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Active learning: an Instructional Technique for Improving Educational Practices

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Abstract: Collaborative and Active-learning techniques are known to many faculties but they are reluctant to use them in their classes. One of the foremost reasons for not implementing the instructional techniques is their perception about it that it takes too much time and the course remains uncovered. The instructor cannot cover as much material in the course incorporating active learning techniques. Secondly, an instructor requires a lot of time preparing lectures with active learning techniques. A growing body of evidence suggests that students learn more information when they are asked to engage it actively (Springer, 1998). Some case studies have been presented in support of the active and collaborative learning techniques which the millennial learners prefer and that proved that students learning will be life-long when engaged in learning material. Collaborative and active learning techniques along with lecture were used in two courses to prepare the students for the workplace.

Keywords: Active learning, course uncovered, life-long learning, millennial learners

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1. Introduction

Students born after 1980's are known as millennial learners. The Millennial learner prefers open, transparent and fair interaction. They learn best when the content is relevant and presented in a rationale manner, when content is presented in multiple modes – visual, audio, games, contests. They are Independent, enjoy researching information and connect well with technology. They have a short attention span. They enjoys social interaction with peers and teachers.

Observing the needs of the 21st century learners active learning has received considerable attention over the last few years. Active learning is generally defined as an instructional method that engages students in the learning process. In short, active learning requires students to do meaningful learning activities and think about what they are doing (Albanese and MITCHELL, 1993).The core elements of active learning are student activity and engagement in the learning process (Prince , 2004)

Collaborative learning is based on the view that knowledge is a social construct. Collaborative activities are most often based on four principles:

(a) The learner or student is the primary focus of instruction.

(b) Interaction and "doing" are of primary importance

(c) Working in groups is an important mode of learning.

(d) Structured approaches to developing solutions to real-world problems should be incorporated into learning.

Collaborative learning can occur peer-to-peer or in larger groups. Peer learning, or peer instruction, is a type of collaborative learning that involves students working in pairs or small groups to discuss concepts, or find solutions to problems. This often occurs in a class session after students are introduced to course material through readings or videos before class, and/or through instructor lectures. Similar to the idea that two or three heads are better than one, many instructors have found that through peer instruction, students teach each other by addressing misunderstandings and clarifying misconceptions (https://www.cte.cornell.edu/teaching-ideas/engaging-students/collaborative-learning.html).

2. Case 1

Methodology of collaborative class

STAD (Student -teams-Achievement Divisions)

To conduct the planned activity - The students were placed in small groups. The class was given the task to design a waste water treatment plant of their city. Each team member designed a unit and the other student will continue to design the other unit of treatment plant. Thus each one will contribute to the other and finally they will compile and draw complete waste water treatment unit.

Individuals were graded on the team performance. Although the tests are taken individually, students are encouraged to work together to improve the overall performance of the group.

Steps taken while conducting collaborative class:

(a) They were provided file pages to design units based on assumptions and then they were supposed to draw those units on the drawing sheet. They had the main goal in mind and they divided the units among them and completed the task. Together working on the project they were enthusiastic. There was good communication among the students and showed leadership skills and they took responsibility of completing the task on time

Few students asked questions regarding assumptions they were to make and if they were having problem deciding what they can assume. What are the variables etc. So there was faculty - student interaction too. The discussion went on among the team members regarding the design whether it was OK or not. Based on SOR when they found that the design was not OK, they worked out the design again with some changes.

(b) Non-participating members were motivated by asking them to what extent they had designed the units and what problems they had been facing. That inquiry and asking few questions about their work engaged them so that they could answer.

(c) After they had completed the task they were sharing the dimension of the units they had framed and the layout of the units. The designs that were best were appreciated and others found where they had been wrong and could modify their designs. Some took time and completed the task later.

Reflections on the collaborative class

i) The first and foremost condition to start collaboration is to set up a common goal because the groups compete with each other. They are eager to fulfill their goal. They have the mindset that they all have a common goal and they would like to be winners. They can also discuss among themselves to find solutions to problems and how others have solved. For that there would be effective communication.

ii) Synchronous communication is essential in collaborative learning. More interaction is there among the students and they are not isolated. They are more confident and learning abilities are more among a group. More discussions and interaction make it really effective. The contribution of each student and discussion, when it is face-to-face the response is immediate. When the questions are asked the answers are received immediately.

iii) As the activity was given to design waste water treatments units. Not more than two groups could choose the same unit. In a group of six, if one person is nominated to represent the group and then all nominated students from each group get together to

select the units they would design . If more than two groups want to design the same units then others have to negotiate. If the team leader negotiates then other team members would not like it. It may lead to group clashes and the situation would be detrimental to collaborative learning.

iv) All collaborative processes are 'cognitively overloading' on learners. I won't say it would be overburden but stress would be there. When the students are given activities in a group where they have to learn by doing things themselves, their cognitive abilities are stretched. There would be brainstorming activity where they have to choose or assume data for designing various units for the water treatment plant.

Table 1: Evaluation of Success (Case 1)

Aspect	Excellent	Very Good	Fairly Good	Unsatisfactory
Deepening the understanding of the Concept		✓		
Promoting Motivation to learn more about the concept/subject	✓			
Encouraging class participation		✓		
Building confidence			✓	
Contributing to the Joy of Learning		✓		

students were actively participating and had great interest but few were sluggish and wanted the team leaders to accomplish the task. They became active when they were interrogated about status of their activity. They were working together on the problem. Few students with less understanding were helped by the team mates to solve the problem and discussed the designing parameters. Finally not all groups were able to submit the sheets with waste water units drawn. Few students asked for additional time to complete drawing -Units on the sheets. They submitted the work the next day.

3. Case 2

Methodology of collaborative class

Active learning was practiced for the course Pollution Control and Safety Management. Carbon Footprint was the topic for which the activities were designed. Brainstorming and think-pair-share was considered

Activity 1: Brainstorming

For brainstorming following question was asked "What are the ways in which one can reduce the carbon dioxide emissions and hence lower its carbon Footprint?"

Students were divided into group size of 5. A Recorder was chosen as the person who is sitting in the middle of the group. Reporter was one whose name comes last in alphabetical order within the group. Each group shared one response in the class first and then cycle continued again for more inputs. The time allotted for the activitiy was 3 min to list own the ways and 2 mins to share and note the points on board.

Activity 2: Think Pair Share

After brainstorming students knew the different ways to reduce carbon dioxide emissions and footprint. In continuation to the above activity the second activity would was performed. Group Size of 2 was formed. Students in pair discussed about their one habit with their partner which they would change to reduce his/her carbon footprint and also quantify how much it will impact. Time allotted was 5 mins to think and calculate 2 mins to share with each other and 2 mins to present each other's views

Reflections on the activities conducted

Since everyone was aware of the pollution and the climate change leading to the rise in temperature so students actively took part in this activity Brainstorming as expected was a bit noisy, even though it was kept under control most of the time. Time limit of 3 mins was too short as informed by the students in their feedback. Giving 5 min next would be more suitable as they had lot many things to discuss upon. While grouping they were reluctant to form groups of instructors choice but eventually they agreed. Activity 2 had a little setback as the students were able to come up with the one change in habit which will bring down their carbon footprint but were not able to quantify by how much? Providing them one example to make them more clear about the instructor's expectations could be done.

A review of research on cooperative learning found

Table 2: Evaluation of Success (Case 2)

Aspect	Excellent	Very Good	Fairly Good	Unsatisfactory
Deepening the understanding of the Concept		✓		
Promoting Motivation to learn more about the concept/subject	✓			
Encouraging class participation		✓		
Building confidence			✓	
Contributing to the Joy of Learning		✓		

that it boosts development of critical-thinking skills and fosters social interdependence and support among students (Slavin, 1996). Further, when compared with more traditional competitive or individualistic learning methods, cooperative learning improves students' attitudes toward their subject area, improves relationships between students, and improves student retention (Johnson & Johnson, 1981, 1989). It has been observed that weighing content coverage against active learning creates a devil's bargain: Either teach more material and have students learn less, or teach less material and have students learn more of it. Little purpose is served by the first choice. Students always will be better educated if we expose them to slightly less content but require them to engage the material (Faust, J. L., & Paulson, D. R. (1998).

4. Conclusion

The results of case studies were overwhelmingly positive and resulted in academic achievement and students benefitted psychologically. The teaching aspect helped the students to understand the courses better and fulfilled the millennial learners needs. Once the active learning strategies are developed it would require less time for preparation and the students too can be responsible for covering the course by participating.

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