

Picture Pieces Activity: An effective Team Building Strategy

Rohith Hallur¹, Preeti S. Pillai², Gopalkrishna Joshi³

¹Centre for Engineering Education Research, K L E Technological University, Hubballi, India

²School of Electronics, K L E Technological University, Hubballi, India

³Centre for Engineering Education Research, Department of Computer Science and Engineering, K L E Technological University, Hubballi, India

¹rohith.hallur@bvb.edu ²preeti_pillai@bvb.edu ³ghjoshi@bvb.edu

Abstract: Practice of Engineering Profession requires Engineers having the ability to work in teams. This is well articulated in Graduate Attribute 9 of Washington Accord. Furthermore, engineering problem solving requires multi-disciplinary skills. This necessitates the need for engineers to be able to work in multi-disciplinary teams. The challenge for academia is to make the “Future Engineers” to understand the need for working in teams, with multi-disciplinary skills. Projects during Engineering are an important part of engineering curriculum. These projects offer learning contexts, which enhance student learning. The challenge for academia is to make the students realize the importance of “Project management” which is an art of managing the project and its deliverables with a view to produce finished products or service. Accomplishing this goal requires that all team and team members work together with a common Strategy and Goal. Keeping this in mind, an activity was designed in “Project Management” module, in a course titled “Engineering Exploration”. This course is designed for freshman engineering students of undergraduate program in KLE Technological University, Hubballi. Through this activity called “Picture Pieces Activity”, the authors have attempted to communicate to students

- 1) The need to work in team in order to successfully accomplish a given task.
- 2) The factors that contribute to effective team execution of a project

This paper shares the details of the activity, the experiences of authors and the learnings in doing this activity.

Keywords: Multi-disciplinary, Graduate Attribute, Project management, Exploration, Freshman.

1. Introduction

With the shift from a predominately instructive to constructivist pedagogy the need for educators to use a variety of teaching strategies and methods is becoming increasingly important. Learning designs need to incorporate student-centered team based learning pedagogy such as project-based, case-based, inquiry-based and problem-based scenarios. Students need to be immersed in learning environments that promote real learning in real contexts. Teamwork help to promote learning that occurs through interaction, problem solving skills, cooperation and collaboration. The process of working collaboratively with a group of people in order to achieve a goal. Team work helps together everyone achieve more. Any team has a common goal and the team members can develop effective, mutual relationship to achieve this team goal. Teamwork relies upon individuals working together in a cooperative environment to achieve

Rohith Hallur

Centre for Engineering Education Research,
K L E Technological University, Hubballi, India
rohith.hallur@bvb.edu

common team goals through sharing knowledge and skills. Successful teamwork relies upon synergism existing between all team members creating an environment where they are all willing to contribute and participate in order to promote and nurture a positive, effective team environment.

Research has provided a number of attributes required for successful teamwork as follows.

- i. **Commitment to team success and shared goals:** Team members are committed to the success of the team and their shared goals for the project. Successful teams are motivated, engaged and aim to achieve at the highest level.
- ii. **Interdependence:** Team members need to create an environment where together they can contribute far more than as individuals. A positive interdependent team environment brings out the best in each person enabling the team to achieve their goals at a far superior level. Individuals promote and encourage their fellow team members to achieve, contribute, and learn.
- iii. **Interpersonal Skills:** Includes the ability to discuss issues openly with team members, be honest, trustworthy and supportive and commitment of work towards team. Fostering a caring work environment is important including the ability to work effectively with other team members.
- iv. **Open Communication and positive feedback:** Actively listening to the concerns and needs of team members and valuing their contribution and expressing this helps to create an effective work environment. Team members should be willing to give and receive constructive criticism and provide authentic feedback.
- v. **Appropriate team composition:** It is essential in the creation of a successful team. Team members need to be fully aware of their specific team role and understand what is expected of them in terms of their contribution to the team and the project.
- vi. **Commitment to team processes, leadership & accountability:** Team members need to be accountable for their contribution to the team and the project. They need to be aware of team processes, best practice and new ideas. Effective leadership is essential for team success including shared decision-making and problem solving.

This activity was planned to make the students realize the importance of team work. When a given task needs a team work then there is no meaning in working in isolation, rather they have to build an effective team and work in team in coordination with each other to get good results at the end.

The students will understand that for any built team to be successful they should

- Agree upon goals.
- Define clear roles.
- Define procedures.
- Develop good interpersonal relationships.
- Define leadership roles.

Traditional approach of teaching team work is to give some example or case studies. Hence an attempt has been made to change this approach to real time situation based through an activity called "Picture Piece Activity". This activity gives them a real time environment to understand the role of an individual in a team to accomplish the team goal. Further the paper presents the activity details, its implementation, its outcomes, reflections, the results and conclusion.

2. Activity Outcome

Some of the studies have shown that teams create synergy and also they can help ensure that the performance of the whole (team) is greater than the sum of the parts (individual) [4]. Talking about building an effective team with theoretical methods is conventional method but in real time, to make a student understand the importance of an individual in a team is difficult. The main objective of this activity is to make student to experience difference between working as individual later combining their work and working as a whole (team), with common purpose and performance goal.

3. Activity Design

Engineering Exploration class has approximately 72-80 students. Activity was experimented on approximately 1100 students. Activity was conducted for two semesters (Odd and Even). Each class had four instructors and each session runs approximately for 3 hours.

A. Overview:

A creative and involving exercise that will highlight the need for communication and collaboration of team members within a team.

B. Pre-Work:

Students in the class were asked to form a team of four, where the same team will be working for a project designed in this course. Approximately 18-20 teams were formed. Next task was to find well-known image, logo and painting, then cut them into pieces (equal sizes & shapes) of same number as of their team. Engineering Exploration course is designed at the freshmen level and the students are new to engineering profession, so they were formed teams randomly. To make this team effective and inculcate all the attributes necessary for a team to be successful they were made to undergo this activity. This activity made each member of the team realize the importance of working in team. Basically activity had two levels, which are called level 1 and level 2. In level 1 each student has to pick one part of the picture in four parts to draw on A4 sized sheet without having any discussion with other member of the team. After the completion of level 1, students were asked to collage the given pictures along with the pictures drawn by each team member. In level 1 they fail to meet the goal because of working in isolation and this makes them realize that team work is important and the effect of that and its results are seen in level 2. In level 2 the team members work in coordination with each other to complete the task successfully. Activity design involved some basic steps which required some prerequisite preparation to select different kind of pictures before sharing with students. Selection of picture was a major task in the activity. Activity designed involves some basic preparation like selecting different kind of pictures. Pictures selected were taken print on a sheet and were cut into four equal parts and laminated, which gives equal work load of drawing for each member of a team. Along with each picture, nomenclature was followed as 1A, 1B, 1C and 1D, which helps students to combine the drawn images at level 2 to compare it with original image.

Factors taken into consideration during the selection of pictures are listed as follows.

- i. When picture is cut into four sections, drawing load for each member of team should be equally

distributed.

- ii. Selection of pictures with respect to which discipline, was a point to be taken care.

- iii. Complexity of the picture.

Keeping these above factors in mind the pictures were selected such that.

- i. They are Symmetric images, so that work load for each team member is equally distributed.

- ii. We decided to have pictures with respect to various disciplines like simple mechanical drawings, simple civil drawings.

- iii. Pictures should be able to drawn by each and every student.

C. Equipment and layout:

Pictures were cut into pieces as we discussed in Pre-Work section. Pen, pencil and other drawing materials were given. A4 size drawing paper for each member of the team was given as.

D. Activity Steps:

The activity has below mentioned steps.

- i. Each individual in a team was given a piece of picture along with pencils and A4 sized drawing sheets of for them to draw the enlarged copies.

- ii. Each individual in a team was instructed to create a copy of their piece of the picture exactly (for example) five times bigger, according to length and width dimension.

- iii. A drawing time limit of 5-30 minutes was given depending on the complexity of the image and the magnification level requested.

- iv. When each team has completed the enlargement of their piece, we asked them to assemble the individual pieces into a finished picture on the table, wall or floor. At this point we produced them with the original (complete) picture to aid the final assembly.

4. Running the activity

This section deals with the implementation details of the activity. This activity was conducted in two levels as Level 1 and Level 2. In level 1 each student gets one part of the picture in four parts to draw on A4 size sheet without having any discussion with other member of the team.

Before the level 1 started some instructions were given to the students as mentioned below.

- i. Form a team of four members each.
- ii. Each team will receive one complete picture which is cut into four parts and one A4 size sheet per student.
- iii. Each member of the team should pick any one part among the four.
- iv. Draw enlarged picture (for example 5x to 10 x) of piece which he/she has picked on and A4 sheet provided to them.
- v. There should not be any discussions among the members in the team.
- vi. This level has a time limit of 5 minutes.
- vii. After 5 minutes each team has to collage/ assemble the individual pieces drawn into a finished picture on the table.
- viii. Compare the collaged picture with the original picture.

After the completion of level 1, the following observations were made

- i. Is the completed/enlarged version matching with the original in any area, if no, where the task failed and for what reasons?
- ii. To what extent does each member in a team need to know what other members are doing in order for the overall task to be achieved.
- iii. Did the team work together or each member in the team did the drawing in isolation with other team members?

- iv. What if they work together and what will be the final output.

These observations made by the students to think about the importance of each member working in coordination. The enlarged picture was not matching with the original as shown in Figure 1. The areas which were not matching are marked in Figure 1. This was due to lack of communication among team members before they started their work and also during the work. The students realized that team work is important. Hence after completion of level 1 we made the students to look upon the above observations and think and discuss what went wrong. After the discussions the activity was conducted again as level 2. Before the level 2 started some instructions were given to the students as mentioned below.

- i. Each member of the team should pick any one part among the four.
- ii. Team members should have discussion to accomplish the task.
- iii. Redraw the image on the other side of the given A4 size sheet.
- iv. This level has a time limit of 10 minutes.
- v. After 10 minutes each team has to collage/ assemble the individual pieces drawn into a finished picture on the table.
- vi. Compare the collaged picture with the original picture.

In level 2 all the members of the team worked in coordination with each other. One member became a team lead and gave directions to other member to complete the task without much difficulty like marking the directions from where the drawing has to be started. These discussions and coordination among the team members improved the students' understanding as to how they should proceed with level 2. The results of level 2 were completely different and 99% of the drawings were matching with the original as shown in Figure 2. Students realized how team work helps them to get better results than when they work in isolation without team coordination.

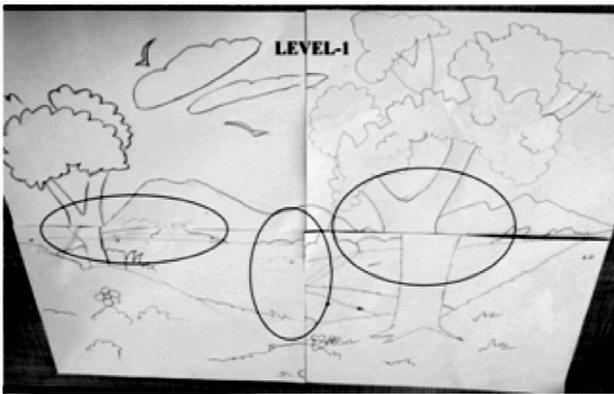


Figure A sample copy of image drawn by students in level1

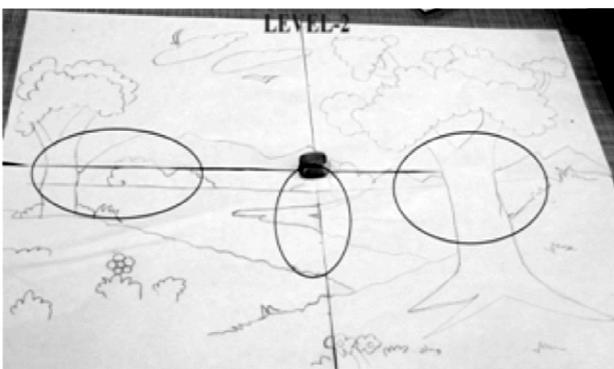


Figure A sample copy of image drawn by students in level2

5. Interaction

During and after the completion of the activity certain observations of faculty members and discussion points with students are noted as follows.

- i. Students were able to identify the purpose of the activity after the completion of level 1 which was reflected in Level 2 process.
- ii. Students were able to discuss importance of team work and role of an individual in a team.
- iii. Few of the students were showing less interest to draw the picture due to lack of artistic knowledge.
- iv. Students were able to take leadership role and assign tasks to other member of the team.
- v. Students were able to work as a team which was reflected in end result.

6. Results

“Picture Piece Activity” was focused on building

an effective team. This was necessary to ascertain whether the team work will improve the performance. Figure 3 and figure 4 indicate that the activity helped the students to realise that team work is important. Collaboration of team members within a team will help to get better results than when they work in isolation without team coordination. Students observed that involvement and participation of each member is crucial to their success and team building helps individual to learn better, participate and adapt to changing situations and also ability of how to work in a multidisciplinary team. This means that any individual failing to involve in team would be left behind and would impact the performance of whole team. The team may fail to accomplish its task. Individual and team work which says how an individual should function effectively as an individual and as a member or leader in diverse teams. At the end of the course a focused group discussion was conducted for students in which students said that they learnt team work and how to work within a team as a member of the team. The results of the activity conducted are reflected below

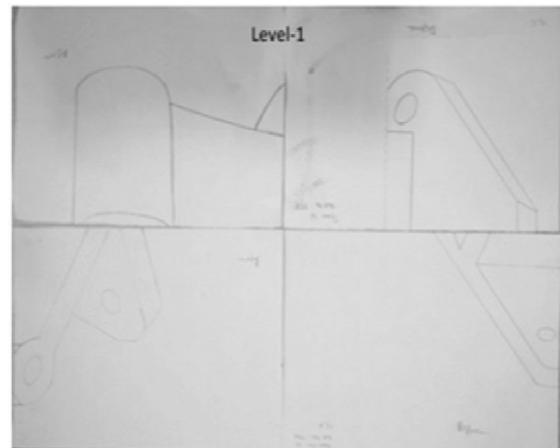


Figure : Image drawn by student at Level 1

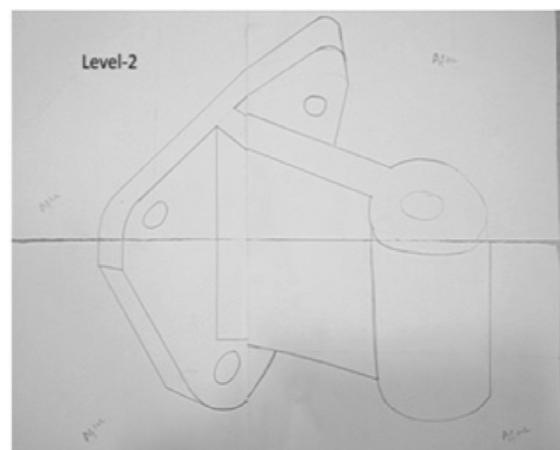


Figure : Image drawn by students at Level 2

7. Conclusion

Authors of this paper tried to show the importance of team work through picture pieces activity. Preparation before execution was done for the activity. Paper discussed about design process of activity, activity outcome and conduction process of activity. Results shows author was successful in his attempt to make student realize the importance of team work and importance of individual in a team. Observations of faculty members give justification for above statement. After the completion of course, in focus group discussion with students who underwent this activity said that activity helped student to understand need of an individual as a team.

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