

## The Effectiveness of Active Learning among Information Technology Student in Tuanku Syed Sirajuddin Polytechnic

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**Abstract:** This paper will discuss on the effectiveness of active learning among IT student in Tuanku Syed Sirajuddin Polytechnic. A total of 81 semester four students were involved in this research. Due to the many advantages of active learning in education, the student were divided into small group discussion and were given instructions to discuss on the ideas of their final year project. From 81 student, around 25 small groups were created and students were given time to prepare on the ideas and information related to the project. Once the groups completed the time given, each group need to do a short presentation discussing all the major important project information. During this session, students are actively involved and the instructor only monitor the class. After the presentation session, student is given a questionnaire to find out on the effectiveness of the session and how do they perform in the session. The questionnaire is then being analyzed using SPSS descriptive analysis. Compared to traditional learning methods, the results gathered showed that active learning provide positive effect on the learning process. Students are more actively involved in the class with better communication skills, better cooperation within the group mate, can think creatively and can manage time easily. In the future different active learning activities will be explored to find which activities provides better performance in the IT learning process.

**Key words:** *Active Learning, Information Technology, Effectiveness, Small group Discussions*

### INTRODUCTION

Active learning is widely being used nowadays due to vast growth in Information Technology [1][2]. Active learning is defined as a methodology used in teaching with the main objective on student-centered learning which engages students in educational process. According to Chickering & Gamson [3] as cited from Schwartz [4], active learning is identified as one of the seven principles of good practice in undergraduate education. This is because, in order for a learning to be active, student need to be more interactive with the teacher or lecturers. Students needs to listen, read, write, discuss, or engaged in solving problems in the classroom [5]. They also need to be engage in higher order thinking task which includes analysis, synthesis and evaluation.

According to Kozar [1], there are five major differences between traditional and active learning which is divided into five element which are teacher’s role, teacher’s work, learning outcome, learning progression and assessment. Table 1 shows detailed explanation on these elements.

Table 1: Comparison on traditional learning and active learning elements

Elements	Traditional Learning	Active Learning
<b>Teacher’s role</b>	Teachers are the information providers that provides all the information to the students.	Teachers are facilitators. Facilitators are the person who assists student in grasping common targets and achieving it without any intervention on his or her behalf.
<b>Teacher’s task</b>	Teacher talk in the classroom while students listen and take notes. Teacher controls the space in the classroom and students tend	Teachers pose questions or problems in the classroom. Students will work out answers or solutions. Students are

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	to be mostly passive.	mostly active in the classroom
<b>Learning outcome</b>	Learning outcome is based on the content. The learning units are structured around important content.	Learning outcome is based on the outcome of the questions or problems given by the teachers. The learning units are structured around activities that promote the outcomes.
<b>Learning progression</b>	Learning progression is a linear progression.	Learning progression is an iterative (spiral) progression.
<b>Assessment</b>	Assessment are created and tested separately in a discrete areas.	Assessment are 'real-life-like' and test multiple areas simultaneously.

Active learning can be divided into several activities such group role playing [6][7][8], collaborative exercises [8][9][10], case study, cooperative learning, debates, drama, role playing, simulation, jigsaw, fishbowl, panel discussion, buz groups, quescussion, pro and con grid, debates, peer review, one-minute paper, activity records, muddiest (or clearest point), and peer teaching [4].

Active learning provides several advantages in teaching and learning process and [11] stated there are six main advantages of active learning such as it allow student the think critically or creatively, it allow student to communicate better with partners or in small group, student can expressed ideas through writing in a better way, student can explore personal attitude and values, student can give and receive feedback easily and lastly student can reflects the learning process.

Therefore, based on the advantages of active learning, a testing was made to 81 Information Technology students to analyze whether active learning provides better performance in teaching and learning process.

**RELATED WORKS**

Active learning had been implemented in various education fields due to the advantages of it. This chapter will discuss on the effectiveness, challenges, and issues in active learning.

[5] implemented active learning to analyze whether learning is being maximized and the course performance being increased by the activity. A meta-analysis is being

made to 225 undergraduate students which comprises from science, technology, engineering and mathematics course. The result generated that the average examination score is improved by 6% compared to traditional lecturing. In contract, using traditional lecturing, student are likely to fail 1.5 times more that active learning. Freeman, Eddy, McDonough, Smith, Okoroafor, Jordt, and Wenderoth, [5] added active learning is effective across all of the class size, although it is suggested to small size class.

Fominykh, Leong, and Cartwright, [6] implemented role-playing and experiential learning in an immersive virtual environment for a professional counselling distance courses. Due to the fact that the sample used in this research is a distant education, the main issue is how to train the counsellor (learners) in a better way. Immersive virtual environment is implemented to solve this issue. Fominykh, Leong, and Cartwright, [6] choose this method since is provide a cost efficient and user friendly way to real life role plays [12]. To analyze the data, questionnaire and interviews were conducted to the counsellors. As the result, participants provide positive feedback and it allow them to do self-assessment better. Not only that, the participants listed out that they found it easy to navigate the activity, communication becomes easier and it is better way than normal methods.

Active learning can be divided into a lot activities and one of it is challenge based learning. Ramirez-Mendoza, Cruz-Matus, Vazquez-Lepe, Rios, Cabeza-Azpiazu, Siller, Ahuett-Garza and Orta-Castanon [13] uses challenge based learning in their research focusing on Engineering students. In this activity, students were given challenges to expose them with the solution of the problem out of their comfort zone. Student need to go through a full semester project in industrial environment using all the courses that were taught from the previous semesters. Although this activity seems to be a small activity, the feedback were different. To implement challenge based learning, student need to master the courses very well because they need to implement all the related courses in their project. This activity cannot be implemented every semesters since it involves a lot of work and time. If the student can perform in this activity, it provides a lot of advantages such as they can share experience and knowledge better between the industries, allow better teamwork between students, lecturers and industries, gain more knowledge and this is an economically feasible model. This is another proof that with better implementation and study, active learning is useful in teaching and learning process.

Due to the advancement of technology nowadays, the teaching and learning process had changed drastically. An example of technological usage in education is available by the work from [14]. Tembe and Kamble

[14] utilizes online course material using concept map and online course module. The study were conducted in two weeks comprises of six lectures. Student in the experimental group were given information about concept map while the control group were taught using traditional methods. Then, the experimental group were given concept map of related mechanical engineering topics and 2 hours online course on that topics. By using concept map, majority of students understand the basic engine terminology and related topics. However, there are several drawbacks in this study since first, this activity is considered as blended learning methods which might need more involvement by the lecturer. Second, the activity cannot be generalized to other topics and lastly, the process of the activity is time consuming.

Due to advantages and disadvantages of current works, this paper will only focus on small scaled group and lesser time usage in the classroom. Small scaled discussion session is being made to the class to find out on the effectiveness of active learning. The next part will discussed on the result and finding of the research.

**EXPERIMENT**

Participants in this study were 81 fourth semester Information Technology student from Tuanku Syed Sirajuddin Polytechnic. Students were divided into smaller group and given time to discuss on finding ideas and related information on the project that will be implemented in their fifth semester. During the time given, they need to come out with a title, basic information on the project and need to present it once the discussion time completed. Students are allowed to use all the sources available such as book, internet and also they can refer to the lecturer.

A questionnaire was given to all the 81 students once the discussion session completed. The questionnaire is divided into six parts which analyze on students working skill, student communication skills, cooperation within group members, students’ creativity, time management, and presentation skills. SPSS is used to analyze all the respondent data.

**RESULTS AND FINDINGS**

Listed below are the findings gathered from the questionnaire analysis.

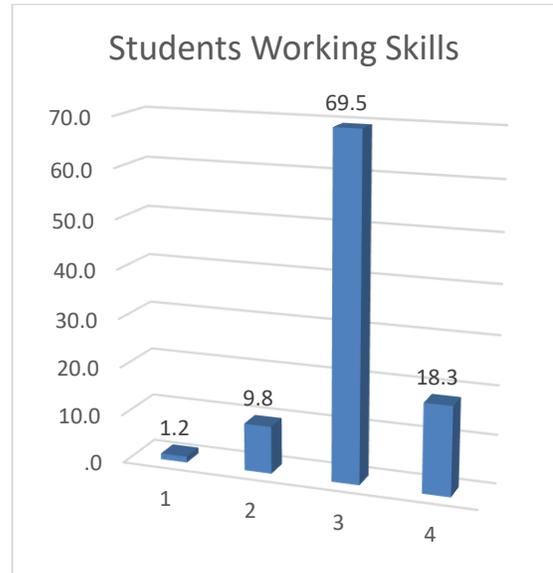


Fig 1: Students Working Skills

Figure 1 shows that 57 out of 81 students (69.5%) students agreed that active learning increases their working skills in finding related information on their final year project. It is followed by 18.3%, 9.8% and 1.2% with strongly agreed, disagree and strongly disagree. This skill is useful since according to Scott [15], the ability for students to open and committed to lifelong and life-wide learning is crucial to the learning process. Bolstad [16] added, future oriented schools must expand their intellectual capacity for learners and strengthen learner’s willingness to keep learning throughout their lives.

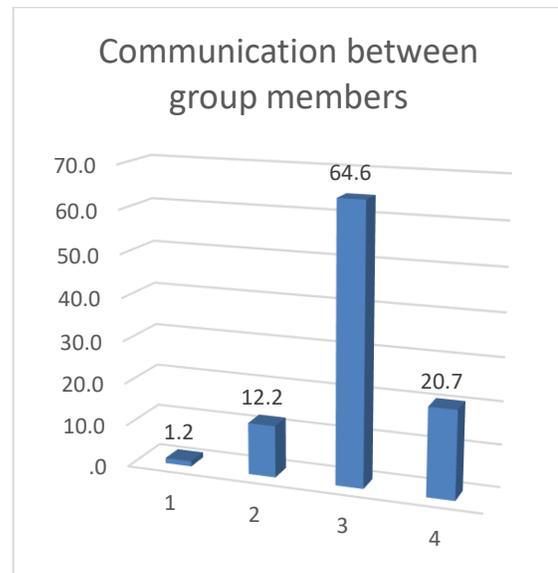


Fig 2: Communication between group members

Wagner [17] identified that for students to excel in the twenty-first century life, work and citizenship, student

need to have these seven survival skills: critical thinking and problem solving, collaboration and leadership, agility and adaptability, initiative and entrepreneurialism, effective oral and written communication, accessing and analyzing information and curiosity and imagination. From these skills, it is shown that active learning is one of the way to be used by student. Figure 2 shows that 85.3% agrees that they communicate better between group members when doing the session. Since student need to be actively involved in the session, each one of them need to communicate between themselves to share their ideas.

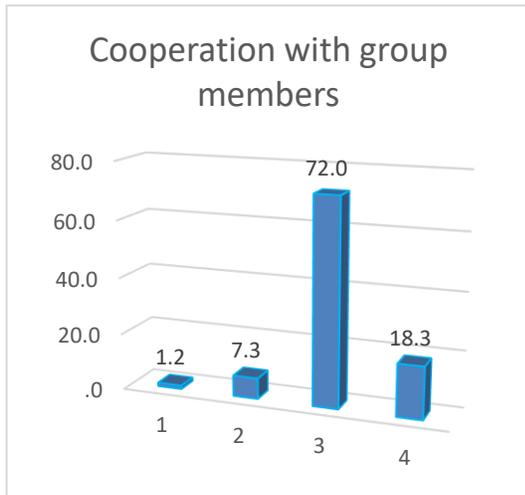


Fig 3: Cooperation with group members

There is an increase of 7.4% on cooperation in compared to communication between students in the active learning session. As important as other skill in the previous graphs, cooperation is crucial to students since it allow the exchange of ideas between students. Scott [15] stated that cooperation and teamwork is two important elements used in problem solving. 74 students (90.3%) agrees that cooperation between group member increases in this session while 7 students disagrees on it.

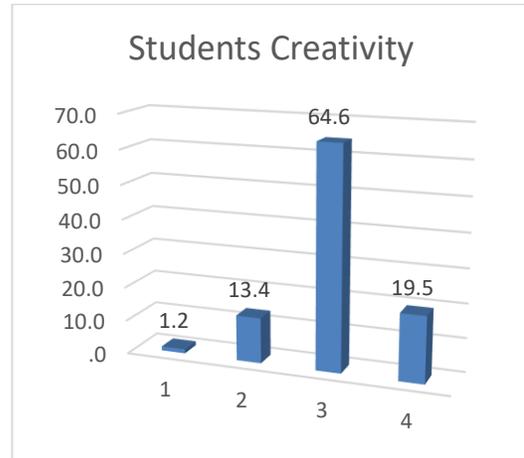


Fig 4: Students Creativity

Students' creativity has increased drastically when active learning activity is implemented in the class. This is supported by 64.6% who agrees and 19.% strongly agrees on this statement. Creativity is the key point for student to engage in teaching and learning process.

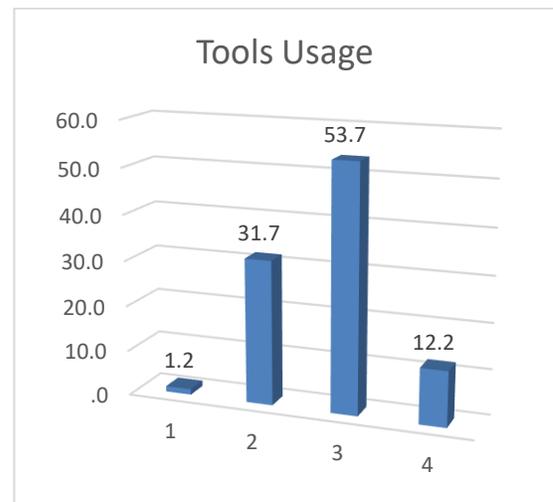


Fig 5: Tools Usage

For the usage of tools in the active learning activity, the results varies because majority agrees that they used tools in the classroom, followed by 31.7% disagreed on it maybe because of time limitation set by the lecturer. The third group strongly agreed with 12.2% that they used tools in the class to find project's information. Only 1.2% strongly disagreed on this statement.

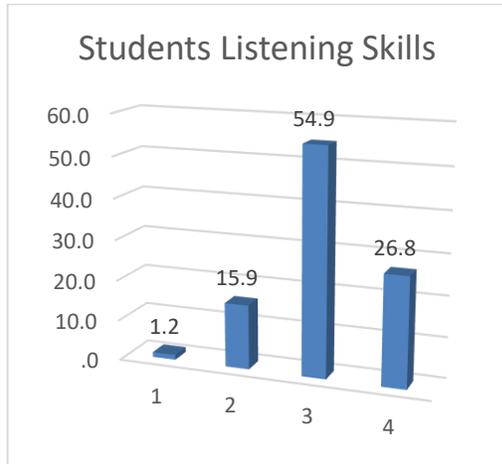


Fig 6: Students' Listening Skills

Based on Figure 6, 81.7% of the students stated that by being in active learning, they tend to listen better compared to traditional learning method. This is caused by active participation by the student in class. Students also can manage time better in finding project's information and in presenting the project's ideas. This is supported by the responds gathered from student which says 79.2% agrees on this matters as shown in Figure 7 below.

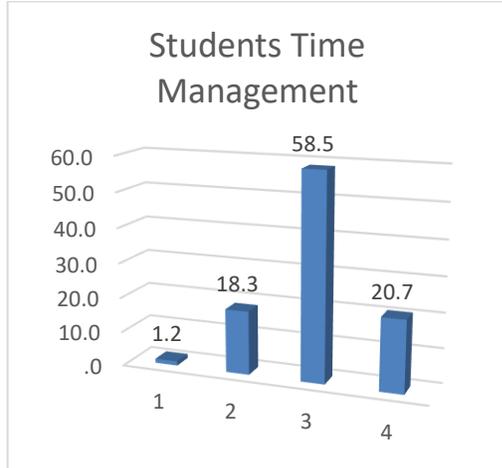


Fig 7: Students' Time Management

With the active learning activity, lecturers or educators only monitor student work and control the time given to the class. By doing so, student can manage time better. This is proven by 79.2% who agrees on it although the results slightly drop compared to other elements.

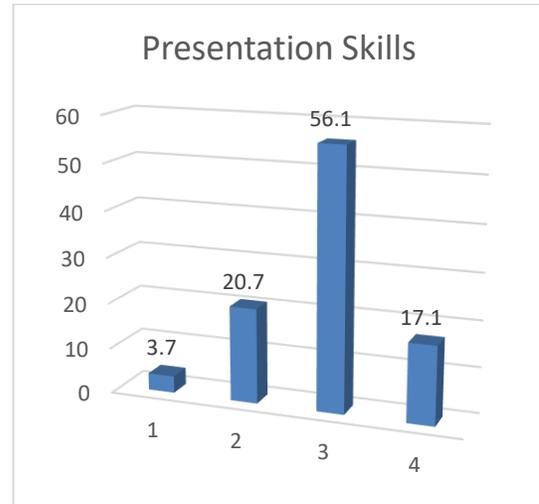


Fig 8: Presentation Skills

Students' presentation skills increased dramatically from the previous class. Majority of the student agrees that they can present the project ideas better. This is due to the discussion session that was done before the presentation session.

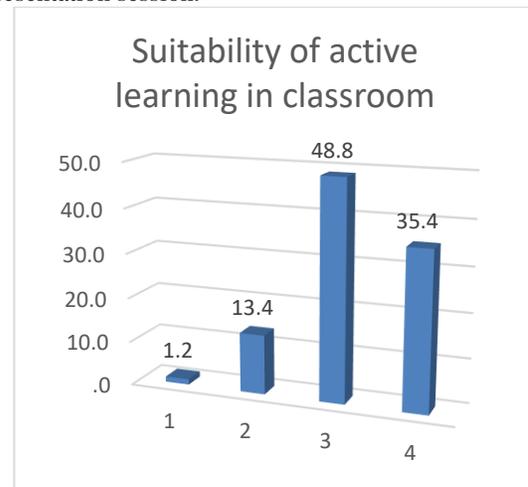


Fig 9: Suitability of active learning in classroom

The active learning activity received positive feedback from majority of the students. 84.2% suggested to the lecturer to do more active learning activities since it is suitable for the teaching and learning process. Students also includes some suggestions on the process that can improve the teaching learning process. The next part will discussed on the conclusion and the summary of students' respond data.

## CONCLUSION

This part discusses on the conclusion of the paper. Based on the feedback gathered by students, they suggested that active learning activities should be frequently being implemented since it provides a lot of advantages in the

teaching and learning process. This is proven by most of the respondents' data which gave positive value on all of the elements (Student working skills, communication skills, cooperation between group members, students creativity, tools usage, student listening skills, students' time management, student presentation skills and suitability of active learning in classroom). There are also additional suggestions from the students to improve more on the active learning activity such as allow social media interaction, includes experts in the fields to interact in class, provides more task in the activity, provide a more conducive classroom and provide detailed explanation on each of the task. In the future, other types of active learning activities will be implemented and explored to compare the effectiveness of the teaching and learning process on different IT courses.

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