17 November 2023

Abstract

Purpose – The study aims to investigate the effect of the dialogue embedded synectics model of teaching on the creative thinking of students.

Design/methodology/approach – The research design of the study was a nonequivalent control group design of quasi experimental research. This study collected data from 80 students in the seventh grade from two different government schools in Bathinda, Punjab, India, which were selected using a random method. The subjects of experimental group were taught by the investigator using the dialogue embedded synectics model of teaching and the subjects of control group were taught by their teacher using the traditional teaching method, i.e. the Herbartian method. The data collections were done using the creative thinking test developed by Baqer Mehdi (1995). The data analysis techniques used *t*-test.

Findings – Key finding indicates that the dialogue embedded synectics model of teaching is effective in enhancing the creative thinking of students as compared to the traditional method.

Originality/value – The present work is unique in terms of development of an innovative pedagogy, i.e. the dialogue embedded synectics model of teaching, which has the potential to encourage students' creative thinking, a key concern for society in the 21st century. Therefore, it is suggested to conduct similar type of studies on this innovative pedagogy and this model of teaching may be used by teachers for enhancing creative thinking of seventh class students.

Keywords Creative thinking, Dialogue embedded synectics model of teaching, Traditional method of teaching

Paper type Research paper

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Declaration of conflicting interests: The investigators declared no conflicts of interest with respect to the research and publication of this article.



Introduction

One of the fundamental goals of every educational institution is to enhance good thinking skills of students. Although there have been significant developments in education since Socrates, the quest to equip students with the ability to think, has always been at its center (Şenel and Bağceci, 2019). Creativity is the ability that arises from thinking and anyone of any age can develop it. For nurturing creative thinking among the students, the school environment is one of the most conducive platforms (OECD, 2019). In this context, Ryan (2013) highlights the necessity of providing a positive learning environment for students that teachers may create and a safe setting for students to express themselves without the fear of being criticized and encourage producing something new or original. In addition to this, a tolerant classroom environment (Florida, 2004), respecting students' responses (Urban, 2007), constructive criticism and a humorous classroom environment where the interests of the students are promoted (Honneck, 2016), are essential for developing creative thinking among students (Şenel and Bağceci, 2019).

Creativity, the most advanced cognitive process, entails coming up with unusual and unique ideas pertinent to the present situation. Creativity is distinguished from intelligence as a distinct and parallel entity, yet it differs from intelligence in that it is not limited to cognitive or intellectual functioning or action. Instead, it is about a complicated mix of motivational elements, irrational personality traits, contextual factors, chance circumstances and even products (Michalko, 1998). In this context, creativity is fundamental to all academic disciplines and activities, and this is considered a critical component of making sense of learning experiences. One cannot think creatively unless one has the competence to think creatively. Because being creative helps the students to better understand concepts, manage their own learning and find solutions from the unfamiliar (Lymbery, 2003). It is defined as the thinking that enables students to apply their imagination to generating ideas, questions and hypotheses, experimenting with alternatives that directly contribute toward their academic performance (Kampylis and Berki, 2014; Moss, 2011). The creative process that makes it particularly powerful is that it requires knowledge and understanding of the area being investigated and a willingness to question and not be constrained by the existing knowledge. Learners should understand how to ask constructive and challengeable questions to help them formulate their understanding, and imagination can play an important role. Therefore, every teacher should provide a conducive learning environment that fosters creative thinking among students. After going through the literature, several teaching and learning approaches help nurture creativity and innovation.

The synectics model of teaching promotes creativity among the individuals to look at the particular phenomenon from a different perspective and solve their problems differently based on this method called metaphorical thinking and intellectual innovation (Pany, 2005; Shabani, 2011). In addition to this, synectics model of teaching is considered a problem-solving technique that seeks to promote creative thinking, typically among small groups of people from a diverse background that stimulates thought processes of which the subject may be unaware (Siddiqui, 2013) and promotes concept development among the students (Sierra-Jones, 2011). Further, the dialogical mode of teaching is to support the stimulation of creativity among students in the classroom contexts (Wegerif, 2005). Socratic's dialogue is an ancient technique of engaging student in a dialogue by asking non-leading questions aimed at revealing to the student how much knowledge they already have on some topics and which kind of reflective self-questioning and co-questioning is intimately related to the view of creativity (Schmoelz *et al.*, 2016). Dialogue learning environment provides freedom to express opinions, flexibility to adapt learning style, a free learning environment and collaboratively (with peers and teachers) finding the solution to the problem. Garaigordobil and Berrueco (2011) considered this type of learning environment as conducive for fostering creativity among students. In more sense, dialogue space as a form of group talk that promotes inter-

thinking (Vass *et al.*, 2014) develops self-confidence, which provides a safe learning environment for developing creativity among students (Celume *et al.*, 2019).

By understanding the common potentiality (promote creative thinking) of both the synectics model and dialogue teaching, the investigator integrated the phases of both teaching approaches to develop the dialogue embedded synectics model of teaching to provide an effective and meaningful learning environment for optimal development of students.

Dialogue embedded synectics model of teaching

In a new direction of the innovation in the teaching–learning process, the present education system gives importance to develop creative thinking. In this context, an attempt has been made to create an innovative hybrid teaching model, i.e. the dialogue embedded synectics model of teaching, where the steps of synectics and dialogue teaching were integrated to make the teaching–learning process interesting and innovative. This is why it is called as the hybrid model. The steps of this model of teaching are given as follows:

Phase-I Introduction: The first phase of the dialogue embedded synectics model of teaching is introduction. It constitutes a general introduction to the topic to bring the students' attention to lesson and the formation of groups for dialogue. The teacher can use different techniques to enhance students' concentration on lessons and build rapport with them by following different techniques, i.e. questioning, group activity, storytelling, etc. This will be followed by formulating at least two groups in the class (one group should not consist of more than eight students), which is the essential feature of dialogue mode.

Phase –II Declaration and description of the topic: In this phase, the teacher will declare today's teaching concept and provide basic information (meaning, characteristics, natures, types, uses, etc.) about it. After that the teacher will ask the groups a subjective question about the teaching concept and tell them to interact, followed by dialogue within the groups to write the answer to the question.

Phase-III Exploration through analogies: In this phase, the students are expected to go for analogical exercises and dialogue. Therefore, this phase of the dialogue embedded synectics model of teaching consist of three sub-phases, i.e. direct analogy, personal analogy and compressed conflict. In the direct analogy sub-phase, the teacher will ask the student to suggest some examples of any living being/nonliving object similar to the teaching concept. For instance, if the teaching concept is 'Tree,' the students may give examples like the parent, family, water, life, etc. In contrast, in the personal analogy sub-phase, the teacher has to propose to each member of the group to imagine themselves as a living being and nonliving object and give physical as well as an emotional description of that example given in the direct analogy stage. For example, the students may be asked to consider themselves as 'railway engine' and proved descriptions like I carry boogies, have a strange power, never tire, carry thousands of people, etc. Further, in the compressed conflict sub-phase, the teacher will ask to choose and suggest two opposite/contradictory words taken up in the dialogue made at the direct and personal analogy level. For example, the students may be asked how constructive and destructive the river is. To facilitate dialogue among and within the groups, the teacher will ask certain number of questions at each sub-phase of this phase.

Phase-IV Synthesis of analogies: This phase has two sub-phases, such as a new direct analogy and synthesis of the topic. In the new direct analogy, the teacher will invite the students to suggest one living being or nonliving object by summarizing the analogies given in the phase of exploration of analogies. The groups are expected to suggest some

examples by dialogue with their group members. After that, there will be a group dialogue to confirm the responses suggested by various groups. In synthesis of topic sub-phase, the teacher will ask them to link all the above analogies with the main concept followed by dialogue with their friends. If the students fail to cover all features of the teaching concept, the teacher will help the students reach at the final work that covers all the aspects of the teaching concept.

Phase-V Evaluation: At the end of the lesson, classwork in the form of objective type and short answer type questions will be given to the students for evaluating the learning outcomes. To nurture creative thinking among students, a task will be given to the students to write a paragraph on the concerned topic using analogical exercises in the above phases. This paragraph writing will be given as homework.

Hypothesis

The main objective of this experimental study was to analyze the impact of the dialogue embedded synectics model of teaching on creative thinking of students. To achieve this objective, the investigator formulated the following hypothesis:

- (1) Dialogue embedded synectics model of teaching will have significant effect on creative thinking of students.

Methods and procedure

- (1) *Design of the study:* For the conduct of this experiment in the school environment, it is not possible to apply the randomization method for getting equivalent control and experimental groups (Koul, 2009). It is also not practically possible to divide the students into two sections to designate them as control and experimental group because it may affect the day-to-day administrative function of the school as well as may create psychological pressure on the students when they would be designated as control and experimental group creating a sense of superiority and inferiority complex among them. Keeping the above limitations in the mind, two government schools of Bathinda, Punjab, were randomly selected out of four similar types of schools i.e. apparently equivalent in their infrastructure, school timing, examination result, curriculum, management and the number of teachers. The experimental and control group comprised of 42 and 38 students, respectively, who were considered as the subjects of the study. In this context, nonequivalent control group design of quasi-experimental research was used to carry out this research. To ensure the internal validity, the investigator selected two schools which are apparently equivalent in the above aspects. It means for conduct of experiment, the investigator selected two schools that are almost equal with respect to their educational environment.
- (2) *Data collection:* A standardized test on creative thinking developed by Mehdi (1995) was used to collect data on creative thinking ability of both control and experimental groups. The subjects in both groups were pre-tested on creative thinking before the treatment, and they were post-tested on the same after treatment. The test includes four sub-tests, and 48 min are required for administering the test. The subtests are consequences test (having three items), unusual test (having three items), similarity test (having three items) and product improvement test (having one item). In total this test includes ten items, and all the items are subjective in nature where the respondent will give free responses. There is no right or wrong responses for items of the test. Each item is to be scored for fluency, flexibility and originality.

- *Scoring for fluency:* Delete the irrelevant and repeated responses and then count the remaining responses to determine the fluency score for the item and enter the number in the appropriate box on the scoring sheet.
 - *Scoring for flexibility:* For this, the scorer categorizes the responses given for each item by alphabet serial. After analyzing all the responses given on the items, the scorer should check how many different categories have been used by the respondents. The total number of various alphabet serials utilized will determine the flexibility score.
 - *Scoring for originality:* The statistical uncommonness of responses is used to determine originality. Therefore, if a response was provided by 0.1%–0.99% of the respondents, the responses will get an originality score of 5; if it was provided by 1%–1.99% of the respondents, it will receive a score of 4; if it was provided by 2%–2.99% of the respondents, it will receive a score of 3 and if it was provided by 3%–3.99% of the respondents, it will receive a score of 2. However, responses provided by 5% or more of the respondents will receive a weight for originality of 0. Hence from the above description, it can be concluded that the more uncommon responses, the higher originality weightage.
- (3) *Treatment:* The subjects of the experimental group were taught through the dialogue embedded synectics model of teaching. The subjects of control group were taught by their teacher using the traditional teaching method i.e. the Herbartian method. In this context, the traditional teaching is referred to a structured learning environment that focuses on face-to-face teacher-centered instruction, including teacher-led-discussion. There is little or no scope for developing higher order of thinking (critical thinking, creative thinking, reflective thinking, etc) among students, because this method focuses more on repetition and memorization. The lesson plans for subjects of the experimental group was designed by following the steps of the dialogue embedded synectics model of teaching. As a whole, the subjects of both the groups were taught 30 lessons constituting three chapters of the seventh grade English book. These 30 lesson plans were developed on three different chapters namely the “*Rent for Water*,” “*Train*,” and “*Birbal’s Khichdi*” taken from the English textbook prescribed for Class-VII by the Punjab School Education Board, Punjab. The duration of treatment was one and half months (45 days). In the dialogue embedded synectics model of teaching, the investigator taught teaching concepts through metaphoric activities followed by the dialogue. Relating the real-life experience with teaching concepts through dialogue within and between groups is the essence of this model of teaching. In addition to this, metaphoric and analogical activities followed by the dialogue in this model of teaching help to make the students conscious and attentive to the learning process. To facilitate the above activities among the students, the investigator poses certain dialogue questions at each stage of this teaching model to initiate the constructive dialogue within and between the groups. The role of the investigator is to observe the activities and support each group to bring their dialogue on track.
- (4) *Analysis technique:* Prior to the beginning of the experiment the subjects of control and experimental groups were subjected the test of their creative thinking ability. The results revealed that there were no initial differences between control and experimental group subjects on creative thinking ability (the obtained *t*-ratio of 0.631 is less than its table value of 2.00 at the 0.05 level of significance with 78 degrees of freedom). It means the subjects of both control and experimental groups had an almost equal level of creative thinking before giving treatment. Therefore, for analyzing the collected data, the investigator applied *t*-test statistical technique.

Results

Impact of dialogue embedded synectics model of teaching on creative thinking

The main objective of this research was to examine the impact of dialogue embedded synectics model of teaching on students' creative thinking ability. It was essential to assess the significance of the difference between pre-test and post-test scores on creative thinking of both experimental and control groups. Before applying *t*-test to draw valid conclusion, it was essential to check whether the present data fulfill the assumptions of *t*-test or not. Basically, the application of *t*-test is based on assumptions, i.e. normal distribution of data, sample should large and homogeneity of variance. However, as an essential assumption of *t*-test the K-S test (one sample Kolmogorov–Smirnov test) for normality of distribution of data were employed in all the cases (pre-test and post-test scores of controls and experimental groups) and the data were found to be normally distributed, which are reflected in [Figure 1](#). In the context of sample size, the number of students in both control and experimental groups was 38 and 42, respectively, which justifies the assumption of large sample (>30). Further, to check the homogeneity of variance, the Levene's test of statistics was used and the result found that the Sig. value (0.26 & 0.764) is greater than 0.05 that means the variance of the dependent variable (creative thinking) is assumed to be equal across the groups (control and experimental groups). Thus, the collected data were subjected to study the significance of the difference in the respective mean scores by *t*-test.

- (1) Significance of mean difference between pre-test scores on creative thinking of both control group and experimental group.

Here, *t*-test of independent samples was applied to calculate the significance of the difference between the pre-test scores on the creative thinking of both control and experimental groups to determine the initial difference between the two groups. The results of the independent samples *t*-test are presented in [Table 1](#).

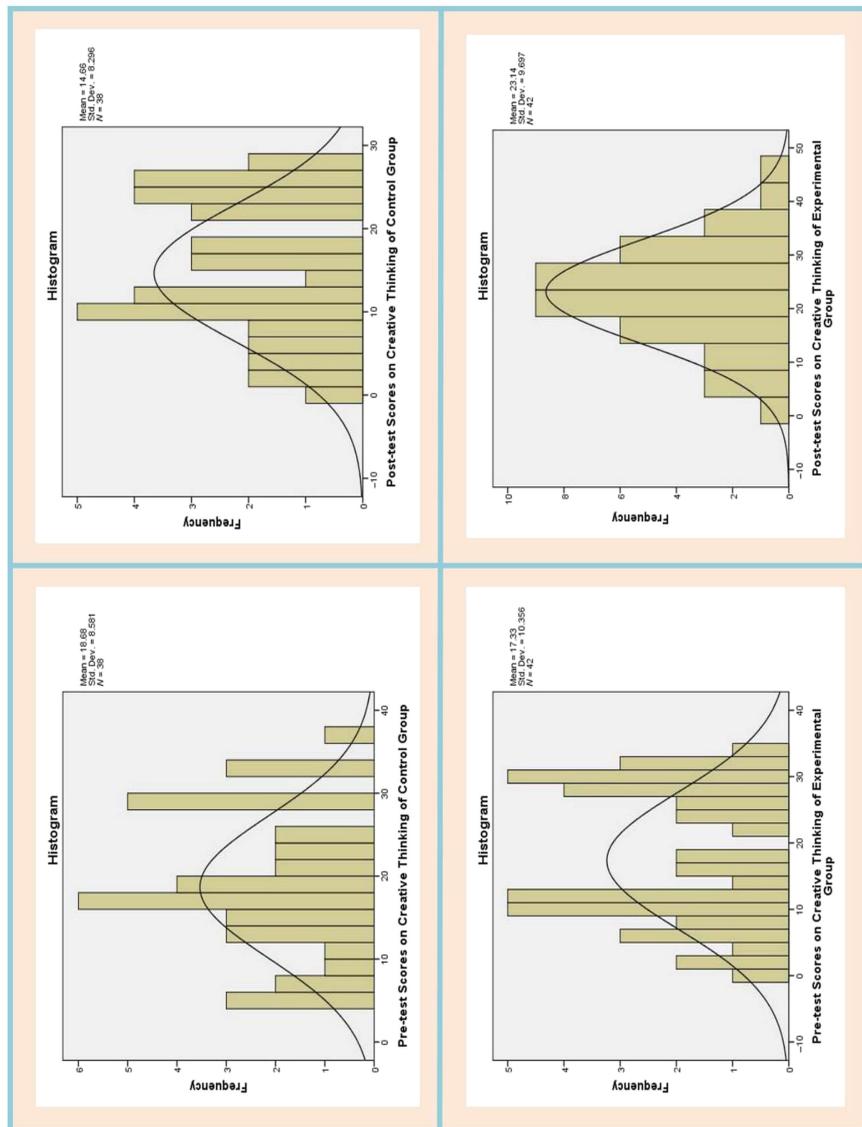
An analysis of data as presented in [Table 1](#) reveals that the mean and SD of pre-test scores of creative thinking of control group was found 18.68 and 8.58, respectively, and the mean and SD of pre-test scores of creative thinking of experimental group was found 17.33 and 10.35. Hence, it means there is negligible difference between pre-test scores of creative thinking of control group and experimental group, which is clearly shown in [figure-2](#). Further the *p*-value of 0.530 is greater than 0.05, it means that there is no significant difference between the pre-test scores on creative thinking of experimental and control groups. Therefore, it may be interpreted that the initial mean differences between the control and experimental groups regarding creative thinking ability are not significant. As a result, both groups can be deemed to have nearly equal level of creative thinking abilities.

- (2) Significance of mean difference between pre-test and post-test scores on creative thinking of both control and experimental groups

To find out the significant difference between the pre-test and post-test scores on creative thinking of subjects of both experimental and control groups, paired-samples *t*-test was applied. The results of the paired-samples *t*-test are presented in [Table 2](#).

The analysis of data presented in [Table 2](#) reveals that the *p*-value of 0.075 is greater than 0.05. Based on this result, it may be interpreted that the mean differences that exist between the pre-test and post-test of the control group with regard to creative thinking ability is not significant. Therefore, it was observed that the traditional teaching method did not influence the development of creative thinking ability of subjects of the control group.

On the other hand, the significance of the difference between the pre-test and post-test mean scores of the subjects of the experimental group on the creative thinking, as shown in [Table 2](#), revealed that the *p*-value of 0.001 is less than 0.05, implying that there is a significant



Source(s): By authors

Figure 1.
Normality of
distribution of data on
pre-test and post-test
scores on creative
thinking of control and
experimental groups

difference between the pre-test and post-test mean scores of the experimental group. Therefore, this significant difference in the creative thinking ability of the experimental group subjects may be ascribed to the impact of dialogue embedded synectics model of teaching.

(3) Significance of mean difference between post-test scores on creative thinking of both control group and experimental group

The investigator employed independent samples *t*-test to determine the significance of difference between the post-test scores of both the control and experimental groups regarding creative thinking. The results of the independent samples *t*-test are presented in Table 3.

The data presented in Table 3 reveals that the mean and SD of post-test scores of creative thinking of control group was found 14.65 and 8.29, respectively, and the mean and SD of post-test scores of creative thinking of experimental group was found 23.14 and 9.69, respectively. Hence, there is a huge difference between post-test scores of creative thinking of

Table 1.

Significance of mean difference between pre-test scores on creative thinking of both control group and experimental group

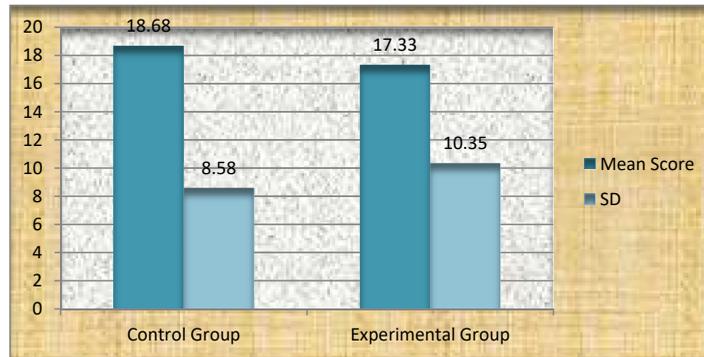
Group	Test	N	Mean	SD	SE _D	df	<i>t</i> -value	<i>p</i> -value
Control	Pretest	38	18.68	8.58	2.13	78	0.631	0.530
Experimental	Pretest	42	17.33	10.35				

Note(s): *N = Number of students, SD = Standard deviation, SE_D = Standard error of difference, df = Degrees of freedom and *t* = *t*-ratio

Source(s): By authors

Figure 2.

Significance of mean difference between pre-test scores on creative thinking of both control group and experimental group



Source(s): By authors

Table 2.

Significance of mean difference between pre-test and post-test scores on creative thinking of control group and experimental group

Group	Test	N	Mean	SD	SE _D	df	<i>t</i> -value	<i>p</i> -value
Control	Pretest	38	18.68	8.58	2.19	37	1.833	0.075
	Post-test	38	14.65	8.29				
Experimental	Pretest	42	17.33	10.35	1.55	41	3.74	0.001
	Post-test	42	23.14	9.69				

Note(s): *N = Number of students, SD = Standard deviation, SE_D = Standard error of difference, df = Degrees of freedom and *t* = *t*-ratio

Source(s): By authors

control group and experimental group, which is reflected in figure-3. Further, the p -value of 0.00 is less than 0.05. It means there is significant difference between the post-test scores on creative thinking of control and experimental group. Therefore, it may be interpreted that the mean scores of both the control and experimental groups differ significantly in the creative thinking ability. Hence, this considerable difference could be attributed to the impact of the dialogue embedded synectics model of teaching on creative thinking ability of the subjects of experimental group.

According to the above findings, there was no significant difference in the creative thinking ability of the subjects of both control and experimental groups before they were exposed to treatments. Further, there was no significant difference in creative thinking between the pre-test and post-test mean scores of subjects of the control group, whereas there was a significant difference in creative thinking between the pre-test and post-test mean scores of subjects of the experimental group. Furthermore, a significant difference was reported when the post-test mean scores of both the control and experimental groups were subjected to test the significance of difference. Based on the preceding interpretations, it may be concluded that the dialogue embedded synectics teaching model is effective in enhancing the creative thinking ability of subjects. As a result, the investigator is inclined to conclude that the hypothesis that the dialogue embedded synectics model of teaching has a significant impact on the development of students' creative abilities has been accepted.

Discussion

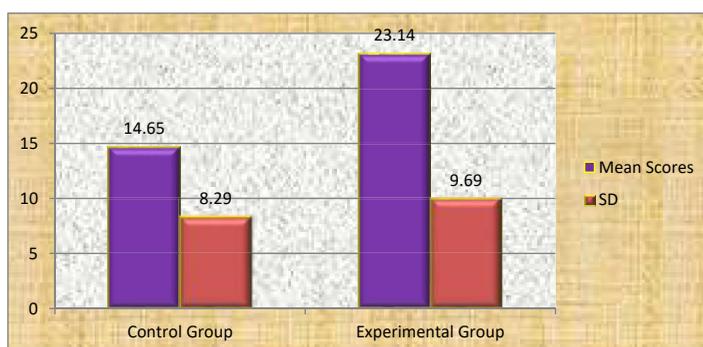
The study aimed to examine the effectiveness of the dialogue embedded synectics model of teaching in enhancing the creative thinking ability of the students. For this, the sample of the study consisted of 80 students of the seventh grade from two different government schools in Bathinda, Punjab. One of the schools was chosen as control group and the other

Group	Test	N	Mean	SD	SE _D	df	t -value	p -value
Control	Post-test	38	14.65	8.29	2.02	78	4.18	0.00
Experimental	Post-test	42	23.14	9.69				

Note(s): *N = Number of students, SD = Standard deviation, SE_D = Standard error of difference, df = Degrees of freedom and t = t -ratio

Source(s): By authors

Table 3.
Significance of mean difference between post-test scores on creative thinking of both control group and experimental group



Source(s): By authors

Figure 3.
Significance of mean difference between post-test scores on creative thinking of both control group and experimental group

one was selected as experimental group using the random method. The subjects of experimental group were taught by the investigator using the dialogue embedded synectics model of teaching and the subjects of control group were taught by their teacher using the traditional teaching method. The above analysis revealed that initially there was no difference in the creative thinking of the subjects of both the control and experimental groups. But after the exposure of the subjects of the experimental group to the dialogue embedded synectics model, it was observed that the creative thinking of the subjects has been developed considerably, whereas the subjects of the control group who were subjected to the traditional teaching methods did not show any improvement in their creative thinking ability. It happens due to the fact that the dialogue embedded synectics model of teaching provides ample scope for free exchange of ideas, scope for think beyond the text book and encourage for giving innovative answer. This learning environment encourages the students to think out of the box and get opportunity to compare the teaching concept to their familiar things. As a result, the investigator is inclined to conclude that the dialogue embedded synectics model of teaching has a significant impact on the development of students' creative thinking. As we know that this model of teaching is new and innovative, which is why the investigator could not locate the research studies that can support the findings of the present study, therefore, the investigator collected studies related to synectics model of teaching and dialogue mode of teaching separately since the dialogue embedded synectics model of teaching is the combination of synectics and dialogue mode of teaching. As such, the finding of this study corroborates with earlier studies which show the synectics model of teaching has a significant effect on creative thinking (Pany, 2005; Vani, 2012; Siddiqui, 2013; Ali, 2016; Suratno *et al.*, 2019). This teaching model promotes creativity among students by giving opportunity to look the particular phenomenon from a different perspective that helps to inculcate divergent thinking (Shabani, 2011). Further, the synectics model of teaching developed creative thinking among groups of people from a diverse background (Siddiqui, 2013) along with conceptual development (Sierra-Jones, 2011). Further, the dialogical teaching mode supports the stimulation of creativity among students in the classroom contexts (Wegerif, 2005). This teaching technique engages a student in a dialogue by asking non-leading questions, aimed at revealing to the student how much knowledge he or she already has and which kind of reflective self-questioning and co-questioning is intimately related to creativity (Schmoelz *et al.*, 2016). In addition to this, the dialogue learning environment provides freedom to express views, flexibility to adapt learning style, free learning environment and find the solution to problem in a collaborative way. Garaigordobil and Berruoco (2011) considered this learning platform conducive for fostering creativity among students. The dialogue space as a form of group talk promotes inter-thinking (Vass *et al.*, 2014), develops self-confidence and provides a safe learning environment for developing creativity among students (Celume *et al.*, 2019). Hence from the above studies, it may be concluded that both the synectics model of teaching and dialogue mode of teaching have a significant impact on creative thinking of students that supports the finding of this research.

Limitations and further research

Basically, in behavioral science research, the investigator deals with the human behavior, which is dynamic in nature and very complex to study. Hence, it is very difficult to control all the extraneous elements which are supposed to put their impact on the dependent variables other than the independent variable. In this context, the present study has certain limitations: the students of both control and experimental groups differ from each other with respect to their home environment, socioeconomic status, educational qualification of parents and certain other aspects like inner potentiality, curiosity to learn, etc. that are

impossible to control these confounding factors in the class room that might have put their effect on the results of this research. However, this study may be replicated by other researchers that will definitely increase the external validity of the study. The present study can be extended to the population of secondary and higher stage of education and the dependent variables like problem solving, critical thinking, communication skills, reflective thinking, etc. This study can also be extended to the population of other countries of the world.

Conclusion

One of the most important functions of education is to provide the students with the competencies that they need and will need in the future to succeed in society. For today's youth, creative thinking is an essential competence for competing with the present world (Lucas and Spencer, 2017). Creativity opens the hearts and minds of students, allowing them to absorb information more quickly and unlocking their hidden potential. Students do not passively listen/absorb when they engage in creative activities; instead, they explore, discover and communicate. It can assist them in adapting society that is continuously changing and demanding adaptable youths with 21st-century abilities beyond basic literacy. In this context, the present study is aimed to investigate the effectiveness of the dialogue embedded synectics model of teaching on creative thinking. The key finding indicates that students' creative thinking ability can be enhanced by applying the dialogue embedded synectics model of teaching. The metaphoric activities (analogy and compressed conflict) and dialogue (within and among the groups) of this model of teaching creates constructive learning environment, which is conducive for nurturing creativity. This learning platform gives chance to learner to give familiar examples through dialogue that support for gaining conceptual understanding about the concept. The present work is unique in terms of developing an innovative pedagogy, i.e. the dialogue embedded synectics model of teaching which has the ability to encourage students' creative thinking, a key concern for society in the 21st century. Therefore, it is suggested to conduct similar type of studies on this innovative pedagogy and this model of teaching may be used by teachers for enhancing creative thinking of the seventh class learners.

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