Case Study: Visual Problem Solving Activity

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Abstract: There is a study which concluded that graphic organisers and visual solving includes student performance throughout the engineering education system. By developing this activity the higher order thinking and time management Skills are enhanced by learning the basics of research by finding the visuals and appropriate data for the given topics. This study examines that students are allotted with different topics and were asked to make use of technology to present it visually with less text and solve a problem related to the topic. Topics were changed by students as they were not comfortable with that particular allotted topic**.** Managing students during the activity, analysis of parameters and evaluation is represented in this paper. Limitations of the current study and recommendations for future research are presented.

Keywords: collaborative skills, peer learning, time management, designing process of activity, process of evaluation, online convertor, windows movie maker.

1. Introduction

It is commonly believed that the problem solving activity is related to the likelihood of increased student knowledge and performance in the examinations. A lot of research has been done in the area of visuality for influencing students.[3] Oluwatosin Alabi described students' computational practices for processing domain relevant knowledge and their strategies for finding out the solutions. In addition, the differences in students' problem solving processes using hand-written and coded methods of computing are highlighted and discussed. The results of this study will be useful in expanding the current work that investigates the role of computing and representational systems in supporting learning in engineering education and will provide insights into how students process knowledge when provided with simulation tools and computational methods for solving design problems. while those with poor lecture have achieved poor results in the examinations [4] Since 2004 Prof. Ralph Ocon has been using a Problem-Based Learning (PBL) approach to teach "Creativity in Business and Industry," which is listed as OLS 350, in the Construction Science and Organizational Leadership (CSOL) Department have drawn a distinction between well-defined and ill-defined problems like during problem solving the path to the intended goal is uncertain. This characterization describes much of what people do. Students' scores in the examinations are considered to reflect their learning. And class attendance is likely to be beneficial for learning, irrespective of teaching modes used and learning experiences provided. This, then, leads to the question, 'Are students motivated to learn? And if so, do they translate their motivation into their behaviours of student. [6]. Prof.Zahed Siddique reviewed that Globalization has put engineering education and the profession at a challenging crossroad. On one hand, the impact of rapid technological innovations on modern societies has been amplified by the globalization of the economy. Hence, better living standards afford increasing equity in education. Despite this fact, students' graduation percentages in U.S. engineering schools have been decreasing over the years 4-5 with the exception of top academic institutions6-10. The competitiveness of the U.S., which is linked to our standard of living, is dependent on our ability to educate a large number of sufficiently innovative engineers. [1].Dr. Sanjay Jayaramin his literature says complete Active learning has several facets, including, collaborative learning, cooperative learning, problem-based learning, project-based learning, case-based learning, discovery learning, and just-in-time teaching. Here in this paper based on Visual problem solving an activity is designed, where the students are allotted with different topics and asked to make use of technology to present it visually with less text and solve a problem related to the topic.by planning and study management?. This paper aims to examine the relationship between student peer learning and problem solving activity through visuality as majority students are interested to use technology. We have this activity the result was awesome and exemplary.

2. Background

Research done so far mainly focuses on the normal classes held without activity leading to poor academic achievement. It was found that the rate of academic result decreases from the beginning to the end of the semester and there is a moderate correlation of academic result with grade for undergraduates (N=120) pursuing bachelor of technology at Hyderabad institute of technology and management where N= no of students. It has been found that there is a positive association between facilitator and students.Solving problems will be a useful learning material to the students and also fun as they try to solve in visual manner like in the form of

video.It had a lot of variations with students changing topics they were not feeling comfortable for those topics. Facilitator kept solving the deadlocks faced by students. Feedback of the students say that activity was good and it help them doing problem and understanding the concept. They want such type of activities but with more time. As per the topic allotted student need to search data use text book, reference book, web data, if needed use help of facilitator.

The two sections are being named as 1ECE-A = target group and 2) ECE- B = Expert group

- Target group: These groups of 60 students are getting training about the tools to be used to develop the content and make video of it. (Image with a student explaining the software can be seen attached to this mail is target group)

- Expert group: This group of students are given liberty to use any tools of their choice and not being trained.(Image with student working on their own can be seen with me and my colleague facilitating them)

3. Method

A. Participants

This study was conducted on students completing the course "Probability Theory and Stochastic Process" and "Signals and Systems" of second year Electronics and Communication Engineering (ECE). Two classes having PTSP and SS in their curriculum with a total strength of N=120 were subjected to this mode of problem solving activity. They were divided into 2 groups and activity is done.

B. Procedure

Visual problem solving activity is designed, where the students are allotted with different topics and asked to make use of technology to present it visually with less text and solve a problem related to the topic. Since it requireS lot of time, facilitator have dedicated her two hours out of five for this activity in lab per week for both sections.The rubric designed is in holistic style to make implementation easier. As per the topic allotted student need to search data use text book, reference book, web data, if needed use help of facilitator.

Note: Total marks for the activity is 50 which will scale down to 10 marks of the Lab (10M for day to day evaluation outcome achieved).

Fig 1 students accessing different softwares

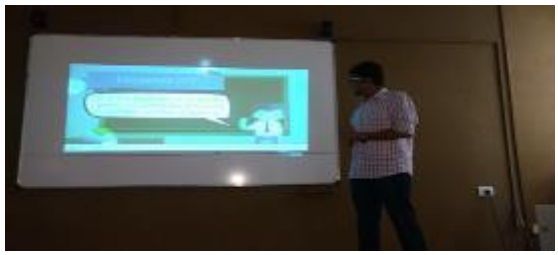

Fig 2 video presentation

Resources

1. Computer Lab with 60 system capacity Projector setup.
2. Audio system
3. Internet Connection
4. Software tools, Ms-Office, Paint, Online converter, Windows movie maker.
5. Facilitators

Tools used

It is observed that the following tools are used ,

1. Ms-Office
2. Online Video Converter
3. Movavi Converter
4. Powtoons
5. Gif Filter
6. Filmora
7. Snipping Tools

4. Results

Over all good learning has happened. Students had fun while learning. Instructor has kept facilitating and open deadlocks faced by students. Feedback of the students say that activity was good and it helped them in solving problems and getting thorough in concept. They want such type of activities but with more time.

Analysis of marks:

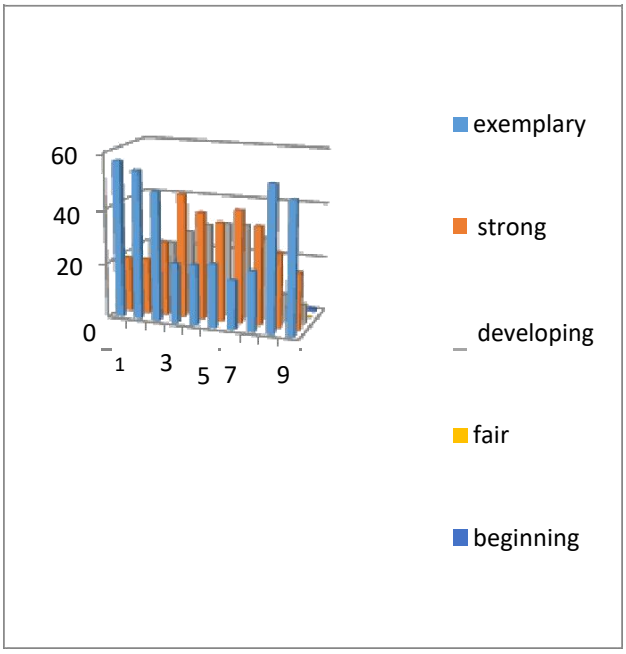

Fig 3 Performance of students in different stages

Complete analysis of marks is obtained only through facilitator for the grading of marks and the performance
The above fig 3 shows the analysis of parameters and the evaluation scale which shows the number of students who stood exemplary, strong, developing, fair, beginning for each parameter

a. **Beginning**: This is the lowest level indicating that the student is having difficulty understanding the material and requires help in meeting an acceptable performance level.
b. **Fair:** indicates students understood the material but requires help in meeting acceptable performance level.
c**. Developing**: Indicates that the student is on the way to meeting the expectations.
d. **Strong**: This level indicates that students are good at performance but couldn't come up with a proper solution to the problem.
e. Exemplary: This is the highest level indicating that the student has met and exceeded all expectations

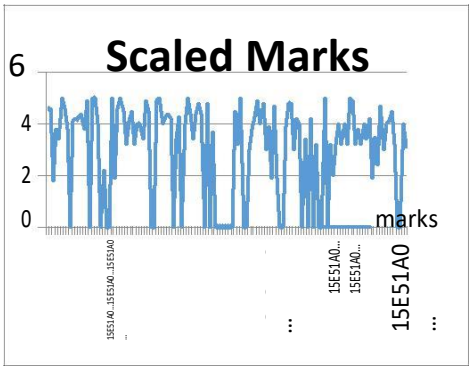

Fig 4 Graphical representation of Average marks Obtained

Fig 4 shows the graphical representation of average marks obtained which is 3.5.

Table1 Sample feedback taken from students

Roll Number	Learning's	Challenges	Tools	Feedback
15E51A0411	Ppt to video conversion	Presentation	Movavi	Practical problem.
15E51A0414	Visualization	Searching data	MS Ppt	Helpful
15E51A0418	Animation	Sound	Biteable, PowToon	Good
15E51A0434	Animations	Conversion	Transition	Nice
15E51A0467	Conversion	Conversion	Snipper tools	Different

Overall Feedback received from the students is Innovative, Interesting Helpful, New, Different and good learning experience as seen in table 1.
Peer learning is one of the best ways of learning as students learned from each other and even instructor learned a lot from them including new software's they used, way of delivering or presenting topic visually.

5. Challenges faced by the students

It is observed that the following are the challenges faced are
1. Technical issues
2. Not familiar to the software
3. Finding content
4. Converting PowerPointPresentation to video
5. Adding Voice.

6. Student learning's from the activity

1. Solve problem which will be useful learning material to their peer students, fun in visual manner.
2. Design their own presentations using PowerPoint and movie maker in effective manner.
3. Learn the basics of research by finding the visuals and appropriate data for the given topics.
4. Learn to use software tools prescribed and not prescribed at the beginner's level.
5. Give presentations with their voice in the form of video.

7. Challenges faced by the facilitator

1. Designing activity within scope of class hours.
2. Designing evaluation scheme was difficult as facilitator have only 5marks of assignment in her hand.
3. Software tools was also challenge, as it was working on some system and not working while presenting
4. Different types of files made, unable to open them while presenting
5. Time management also a challenge, as the presentation and arrangement of student and execution was taking time.
6. Mentoring, facilitating and managing was biggest challenge as the class size was large and I was the only facilitator from 2nd week
7. Topics were changed by students as they were not comfortable with those allotted topic.
8. Managing students during the execution of the activity in first week for section A was difficult when student trainer was giving training about software tool as some of the students were already aware of the software.
9. Maintaining discipline for peer learning activity is difficult as students need to talk to each other.
10. Providing good software tool was also a challenge as systems, laptop of different compatibility.

8. Facilitator learning's

1. Designing process of the activity
2. Designing process of evaluation
3. Time management
4. Collaborative skills
5. Managing, mentoring, facilitating students.
6. Importance of documentation and learned documenting.
7. Consolidating the data and analysing short comings and outcomes achieved.

9. Discussion

Peer learning is one of the best ways of learning as students learned from each other and even facilitator learned a lot from them including new software's they used, way of delivering or presenting topic visually. Managing students during the execution of the activity in first week for section A was difficult when student trainer was giving training about software tool as some of the students were already aware of the software Overall Feedback received from the students is Innovative, Interesting ,Helpful. Because we have designed this activity within class hours, all the students need to manage time also. Software tools was also challenge, as it was working on some system and not working while presenting. Different types of files made and they were unable to open them while presenting. Such that a challenge, as the presentation and arrangement of student and execution was taking time. Mentoring, facilitating and managing were biggest challenge as the class size was large. Topics were changed by students as they were not comfortable with those allotted topic.

10. Limitation & Recommendations

The findings of this study are to be viewed in the context of some limitations. It had a lot of variations with students changing topics as they were not feeling comfortable for those topics. Use of other softwares after learning from peers and technical issues. The study is based on a single college sample, drawn from an urban context, where the importance laid on education could be more compared to a rural college. A sample drawn from a rural setting, perhaps, would show whether the same results of correlation could be identified in the engineering course. Motivation to a criterion variable such as, final grades. In addition to self-regulatory behaviours such as study planning and study management which are used to measure motivational behaviours, class room engagement could also be observed and used in the analysis to assess student motivation. Maintaining discipline for peer learning activity is difficult as students need to talk to each other. Providing good software tool was also a challenge as systems, laptop of different compatibility.

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