



BEST PRACTICES FOR INVOLVING STUDENTS IN LEARNING - AN EXPERIENTIAL APPROACH TO INCREASE THE RATE OF LEARNING OF ENGINEERING STUDENTS

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Abstract:

Learning is an activity or the process of gaining knowledge or skill by studying, practicing, being taught, or experiencing something. In this study, an effort is made to study the changes in the rate of learning of the Engineering students in the Irrigation Structure Design and Drawing subject, after actual exposure to the existing structure. It was found that the rate of learning of the two dimensional drawing of the Irrigation structure was greatly increased for the batch of students those who were exposed to the real structure. More than 90 percent of the students could understand the structural components when it was taught in the class easily after exposure to the existing structure, which was otherwise around 15% to 20 %only. Time taken to teach the concepts reduced to around 25%. Students were made to involve in learning by taking them near the actual structure and also some activities, like measuring the side slope of the earthen dam embankment etc. are deliberately done to help the students to understand the three dimensional structure and imagine the same in the classroom. It was found that the experiencing helped the students to increase the comprehensiveness in their learning. Concept of sand modeling for the student involvement in learning and pre-preparedness to attend the classes by the students were also found useful in student centric learning.

Index Terms: Irrigation Structures, Rate of Learning, Sand Modeling & Pre-Preparedness

1. Introduction:

Learning is the act of a person who gains knowledge or skill. Even the knowledge or skill is gained from teaching or study. As per Psychology learning is the modification of behavior through practice, training, or experience. Participation is a way to bring “students actively into the educational process” and to assist in “enhancing our teaching and bringing life to the classroom”

Learning is a cycle of concentrating, reasoning, understanding, practicing and teaching. Many learn only when they start teaching the learnt concepts. Prevailing Examination evaluation systems fully cannot find the learning because, evaluation is done based on what is written in the answer script not actually what is learnt, or understood. Sometimes it becomes evaluation of memory rather than the outcome of learning. So learning procedure, to some extent may be told that it is complete when a person teaches the learnt concept effectively to his students and makes them understood.

Understanding needs remembering conceptual key things, reasoning amongst them, accepting the relation and coming to an agreement of thoughts. This process needs good imagination, clarity of thoughts, mental capability, and level of pre-adaptation to the concept by the history and scope of previous learning pattern.

Participation is a way to bring “students actively into the educational process” and to assist in “enhancing our teaching and bringing life to the classroom” (Cohen, 1991).

The more they participate, the less memorization they do, and the more they engage in higher levels of thinking, including interpretation, analysis, and synthesis (Smith, 1977). Students have been found to earn higher grades as their participation increases. (Handelsman et al., 2005). Although instructors, researchers, and students all appear to recognize the importance of and seemingly want to increase participation, many Students do not participate for multiple reasons (Kelly A. Rocca, 2010).

2. Rate of Learning:

It is observed that some students learn the concepts at a faster rate compared to others. Rate of learning depends upon individuals,

- ✓ Basic knowledge on the concept.
- ✓ Importance given by the students to the topic.
- ✓ Pressure of learning.
- ✓ Interest of learning.
- ✓ Intelligent quotient.
- ✓ Mental Adoptability

Also depends upon the

- ✓ Pedagogy followed by the teacher
- ✓ Clarity of thoughts of the teacher
- ✓ Flow rate of thoughts
- ✓ Planning the delivery to attract concentration of the learners.
- ✓ Soft skill of the teacher and personality

Learning procedure is a complex of all these variables which are directly and indirectly influencing the rate of learning. Ways to involve students in learning.

- ✓ Best teaching
- ✓ Experiencing
- ✓ Discussing
- ✓ Adapting
- ✓ Brain storming
- ✓ Solution finding
- ✓ Innovating

3. Student Involvement:

Problem Definition:

Concept of understanding three dimensional models with the two dimensional figures are always difficult to the students because it needs of the good imagination. Teaching such concepts to the students is a challenge to the teachers. In engineering there are many subjects which are really interesting but need good imagination and basics to understand. In this paper teaching the Irrigation Design and Drawing for a section of student is taken and appropriate student involvement is tried to increase the learnability of the students in that portion of the syllabus.

3.1 Student Involvement 1:

Engineering students are to learn the design and drawing of the irrigation structure in the 6th semester of the university. In this paper particularly learning ability of the students with respect to design and drawing of earthen dam with weir is studied. The problem in front of the teacher to teach this drawing is

- ✓ It is a complicated structure which requires the good imagination
- ✓ Drawing involves number of projected lines in its three views, i.e. front, side and sectional view.
- ✓ There are many components which requires the 3 D imagination to draw the drawing of the structure

- ✓ It is having the earthen slopes, bank connections foundations, weir structures sluices, water levels, protection works etc.

Often it is felt difficult to teach at a stretch all the components of the drawing. So the rate of learning is very slow, imagination of the students of the structure either slow or wrong. How to involve and evoke the interest of student and increase the rate of learning is the question.

Action Plan and Activity 1:

It was decided to involve the students to learn this structure by taking the students to the real dam site where the similar structure is available. 100 students were taken to the site and they are briefed regarding various components, purpose of various components and their relationship with other components. The various views to be drawn in the class were made to understand at the site itself. Some of the drawing parts are drawn on the spot itself. Appropriate audio system and good number of faculty members were available at the site to make the effort more effective. To make the structure familiar to the students, actual measurement of the various parts of the structure was done. Some of the minor details which can be found out on the spot like the side slope of embankment of the earthen dam, bed slope of canal, dimensions of water cushion etc. Students were made to spare more than 6 hours at the structure. Video and photographs of the structure are taken to aid in class room teaching.

Result of Student Involvement:

Since the event was breaking the monotony of the class room teaching, all the students were involved actively, since it was a group work, various teams were self motivated and required activities were done with great enthusiasm. Students themselves started appreciating the structure, which they have studied in the class theoretically. Impression of being near the structure was totally different and learnability was at the peak. Many questions were raised by the students regarding the functionality of the structure and also they have understood many concepts on the spot.



Figure1: Students at the Irrigation structure site

After the visit, it was a very good experience to teach the same structure in the class. Students understand the concepts and sub concepts very clearly. Good reference and good experiential memory lead to fast understanding of the concepts with minimum or no stress

Most complicated things to imagine had become sweet memories. Learning environment which was tense had become easy and loving. Rate of learning went many folds. Understanding level went up exponentially.

It is a simple case of student involvement in learning, even though it is difficult to take the students to the site very often; it will be really useful when the outcome of learning is substantial.

3.2 Student Involvement 2:

To teach the students the concept of the Dam, reservoir, and canal distribution system by the process of student involvement. It is very difficult to make the students to understand the total concept of integrated water supply to the cultivable command area and control the supply of water to avoid under or over irrigation to the required crop.

Problem Definition:

Intention of the teacher is to teach the students the concept of irrigation by Student's involvement. Normal teaching will not clear the overall concept. Bed slope of canal, canal drop structure, canal in embankment, canal in cutting, canal partially in cutting partially in filling, sluice level in the reservoir and the canal bed level all these aspects are to be understood by the students.

Action Plan and Activity:

Since seashore is accessible, activity of sand modeling by the students was planned to involve the students in learning. Students were divided into number of groups and a competition was conducted to make the sand model of the complete canal distribution system and a prize was announced to a good technical model.

Students were divided in to ten groups and each group consisting of 10 students were given 2 hours of duration to make the models of the canal distribution system. The basic concept of the system was explained earlier itself to the students, and the good integrated model with proper technical details were expected from the students. Students had shown good interest and very much involved in bringing out a good model by sharing the ideas amongst themselves to make appropriate and creative model.

Result of Student Involvement:

Here also learning happened because of the technical reasoning and conceptual evaluation. Comparative study of the different models of the different groups made a great impact on learning. Mistakes were shown in the various models, and the better ones were appreciated.

As a result of student involvement in the learning, concept clearing in this particular portion of the syllabus had become very easy in the class. Since it broke the monotony of the classroom teaching, sustaining the student interest also became easy which is very important in the teaching learning process.

3.3 Student Involvement 3:

For any student, class room understanding will happen only if he is in touch with the portion covered in the previous class. Many times, the chain of understanding will be lost because the student is not pre-prepared to attend the class and understand the concept. Many students those who are not having good academic habits are facing the problems of not understanding the concepts. Absenteeism is also a reason for the students to face these problems.

So it is very difficult to make a good percentage of students to involve and to have concentration in the class on the topic covered on a particular day.

Assumption made in this activity of student involvement was that if a student go through the portion covered in the previous class before entering a particular day's class, his learnability will improve in the class.

Problem Definition:

There is a problem amongst student's community of not preparing to attend a class and take full use of the class. Very few students are academically disciplined and

major percentage of the students is not taking the best advantage of the class room teaching. How to make student pre- prepared to attend the class and make them to involve in the class room teaching is a question to be answered.

Action Plan and Activity:

All Students of a particular class were told to manuscript write and practice the portion covered in the previous class on a sheet of paper separately for the all the subjects and submit end of every week. Students were reminded of the work time to time.

Result of Student Involvement:

- ✓ Students have submitted the report around 25 pages per subject totaling around 100 pages for four subjects in 20 days.
- ✓ Procedure had made the students to be in touch with the subjects
- ✓ Students were busy and academically oriented during that period.
- ✓ Students those who were not practicing manuscript writing earlier were very uncomfortable.
- ✓ Benefited the students those who were regularly doing the academic work
- ✓ Percentage of student involving in the class increased.
- ✓ Quality of answering improved.
- ✓ Not liked by the students those who were not having habit of writing and learning.
- ✓ Some students expressed that it was waste of time.
- ✓ Liked by the students those normally write and learn.

4. Conclusions:

- ✓ It was found that the rate of learning of irrigation drawing by the students was greatly increased when they are exposed to real structure.
- ✓ Student involvement in model making of the academic concepts greatly increased the comprehensive learning.
- ✓ Pre-Prearedness to attend the class always help to increase the efficiency of classroom learning.

5. References:

1. Cohen, M. (1991). "Making class participation a reality". PS: Political Science & Politics, 24,699-703. (IT).
2. Handelsman, M. M., Briggs, W. L., Sullivan, N., & Towler, A. (2005). A measure of college student course engagement. The Journal of Educational Research, 98, 184-191. (ES).
3. Kelly A. Rocca (2010) "Student Participation in the College Classroom: An Extended Multidisciplinary Literature Review" Communication Education, Vol. 59, No. 2, April 2010, pp. 185-213.
4. Smith, D. G. (1977). "College classroom interactions and critical thinking". Journal of Educational Psychology, 69, 180-190. (ES.)