Journal of Engineering Education Transformations ,
Volume 31 , No. 1, July 2017, ISSN 2349-2473, eISSN 2394-1707

An Overview of Active Learning Techniques.

Namburu Yamini Gupta[1], B Prakruthi Gowd[2],A Sri Kalyan Chakravarthi[3].
[1]Department of Information Technology,VidyaJyothi Institute of Technology, Aziz Nagar Gate, C.B Post, Hyderabad.
[2]Civil Engineering Department, VidyaJyothi Institute of Technology, Aziz Nagar Gate, C.B Post, Hyderabad.
[3]HR Manager,Capgemini India Private Limited,Gachibowli,Hyderabad.
[1]yamee.namburu@gmail.com
[2]prakruthi1605@gmail.com
[3]kalyanaddagiri@gmail.com

Abstract: Active learning concept itself is multi fold, also a student centric approach in which the responsibility of learning is placed upon the student with collaborationof their classmates. In active learning, teachers acts as facilitators rather than one-waysuppliers of information. The presentation of facts so often introduced through straight lecture, however in Active Learning it is deemphasized in the favour of studentsthrough discussions, problem solving concepts, cooperative learning, and writing exercises. In this paper we have tried to describe various Active Learning Techniques available along with their descriptions, procedures and rubrics so that it would help the Instructor to emphasize the importance of particular subjects. From student's perspective, active learning techniques would unknowingly make them learn teamwork, effective communication, social skills, prioritization of work, practical approach towards theory, and time management.

Keywords: Active learning, Rubrics.

Namburu Yamini Gupta
Department of Information Technology,
VidyaJyothi Institute of Technology,
Aziz Nagar Gate, C.B Post, Hyderabad.
yamee.namburu@gmail.com

1. Introduction

The aim of this study was to provide an overview of the different active learning techniques over a broad range of academic courses. Active learning is a process where the students engage in activities, such as reading, writing, discussion, or problem solving that promote analysis, synthesis, and evaluation of class content. In short, anything the student does in a classroom other than passively listening to an instructor's lecture. This includes everything from listening practices which help the students to absorb what they hear, to short writing exercises where students react to lecture material, to complex group exercises in which students apply course material to "real life" situations to new problems.

2. Benefits of Active Learning

- Reinforces important material, concepts, and skills.
- Provides more frequent and immediate feedback to students.
- Addresses different student learning styles (Audio, Visual,kinaesthetic).
- Simultaneously provides students with an opportunity to how think about, talk about, and process course material.
- Creates a personal connection to the material that, which increases their self-motivation to learn.
- Allows students to practice important skills, such as collaboration, through pair and group work.

- Builds self-esteem through conversations with other students.
- Creates a sense of community in the classroom through increased student-student and instructor-student interaction

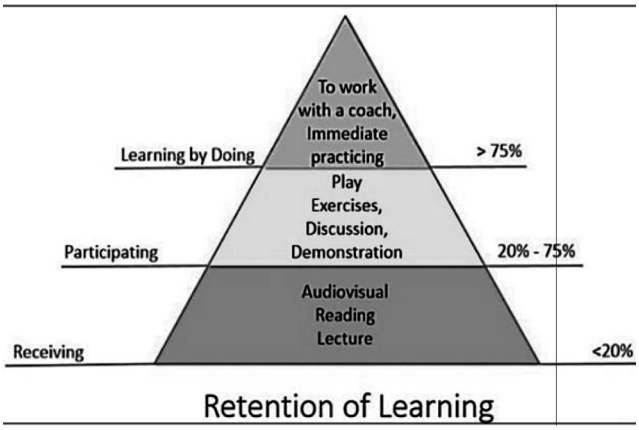

Fig 1 Cone of Learning

3. Techniques for Active Learning

The various techniques available for active learning are described below with their Introduction, Procedure and Rubrics which would help the faculties to use them in their classes basis the subject or module they are teaching in their classes.

A. One Minute Paper

[5] This technique can be used to check the student progress, both in understanding the material and in reacting to course material

1) Procedure:

Ask the students to take out a blank sheet of paper and pose a question (either specific or open-ended)

2) Rubrics:

Marks to be awarded	Identifies and summarizes the problem at issue
5m	Accurately identifies the problem and provides a well defines summary
3m	Identifies the problem but provides a poor summary or identifies an inappropriate problem
1m	Does not identify the problem at all nor provides a proper summary.

B. Student-Created Presentations, Charts, Matrices, Flowcharts, Models:

Students are encouraged to build charts, matrices, flowcharts, and models as contexts for extending their understanding of key course-specific concepts.

1) Procedure:

This Technique can be implemented by providing the basic guide lines and the skeleton for the students to develop their presentation. Faculty remains as a facilitator and limits himself/herself to probe meaningful questions.

2) Rubrics:

Marks to be awarded	Creativity	Presentation	Content
5m	Highly Creative	Powerful Presentation, intelligent use of animation and sound	Meaningful content
4m	Creative	Good Presentation with good use of animation and sound	Good and relevant content
3m	Effective but lacking creativity	Average presentation lacking in captivating the audience	Average content
1m	No Creativity	Poor presentation	Poor content

C. The Fish Bowl:

[1] Students are given index cards, and asked to write down one question concerning the course material. They should be directed to ask a question of clarification regarding some aspect of the material which they do not fully understand or, perhaps we may allow questions concerning the application of course material to practical contexts.

1) Procedure:

At the end of the class period (or, at the beginning of the next class meeting if the question is assigned for homework), students deposit their questions in a fish bowl. The instructor then draws several questions out of the bowl and answers them for the class or asks the class to answer them.

2) Rubrics:

Marks to be awarded	Identifies and summarizes
5m	Accurately identifies the problem and asks pertinent questions
3m	Identifies the problem but asks not very pertinent question.
1m	Does not identify the problem at all nor frames a proper question.

D. Debate:

[1] It is a formal discussion on a particular matter in a public meeting or legislative assembly, in which opposing arguments are put forward and which usually ends with a vote.

1) Procedure:

This technique can be implemented by dividing the Students into debate teams, given a position to defend, and then asked to present arguments in support of their position

on the presentation day. The opposing team should be given an opportunity to rebut the argument(s) and, time permitting, the original presenters asked to respond to the rebuttal. This format is particularly useful in developing argumentation skills (in addition to teaching content).

2) Rubrics:

Marks to be awarded	Content	communication	Body language	Rebuttals
5m	Strong	Initiation, Very effective. Able to convey his/her views	confident	Strong
4m	V good	Effective. Able to convey but not too effectively	Less confident	V good
3m	Good	Had strong views but couldn't convey effectively	Passive and neutral	Good
2m	Fair	Weak in conveying	diffident	Fair
1m	Poor	Couldn't express at all.	Arrogant	Poor

E. Video Synthesises:

A video synthesizer is a device that electronically creates a video signal. It is able to generate a variety of visual material without camera input through the use of internal video pattern generators. This helps in developing the analytical abilities of students and help them forecast the intangibles.

1) Procedure:

Students are shown a movie clip of 8-16 minutes' duration. They are then expected to synthesize (not summarize) the essence of the clip in not more than 8-10 words or 3 bullets. This technique not helps in developing the analytical skill and critical thinking, it also improves the vocabulary and hence articulation as the student has to describe the whole clip in condensed language.

2) Rubrics:

Marks to be awarded	Able to analyse, synthesise and succinctly describe with minimal usage of words.
5m	Excellent analysis, brilliant synthesis and accurate description.
3m	Good analysis, but a little verbose.
1m	Inability to either analyse or synthesise correctly or able to articulate well.

F. Quiz/Test Questions:

[3] Here students are asked to become actively involved in creating quizzes and tests by constructing some (or all) of the questions for the exams.

1) Procedure:

This exercise may be assigned for homework and itself evaluated (perhaps for extra credit points). In asking students to think up exam questions, we encourage them to think more deeply about the course material and to explore major themes, comparison of views presented, applications, and other higher-order thinking skills. Once suggested questions are collected, the instructor may use them as the basis of review sessions, and/or to model the most effective questions. Further, faculty may ask students to discuss the merits of a sample of questions submitted; in discussing questions, they will significantly increase their engagement of the material to supply answers. Students might be asked to discuss several aspects of two different questions on the same material including degree of difficulty, effectiveness in assessing their learning, proper scope of questions, and so forth.

2) Rubrics:

Marks to be awarded	Identifies and summarizes the problem at issue
5m	Accurately identifies the problem, effective in assessing, proper scope of questions
3m	Identifies the problem but provides a poor assessment or identifies an inappropriate problem
1m	Does not identify the problem at all nor provides an effective assessment or scope of questions

G. Brain Storming Sessions:

It is a group creativity technique by which efforts are made to find a conclusion for a specific problem by gathering a list of ideas spontaneously contributed by its members. This technique will provide a non-structured option of discussing the topic.

1) Procedure:

The faculty can act as an observer and divide the class into groups of 8-10 members. Declare the topic and allow five minutes of time for preparation. Allow the teams to discuss on the topic for 15 minutes. Faculty must control the flow of discussion ensuring that there is no chaos and the process goes smoothly.

2) Rubrics:

Marks to be awarded	Content	Defining the topic	IInd level of brain storming: Creating new ideas out of the given topic	IIIrd Level of Brain storming: Innovating the idea.
5m	Strong	Able to define the topic and offer strong views	Able to create new ideas	Able to innovate the 2nd level
4m	V good	Able to define the topic and offer good views	Less confident	Partially successful in innovating
3m	Good	Able to define the topic and offer fair views	Passive and neutral	Unable to offer much, but active
2m	Fair	Weak in conveying	Diffident	Diffident
1m	Poor	Couldn't express at all.	Offers no new insight.	Offers no new innovative ideas.

H. Immediate Feedback:

[1] These techniques are designed to give the instructor some indication of student understanding of the material presented during the lecture itself. These activities provide formative assessment rather than summative assessment of student understanding, Formative assessment is evaluation of the class as a whole in order to provide information for the benefit of the students and the instructor, but the information is not used as part of the course grade; summative assessment is any evaluation of student performance which becomes part of the course grade.

1) Procedure:

For each feedback method, the instructor stops at appropriate points to give quick tests of the material; in this way, she can adjust the lecture mid-course, slowing down to spend more time on the concepts students are having difficulty with or moving more quickly to applications of concepts of which students have a good understanding.

2) Rubrics:

Since this is only a formative assessment and not a summative assessment, no Rubric has been provided.

I. Case Study:

A process or record of research into the development of a particular person, group, or situation over a period of time. An analysis of a particular case or situation, either real or constructed, that is used as a basis for the application of knowledge and/or drawing conclusions in similar situations. 1) Procedure:

The Instructor should provide a case which could be a person or a group or a unit or a corporate division. The case study can be exemplary, cautionary, or instructive. Exemplary and cautionary case studies are presented in total to serve as a model for success or failure, for example. Instructive case studies can present problems that require identification through clues, symptoms, or outcomes and consist of background information that can be ambiguous, incomplete, or hidden.

2) Rubrics:

Marks to be awarded	Identifies and summarizes the problem at issue and reaches a conclusion.
5m	Accurately identifies the problem, effective in assessing and reaching a convincing conclusion.
3m	Identifies the problem but provides a poor assessment or reaches an inappropriate conclusion.
1m	Does not identify the problem at all nor provides a effective assessment or a definitive solution.

J. Puzzle, Enigma, Contradiction:

[1] Information presented to student that is accurate, but is either incomplete, ambiguous, or paradoxical in nature.

1) Procedure:

The Faculty provides only partial information about the project. 2. The students then are expected to develop the entire project by researching from internet, books or other sources.

2) Rubrics:

Marks to be awarded	Identifies the question and is able to l ead to unexplored areas or fosters cognitive dissonance.
5m	Accurately identifies the question and leads to probing answers.
3m	Identifies the question but is unable to provide satisfactory answer.
1m	Does not identify the problem at all.

K. Statement-Opinion-Summary:

This technique willprovide an arguable statement and ask student to submit their opinion on it through a write up after allowing discussion.

1) Procedure:

The Faculty provides an arguable statement. The students then discuss that statement and offer their opinions. They then submit a write up of the same.

2) Rubrics:

Marks to be awarded	Identifies the question and is able to lead to Identifies the question and is able to lead to unexplored areas or fosters cognitive dissonance.
5m	Accurately identifies the question and leads to probing answers.
3m	Identifies the question but is unable to provide satisfactory answer.
1m	Does not identify the problem at all.

L. Peer Review:

[2] Evaluation of scientific, academic, or professional work by others working in the same field. Students will review and comment on materials written by their classmates.By using this technique, the student can gain additional knowledge.

1) Procedure:

Often students appear dissatisfied with the teacher's appraisal. This provides a platform for student's participation. Students are given material prepared by their peers. They are expected to review and comment on that material.

2) Rubrics:

Marks to be awarded	Appraises critically and offers comments on peer's material.
5m	Expertly reviews the material and offers intelligent comments.
3m	Reviews well the material and offers good comments.
1m	Fails to either review the material well or offer good comments.

M. Just In Time Teaching:

[3] Students read assigned material outside of class, respond to short questions online and then participate in collaborative exercises the following class period.

1) Procedure:

The Faculty provides material in advance. Students read this material outside the class and respond to short questions online. In the following period, students will participate in collaborative exercises.

2) Rubrics:

Marks to be awarded	Identifies the question and is able to lead to unexplored areas or fosters
5m	Accurately identifies the question and leads to probing answers.
3m	Identifies the question but is unable to provide satisfactory answer.
1m	Does not identify the problem at all.

N. Peer Survey:

[2] Each student is given a grid that is to be filled in according to the needs of the group. Students/group members can be instructed to fill in the grids on their own or they can collect statements from peers and then share in small/large groups. Groups can then generate and share conclusions.

1) Procedure:

The Faculty divides the class into groups and provides only partial information about the project. They are given grids to be filled in according to the needs. Groups generate and share conclusions.

2) Rubrics:

Marks to be awarded	Being a group task, the team can be reviewed in a group. Which group generates and s hares the conclusions effectively.
5m	Collates information and generates conclusion and shares exceptionally.
3m	Collates information and generates conclusion well.
1m	Does not identify the problem at all.

O. Role Playing:

[1] The instructor provides either real or imaginary contexts along with a range of relevant characters/roles; students are encouraged to research these contexts, characters, and/or roles, and then to improvise dramatic interactions among their characters during class periods.

1) Procedure:

The Faculty provides a situation for example inside a bank. The students then are expected to use their creativity in playing different roles.

2) Rubrics:

Marks to be awarded	Identifies the offered role and plays it with perfection.
5m	Accurately identifies the role and performs it admirably.
3m	Accurately identifies the role and performs it satisfactorily.
1m	Does not identify the problem at all.

P. Student Field Work with Reflection:

Any number of organized or individual instructional experiences that are held outside the classroom. Their design is meant to be as authentic as possible or as the instructional topic permits. Students are usually asked to journal, report, or otherwise produce documentation and/or their impression of the experience.

1) Procedure:

The Faculty assigns projects that are conducted outside the classroom. Students can be formed in groups. Students submit a journal or report or any other documentation.

2) Rubrics:

Marks to be awarded	Identifies the offered role and plays it with perfection.
5m	Accurately identifies the role and performs it admirably.
3m	Accurately identifies the role and performs it satisfactorily.
1m	Does not identify the problem at all.

Q. Inviting Effective Guest Speakers:

Adding the voice of an especially knowledgeable and instructionally effective invited speaker can bring both outside authority and possibly enhanced student inspiration to classroom. In short, the thoughtful selection of one or more potential guest speakers, combined with skilful pre-class planning to adequate prepare both the speaker and students, this can excite student interest in a topic and stimulate lively atmosphere in-class discussion.

Rubrics: Since this is only a formative assessment and not a summative assessment, no rubric hasbeenprovided.

4. Scope for future work

The implementation of these techniques has not been done to come up with any numerical case study. So, the above stated methods could be applied in the classrooms and numerical studies can be made from the results obtained to understand the relevance of each technique in a particular chapter or subject, as well as to know to what level the improvement is achieved using them.

5. Conclusion

Active learning is a term that comprehends a wide range of pedagogicapproaches, which have been used in both schools and universities over a long period. There is evidence that where we wish to engage students through active engagement in a life-long learning process that promotes reflection and the use of higher order in academic skills such as analysis, synthesis and evaluation, Active learning requires teachers to reconsider their role and acknowledge that importance of student learning styles. By implementing the above mentioned techniques, students will be able to learn more and will implement the knowledge for any real time project.

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