

STUDY OF STUDENT ENGAGEMENT LEVELS IN CLASS ACTIVITIES

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Abstract - This paper presents the results obtained from application of active learning methods into lectures to students of Mechanical Engineering classes. The traditional methods of teaching make students become more and more passive when they are in class. This leads to serious consequences that directly affect students' achievement. Firstly, students will easily fall asleep during the lesson or lecture. Secondly, students find it very difficult to understand the lessons and concentrate on their study. Finally, students will lack communicative competence after graduating from university. In order to make students get involved in class activities, the author will suggest some useful techniques, including group discussion, learning by teaching and giving marks to students who have good answers and presentations in front of the class. To examine the reliability of these techniques, one survey was conducted with a questionnaire. The result shows that group discussions and interactions between students and teacher are two important factors for student engagement in the classroom with assent of about 87,5% of total number of students taught.

Key words - student engagement; active learning; think-pair-share; communication skill; educational changes.

1. Introduction

Education is considered as the shortest way to success. It can be seen that in some developed countries education attracts huge investment. As a result, their economy has been developing dramatically. The purpose of education is to bring success to students. A question is posed is that who is responsible for their success. Obviously, educators, government, employers and students all are factors that accelerate the development of education system. Before the international integration, domestic and international employers often seek to hire staff with 'strong interpersonal skills' - they want people who will work well in a team and be able to communicate effectively with colleagues, customers and clients. What should we do to help these students succeed in their study? As a lecturer, the author always work out new techniques to improve the quality of teaching and learning at university, especially enhance student engagement in the classroom.

With credit training programs, students have fewer classes than before. Therefore, teachers only have enough time to provide students with fundamental knowledge at school and students have to spend a lot of time studying at home. Since new teaching program was applied into specialized classes, however, our observation reveals that few students pay attention to their study. According to traditional methods of teaching, especially teacher-centered method, teachers only provide knowledge for students and students only copy what they can get from their teachers. As a result, students are becoming more and more passive when they are in class. They do not want to make questions or raise their voices in front of their teachers and their classmates.

Student engagement has been studied for more than

twenty years. Engagement refers to a "student's willingness, need, desire and compulsion to participate in, and be successful in, the learning process". Disengagement revolves around minimal participation, motivation and misbehaviour amongst students as well as limited group interaction [1]. Previous studies that show the way to encourage student engagement in tertiary institutions are dependent on specific majors, learning environment, gender as well as kinds of students. Russell B. et. al. employed a conceptual model with four factors including motivation and agency, transactional engagement, institutional support and active citizenship to analyse data of student engagement. The results show that the first three factors were significant in student learning [2]. Schuetz has mentioned student motivation and their effort as a main strand in engaging students [3]. Some reported that student engagement was related to student, teacher, school and family variables and their combination. The study indicated that engagement levels among young females are higher than those among males. Furthermore, parental education played an important role in engagement. Students who have better levels of parental education were higher in engagement than those from families with worst levels of parental education [4].

Engagement is an important issue in teaching because it affects how much students learn on a daily basis. Quality learning depends greatly on students' interest and teacher's ability to create a motivating environment. It can be seen that many new teaching techniques have been applied to teaching in the classroom not only in the world but also in Vietnam so far. The reality shows that these techniques are not well-applied to teaching and learning of teachers and students at Mechanical Engineering classes. Many teachers admitted that they had trouble in explaining the lessons to students in the classroom because these students did not concentrate on their study and teacher's explanations. Even they do not want to go to class. Another aspect indicates that students are in the class but they have anxiety when teacher asks questions. It is obvious that to attract students' attention to class activities is a big challenge to teachers at Mechanical Engineering Department at DUT. This paper examines the effectiveness of some new techniques applied in teaching and learning such as "Think-Pair-Share", "Group discussion", "Learning by teaching and interaction between teacher and students".

2. Literature review

2.1. Think-Pair-Share

This technique will be presented in Table 1

Table 1. Think-Pair-Share technique

What teachers do?	What students do?
Topic selection: Choose a situation where the process of reflection and shared discussion would bring deeper understanding, and insert a brief Think/Pair/Share activity into the lesson at that point.	
Group selection: With students seated in teams of 4, number them from 1 to 4	Remember their numbers
Entrance: “At the end of this class today, we are going to do a TPS activity”	Listen to teacher’s directions
Instruction: “Here is your challenge...Recite the problem statement: Example: “Students explain working principle of the diagram” - Pause for question or confusion - Deliver worksheets to students	Listen and ask their teachers for further information Read the text
Introduction to TPS technique	Listen and ask their teacher for more information
Send them on their way: “OK-Are you ready?-OK-Here we go-Think-Pair-Share”	Prepare for TPS
Give students at least (1-3min.) of think time to THINK of their own answer	Formulate thoughts and ideas, write them down if necessary to prepare for sharing with a partner.
Using student numbers, announce discussion partners. (Example: For this discussion, Student #1 and #2 will be partners. At the same time, Student #3 and #4 will talk over their ideas.)	Practise good active listening skills when working in pairs, using techniques such as paraphrasing what the other has said, asking for clarification, and orally clarifying their own ideas.
Observation: Look to see how the conversation is going. Move towards those students who are not engaging. Ask them the question personally. Give positive comments: “That’s a good point”, “Good idea” and “Well-done”.	
Exit: “OK....Time’s up”	
Reflection: “I’d like to hear from a few group, students...” Finally, randomly call on a few students to SHARE their ideas with the class	Pinpoint any information that is still unclear after the pair discussion, and ask the class and teacher for clarification
Give them remarks	Take notes
Transfer: We will have a more interesting TPS activity next week.	

2.2. Learning by teaching and interaction between teacher and students

According to J. P. Martin (2008), learning by teaching is a method where students learn by teaching each other. Students actively research a topic and prepare the information so that they can teach it to the rest of the class [5]. After “Think-Pair-Share Activity”, teacher has to check students’ understanding about the given topic. Normally, some students do not understand the lesson clearly. Therefore, teacher should raise a question “Who can explain the lesson again to help other students understand?”. This technique is called “learning by teaching” that demonstrated specifically as shown in Table 2.

Table 2. Learning by teaching technique

Teacher activities	Students activities
Teacher chooses a topic related to the lesson and deliver the topic to students	Listen to teacher’s directions
Introduce “Learning by teaching” method and objective	Listen
Give students about 5-7 min	Students study and prepare information according to the topic requirement
Select volunteered students for teaching the topic to the rest of class.	Be willing to present
Give students remarks	Write down something

3. Method

This study was carried out at classes belonging to manufacturing technology, mechatronics and transportation mechanical engineering. Author applied active learning techniques into teaching in the classroom, especially “Think-Pair-Share”, “Group discussion”, “Learning by teaching and interaction between teacher and students”.

In each session, the teacher selects a topic and requires students to answer questions related to the issue. In this case, the teacher can pick students randomly, asking them to stand up and deliver their speech. This activity enables every student to prepare and think about the topic. In order to stimulate students to give opinions, teacher gives extra-point to students who have good ideas. With this way, students have good chances to interact with instructor so that they can develop their communication and criticism skills. To confirm “how to get student engagement”, a survey was performed at mechanical and transportation mechanical engineering classes.

3.1. Research question

It is clearly seen that there are a lot of factors affecting student engagement in the classroom such as motivation, methods of teaching, family, school, social environment and others. In this study, the author only focused on learning and teaching activities in the class. Therefore, my main research question here was “Which factors affect student engagement in the classroom?”.

3.2. Participants

The author selected two third-year student classes for

my research. The students in this grade were mostly twenty years old. Two groups of students that belong to mechanical transportation engineering department and mechanical engineering department, DUT were invited to take part in the survey as informants. 64 students coming from naval engineering class called group 20, and 57 students from mechanical engineering one called group 05.

3.3. Data collection

At the end of the semester, the author delivered a survey sheet to the students of two groups: group 20 and group 05. The survey sheet focused on student engagement in teaching techniques. There were four teaching techniques selected for this study including only chalk, only slides show, chalk & slides show combination, chalk & slides show & group discussion & teacher and student interaction combination. In each teaching technique, depending on agreement or disagreement, students can mark “x” in respective columns as depicted in Table 3.

Table 3. Survey sheet of student engagement

Which of the following teaching methods help you to increase engagement in the class					
Student Engagement	Teaching Methods	Disagree strongly	Disagree	Agree	Agree strongly
	Only chalk				
	Only Slides show				
	Chalk & Slides show combination				
	Chalk & Slides show & Group discussion & Teacher and student interaction combination				

4. Results and Discussion

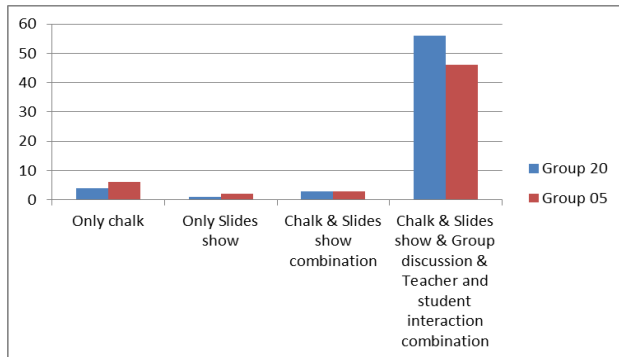


Figure 1. Survey results of teaching methods affecting student engagement

This result was done with third-year students in mechanical and naval engineering at Department of Mechanical Engineering and Transportation Mechanical Engineering, Danang University of Science and Technology. Figure 1 shows the relationship between number of students and teaching techniques with group 20 and 05. The vertical axis indicates the number of students in each group. The horizontal axis represents the teaching techniques. The result shows that techniques of teaching with chalk, slides show, group discussion and teacher and

student interaction combination have had a large contribution into increasing student engagement in the classroom.

The following pictures describe different student engagement levels in teaching and learning. Firstly, teacher represented a diagram, after completely drawing the diagram on the blackboard, teacher only explained some basic signs and required student to state working principle regarding to the diagram. Teacher raised a question, “Can anybody explain working principle of this model?”. The result shows that no student raised their hand although teacher had stimulated three times as shown in Figure 2.



Figure 2. Nobody raised their hands



Figure 3. Think-pair stage used



Figure 4. Only two students raised their hands

After using TPS technique, the teacher encouraged students to think about the given issue individually within one minute and then asked two students to have small discussion within three minutes as shown in Figure 3. In general, most students did well in this stage. However, some students were not familiar with this method. That teacher should do in this situation is to come to those students and

stimulate them to follow this method. After this step, teacher made the same question again and there were two students who raised their hands immediately as shown in Figure 4.



Figure 5. A large group discussion



Figure 6. A lot of Students had their opinion



Figure 7. Understanding level checking of Students



Figure 8. Three students understood the lesson

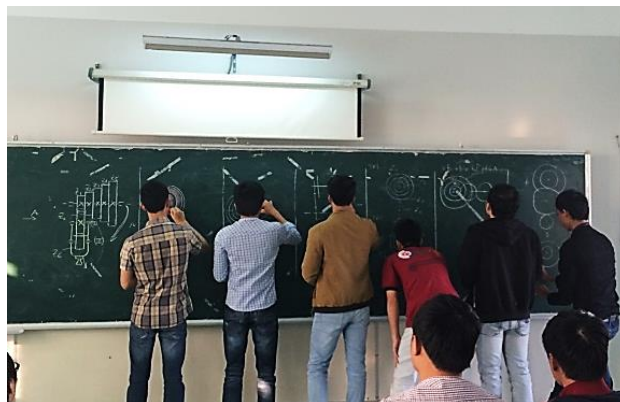


Figure 9. Six students volunteered using "learning by teaching"

It can be seen that the number of students who raised their hands was too few compared to the total number of 64 students in that class. In order to enlarge students' interaction ability, a large group discussion which took place as depicted in Figure 5 represented the increase in number of volunteered students (Figure 6). Thumbs up, thumbs down and thumbs side were used to check student's understanding level as shown in Figure 7. The result of this step shows that there were three students who did not understand the lesson as represented in Figure 8. The next technique employed was "learning by teaching". Teacher asked the students who understood the matter to teach this topic to students who did not have clear understanding. There were only 06 students raising their hand as shown in Figure 9. It is clear that not all students who understood the matter could explain it again to other students. This proved each student had different understanding level.

5. Conclusion

This paper presented the results of active teaching activities and reported responses from a questionnaire about student engagement. The work was carried out with the 3rd and 4th year- students of manufacturing, mechatronics and naval engineering that belong to Mechanical Engineering and Mechanical Transportation Engineering Departments at DUT, Vietnam. Interviews with students at the beginning of this semester show students in the class are very passive. They just go to class for attendance and only copy what their teacher writes down on the blackboard. One thing needs to be considered is that they are not willing to be at school. Active learning used at mechanical classes has attracted more students' attention to class activities. The number of students coming to class and their understanding level also increase considerably. Teaching method with group discussion and interaction between students and teacher plays an important role in student engagement in the classroom with agreement accounting for 87,5% of total number of students taught in semester II, schoolyear 2014-2015. Furthermore, interaction between students and students, students and teacher and learning by teaching are the factors which help students improve their communicative skills and academic achievements at university.

Acknowledgment: The author would express their acknowledgement to classes of group 20, 05, 02, 03,

semester II, year 2014-2015 from Department of Mechanical Engineering and Mechanical Transportation Engineering, DUT for doing the study.

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(The Board of Editors received the paper on 06/01/2015, its review was completed on 06/23/2015)