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Communication and Teamwork Skills in Student Learning Process in the University

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Abstract

The objective of the study is to examine the effectiveness of learning and teaching techniques of communication and teamwork skills of students in the learning process in the university. The study was based on a survey form and the examination results of students in courses selected by Department of Chemical and Process Engineering, which is Utilities Design and Integrated Projects (IP) with 75 and 43 respondents, respectively. The data analysis obtained shows that students are receptive to carrying out tasks in small group, satisfaction with the evaluation through presentations and receive new knowledge.

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Keywords: Learning technique; communication skill; teamwork skill; problem based learning; survey form

1. Introduction

Studies based on learning outcomes are intended in Chemical and Biochemical Engineering program to be in line with global demand growth and industrialization in this century. This statement is strongly supported by Moussavi (1996) which states that engineering courses could not be separated from industrial areas. Changes are required in the industrial market and this can cause revolution on engineering courses. In the world of rapid globalization and the current development, the traditional way of learning in engineering courses previously is not promoting the understanding of the purpose of an idea through human interaction and interpretation of the world and worldly things (Frank 2003). It clearly shows that a passive learning which refers only knowledge of the lecturer is not sufficient. This teaching model produces graduates with high technical ability, but with limited teamwork ability, communication skills and writing that does not stand out, not creative and conscious life-long learning (Hoyt 2003).

Because of the problems that arise, the study on methods of teaching engineering courses based on questions, problems, objectives and values of cooperation are proposed in this study. Research conducted on engineering

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courses are expected to bring reforms in terms of: (1) Consolidation of learning and design techniques in engineering courses (Hoyt 2003); (2) Converting lecture hall atmosphere to form work group environment (Hoyt 2003); (3) Searching for solutions, answers, explanations and decision-making related to the subject of research graduates; (4) Injection of confidence and a high learning ability. In addition, the actual learning techniques should emphasize the development of skills such as writing, critical thinking and problem solving (Felder & Brent 2003).

Therefore, the objectives of this study are to (1) survey on student learning method at Department of Chemical and Process Engineering, UKM and (2) conduct research on the effects of student communication within the group to solve problem in engineering courses.

2. Methodology

This study is divided into two parts, one is based on student survey forms for Design Utilities courses and another based on the Year III Integrated Project. The data obtained were entered into the computer using SPSS program software or Microsoft Excel to display the analysis study. Tests will be conducted with the use of t-tests, diagrams, histograms and plotting specific (stem-and-leaf Diagrams, Histograms, Boxplot). T-tests were used to obtain a test point representing a neutral point. For each point falls on the upper and lower boundaries, a label will be on the point. As for the points that meet the neutral point, it will have both upper and lower boundaries of the label. Next, comparison data will be done among the students of different years of study in the Department of Chemical and Process Engineering, Faculty of Engineering and Built Environment, Universiti Kebangsaan Malaysia. Data analysis will focus on the comparison of the following items of learning technique, communication and teamwork skills.

3. Results and Discussion

The results will be discussed on the students desire as in Tables 1 to 3. Results for statements in Table 1 will be displayed using the SPSS and the respondents consist of Utility Design students, while the results in Tables 2 and 3 will be discussed using Excel, displays the respond of students had gone through the Integrated Project.

Table 1. Learning technique

| No. | Statements                                           |
|-----|------------------------------------------------------|
| 1   | I love to learn and work in small groups             |
| 2   | I love to ask questions to the lecturer via email    |
| 3   | I like the evaluation through presentation           |
| 4   | I like learning based on problem                     |
| 5   | I love to give opinions and make decisions           |

Table 2. Communications

| No. | Statements                                                                 |
|-----|-----------------------------------------------------------------------------|
| 1   | I was given the opportunity to make presentations in this course.           |
| 2   | I feel very confident in making presentations.                              |
| 3   | I am preparing for my presentation.                                         |
| 4   | I could write a report with the appropriate procedures (Style UKM).         |
| 5   | I can relate from one chapter to another chapter in the report writing.     |

Table 3. Cooperation within group (team work)

| No. | Statements                                                                 |
|-----|-----------------------------------------------------------------------------|
| 1   | I always give an idea while doing the Integrated Project.                   |
| 2   | I am always willing to help other members in the conduct of the Integrated Project. |
| 3   | I held a discussion group in the commission of an Integrated Project and during the writing of the report. |
| 4   | I just remain silent during an Integrated Project carried out.              |
| 5   | Some of the group members did not do any work.                              |
Figure 1(a) displays the number of students who was able to study and work in small groups. Through the tree diagram Stem-and-Leaf, the available width of the tree shows mean value of 1.0 indicating that the tree is a unit of the place. Leaves of the tree next to zero value of two on the second line shows the reading of 2.0. Through the second row is ten students chose two as the score of their choice. Overall, there were 59 students had chosen scores three and above. This proves that most students liked the small group learning. Summary of percentage scores can be read through Figure 1(b).

Figure 2(a) shows the record number of students who was able to ask questions to the lecturer via email. Based on the results of a given histogram, it was found that the mean is 1.8. Noted that the mode> median> mean due to the probability of isolation data move to the left. Overall, most students are not interested in asking questions via email by selecting a score of one and two. Summary of percentage scores can be read through Figure 2(b).
Figure 3(a) allows us to know which race that prefers assessment in the form of presentation. For Indian and others, the results are not consistent. While for the Chinese and Malays, it is able to get the first quartile, second quartile, third quartile, the minimum position of boundaries and border the maximum position. By plotting this, it is found that the scores are balanced for Chinese and Malay with an equal separation occurred between the two communities. These proved that many students choose scores from two up to four. In conclusion, acceptance of the evaluation in the form of presentations is purely moderate. Summary of percentage scores can be read through Figure 3(b).

![Figure 3(a)](image1)

**Figure 3. Types of People Prefer the Evaluation through Presentations**

One sample t-test was conducted on the number of students for problem based learning loading to assess whether the mean is recorded differently than 2.5. From Figure 4(a) stated, the results of significance equal to 0000, or in other words, the results are accurate. In addition, the obtained mean data, M = 2.5467 and standard deviation, SD = 1.04356. This shows that the results can be accepted for not lagging far behind on the score of each other. In conclusion, it appears that most students feel more burdened with the problem based learning. Summary of percentage scores can be read through Figure 4(b).

![Figure 4(a)](image2)

**T-Test**

**One-Sample Statistics**

| Group | N | Mean | Std. Deviation | Std. Error of Mean |
|-------|---|------|----------------|--------------------|
| BESANPEL | 75 | 2.5467 | 1.04356 | 0.005 |

| Group | t | df | Sig (2-tailed) | Mean Difference | 95% Confidence Interval of the Difference | Lower | Upper |
|-------|---|----|----------------|----------------|---------------------------------|-------|-------|
| BESANPEL | 4.307 | 74 | .000 | 0.567 | 0.396 to 0.738 |

**Graph**

![Figure 4(b)](image3)

**Figure 4. Loading Problem Based Learning**
One sample t-test was conducted on the number of students who enjoy problem based-learning by assessing whether the mean is recorded differently than 2.5. Through Figure 5(a), the significance was 0.026. This proves that the decision is authentic. In the meantime, it is found that the mean data, M = 2.7867 and standard deviation, SD = 1.09413. Thus, the results can be accepted for not being far behind in the score values to each other. In conclusion, most students choose scores three and above, and prove that they enjoyed learning based on problems since they were given the opportunity to provide comments and make their own decisions. Summary of percentage scores can be read from Figure 5(b).

Figure 5. Love to Give Opinions and Make Decisions

Figure 6. Response on Communication Skills for (a) Session 2009/2010, (b) Session 2010/2011
Two different approaches have been taken into account which are the selection of members for the 2009/2010 session IP group determined by the lecturer, while for the 2010/2011 session, the students select their group members. Based on the analysis results shown in Figure 6, about 70-90% also choose "Strongly Agree" and "Agree" to all the statements given. However, it appears that the statement to "Strongly Agree" increased for session 2010/2011 compared with 2009/2010 session. This shows that students tend to work hard with members of the group if they choose themselves. This may be easier for them to discuss, give opinions and so forth. In addition, IP is also very effective for training communication skills that can help their students to graduate soon after.

The trend of cooperation in the group can be evaluated in IP. It is found that the average of student agree that the IP can enhance the generic or soft skills such as teamwork. Feedback received is that majority (> 80%) think IP can help them to cooperate doing the work assignment. According to the 4th and 5th statement, <10% chose "Agree" and "Strongly Agree" for the opinion of almost all members in a group are able to cooperate. Similar to the evaluation of communication, found that the statement of "Strongly Agree" is increasing or 2010/2011 session compared with 2009/2010 session.

![Graphic](image1.png)

(a) Session 2009/2010

![Graphic](image2.png)

(b) Session 2010/2011

Figure 7. Cooperation within groups for (a) Session 2009/2010, (b) Session 2010/2011

4. Conclusions

From the results of data analysis, it can be concluded that: students are receptive to the conduct of the planned lectures, like carrying out tasks in small groups, satisfaction with evaluation through the presentation and adopt new learning style. However, students need adequate transition time before they can adjust to the new learning environment and new learning based on the problem. In addition they feel that IP is very helpful in sharpening the
skills of communication and cooperation within the group. Next, the selection of group members is also very helpful to the group's success.

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References

Felder, R. M., & Brent, R. (2003). Learning By Doing. Chemical Engineering Education 37(4), 282-283
Frank, M., Lavy, I., & Elata, D. (2003). Implementing the Project-Based Learning Approach in an Academic Engineering Course. International Journal of Technology and Design Education. 13, 273-288.
Hoyt, B., Prince, M., Shooter, S., & Hanyak, M. (2003). Engineering Education a Conceptual Framework for Supporting Faculty in Adopting Collaborative Learning. Proceedings of the 2003 American Society for Engineering Education Annual Conference & Exposition.
Moussavi, M. (1996). Cooperative Learning in Engineering Education. Proceedings FIE. Publishing Corporation. (pp. 24 – 28).