

# Intervention Programme: The Implementation of Buddy System Programme amongst Civil Engineering Students

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## ABSTRACT

*The Buddy system is a peer-to-peer assisting and monitoring system where a group of individuals (peers) work as a team collaboratively to reach the desired outcome. Due to the constant high failure rate attained by the students in one of the fundamental engineering courses; Fluid Mechanics, the School of Civil Engineering, Universiti Teknologi MARA, Pasir Gudang Campus have introduced various initiatives or interventions, including the introduction of the Buddy System Programme to overcome this problem. The purpose of this research is to analyse and compare the performance of a group of diploma students before and after the implementation of the Buddy System Programme for two semesters (September 2017 - January 2018 and March 2019 – July 2019). The findings revealed that the percentage of the failure rate for semester September 2017 – January 2018 dropped when the student-centred approach was implemented. Meanwhile, for semester March 2019 – July 2019 when the teacher-centred approach was used, the percentage of failure rate showed a slight decrement from the previous semester without the implementation of the Buddy System Programme. The results conveyed an initiation in the teaching method to motivate students towards independent learning culture and keeping students with average performance occupied for the whole semesters by interacting continuously with the mentors.*

**Keywords:** *Peer, Teacher-Centred, Student-Centred, Independent Learning, Failure Rate*

## 1.0 Introduction

The history of co-operative learning in higher education can be traced back thousands of years ago when the Talmud recommended “learning partners” for understanding the legal codes and when Socrates engaged students in the “art of discourse” (Johnson et al., 1998). The co-operative learning process today involves students working in groups to reach learning goals where they talk, debate and build their understanding. The lecturers also observed that the students were more interested in studying with their mentor or peer rather than studying alone or using the student-lecturer technique (Mukundan et al., 2011).

The majority of studies shows that buddy system efficiency has a substantial and positive impact. For example, Johnson et al. (1998) confirmed that the student-centred and cooperative learning approach is valid for the academic performance of students, relations with peers and teachers, and the position towards the academic life. Several comprehensive reviews and implementations have been released on this topic by multidisciplinary organizations and universities, for instance; academic issues (Goldstein et al., 2018), health education (Ringby & Duus, 2017), special education (Adams, 2016; Goodman et al., 2008), environmental education (Stavrianos, 2016), Mathematics and Sciences education (Aina et al., 2015; Balan, 2015; Mukundan et al., 2011; Vaninsky, 2017) and e-learning (Varadarajan & Ganz, 2009).

Generally, the buddy system is a programme in which students initially worked in pairs. This concept is based on the principle that friends would be able to help each other rather than compete. This experience also encouraged students to access concepts, understanding and resources that were shared in another course that was part of the programme and which, in turn, would have improved their study (Espitia Cruz & Kwinta, 2013). The buddy system is one of the student-centred approaches; with classrooms designed, implemented and evaluated by students. More work will be done on them by involving the students in these decisions, which can be a great thing. Teachers support student-centred learning by encouraging students to cooperate in decisions, be aware of their ability to develop, and remember how they feel about learning (Wright, 2011).

Peer support can be described as social interactions between similar groups of people. The programmes help to develop their academic and social skills by the constant interactions between both parties which will break the barrier and boost their confidence level (Thalluri et al., 2014). The mentor may communicate with their mentee either on a one-to-one session or in small groups by transferring

learning abilities, sharing study skills, resolving specific or engineering problems and promoting active learning. Students prefer casual environment and generally feel more comfortable referring to peers rather than to lecturers about certain subjects. Student engagement in answering questions, discussing and thinking can improve their performance in the critical subject (Barnett, 2008).

This article aims to analyse the performance and efficiency of the buddy system technique. The Teacher-centred approach which contributes to pedagogical modifications needs lecturers to get involved in the process of teaching and to learn with the same techniques they use. In other words, to “understand deeply, teachers must learn about, see, and experience successful teacher-centred and student-centred teaching practices” (Dole et al., 2015). This approach of teaching applies the strategies used by teacher-centred and student-centred learning. The students will get information better from the learners than from the information given by the lecturer. This method encourages the students to find more information rather than waiting for the lecturer to provide it. As such, research evidence on teaching approaches maintains that this teaching method is effective in improving students’ academic performance (Ahmed & Ain, 2013).

## **2.0 Methodology**

The Fluid Mechanics course focused on students’ ability to acquire and apply basic knowledge of fluid mechanics, as well as the ability to identify, formulate and solve engineering problems such as flotation, stability, fluids under static conditions, concepts on continuity, momentum principles and common flow measuring devices. Due to the constant high failure rate obtained by the students for this particular course every semester, the Buddy System programme was introduced and conducted for two semesters (September 2017 - January 2018 and March 2019 – July 2019) with two different methods.

For the intake of September 2017 - January 2018, the Buddy System programme was conducted whereby the students were divided into small groups and assisted by one mentor. The mentors were identified and selected among students beforehand based on their academic achievement and performance in the classroom. The programme began with a brief introduction given by a lecturer which focused on tips for answering questions and comprehensive explanations of all the topics involved. The assigned mentors then were responsible for assisting the other group members to answer the questions provided by the lecturers for the Fluid Mechanics course throughout the programme. The mentors, however, were highly encouraged to continue their role as a mentor and assisted their mentees every time

and everywhere they were needed until the end of the semester.

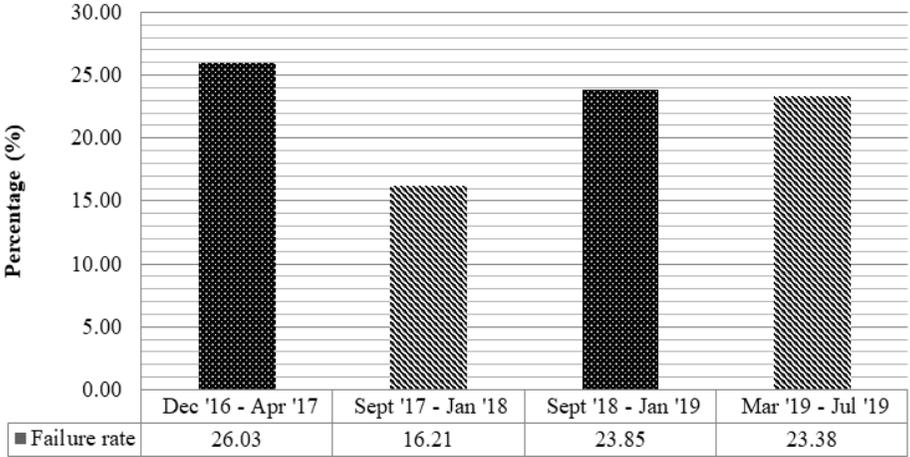
For the intake of March 2019 – July 2019, this programme had been conducted and facilitated by five lecturers to assist the students throughout the sessions. The lecturers acted as facilitators to deliver comprehensive conclusions, provide the materials and be prepared to answer any questions related to the designated topics. The session began with a brief introduction and overview of the topics covered for the Fluid Mechanics course. The questions based on each of the topics were prepared beforehand, and students were given the opportunity to study with different lecturers for each topic during the session. This method was used to expose the students to different approaches and teaching methods by different lecturers. Besides, students were given a chance to study the related topics with the other lecturers during the sessions and enhance the bilateral relationship between lecturers and students. A summary of the techniques implemented for the Buddy System programme is shown in Table 1 below.

**Table 1: Methods used in Buddy System**

Semester Intake	Implementation of Buddy System	Method
Dec 2016 - April 2017	No	Not applicable
Sept 2017 - Jan 2018	Yes	Student-centred
Sept 2018 - Jan 2019	No	Not applicable
Mar 2019 – Jul 2019	Yes	Teacher-centred

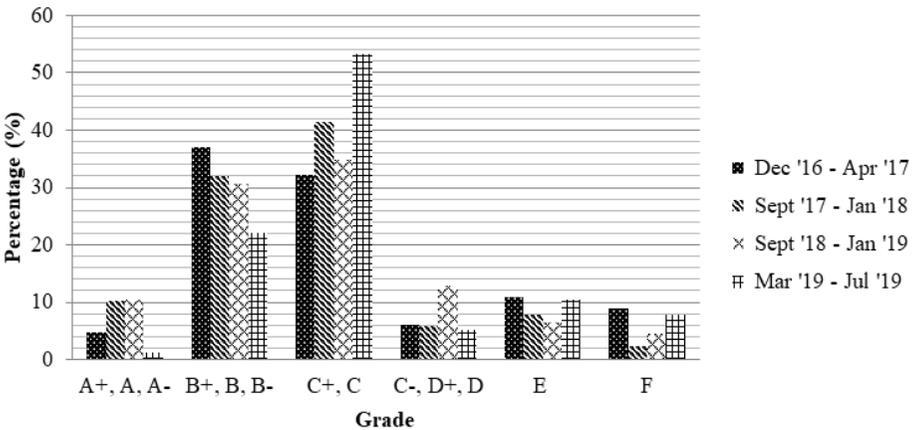
### 3.0 Results and Discussion

The result was analysed and compared based on the percentage of failure rate before and after the implementation of the Buddy System programme for four semesters. The findings as shown in Figure 1 revealed that the percentage of failure rate for semester September 2017 – January 2018 plummeted from 26.03% to 16.21%. The decrement of 9.82% resulted from the continuous guidance and assistance from the mentors appointed amongst students throughout the semester. In comparison to semester March 2019 – July 2019 where several lecturers were appointed as a mentor, the percentage of failure rate shows only a slight decrease with 0.47% from the previous semester (September 2018 – January 2019) without the implementation of the Buddy System programme.



**Figure 1: Percentage of failure rate according to semester**

Figure 2 shows the detailed segregation of students' achievement based on grades obtained according to semesters in percentage. Students are considered to fail in the subject taken if they obtained less than 50 marks of total assessment (grade C-, D+, D, E and F). Meanwhile, the other grades are considered as distinction (grade A+, A and A-), credit (grade B+, B and B-) and pass (grade C+ and C).



**Figure 2: Percentage of students' achievement according to grade**

For the semester September 2017 – January 2018, the mentors were selected based on their academic performances from the previous semesters. Based on the findings, the implementation of the Buddy System Programme with mentors appointed amongst students show that the peer influence may contribute to the

similarity of academic behaviours of the mentors and mentees. The studies on academic socialization revealed that youth are more likely to seek out peers with similar academic achievement and that these peer affiliations also influence their achievement over time (Goodwin et al., 2012; Laninga-Wijnen et al., 2018). With the help and guidance from excellent peers and virtuous surroundings, the average students that require assistance were able to work and overcome problems related to this particular course together with the mentors.

Appointing lecturers to be their mentors can also be similar to having an extended face-to-face interaction in a physical classroom, but with a non-conventional approach. Having lecturers mentoring the students, paving their curiosity with fundamentals, showing them the way to find additional resources and answers to their questions may expand and broaden their knowledge more compare to having students as mentors. However, studying with mentors appointed among lecturers can be restricted due to time constrain and coping with their individual time. Instead of finding a suitable time for both parties with limited time available, students tend to seek help from their peers to revise together. The amount of study time spent among them was unlimited compared to the time spent studying with lecturers appointed as a mentor (semester March 2019 – July 2019). Nevertheless, students need to be observed to ensure they are still on track so that the aims of the buddy system programme can be achieved.

A positive learning environment is important to create a value participatory in teaching and learning processes. The behaviour and attitude of the students in front of lecturers are frequently different compared to when they are among themselves. In the classroom, the students might keep themselves from asking questions due to low self-esteem, shyness and having difficulty in forming the question. The gap in the lecturer-student relationship might also hinder them from asking questions, and hence, risk them losing valuable academic information.

By appointing mentors among peers, it can be seen that direct interaction between students encourages an active learning process. Students tend to discuss and cooperate with each other to solve the given problems rather than simply listen to the solutions given when lecturers as their mentors. Besides, students who communicate a similar discourse will provide a better understanding. Mentors can explain difficult jargon and expressions by using words that fellow students can understand. It does not only create a less formal mean and comfortable learning environment but also benefits in increasing the motivation for studying for both mentors and mentees. Students engaged in active learning result in higher attainment, more positive feelings from the students about each other and

improved academic self-esteem contrast in individualistic learning (R. T. Johnson & Johnson, 2008).

## **4.0 Conclusion**

This study has shown that the implementation of both Buddy System methods has improved the percentage of failure rate for course Fluid Mechanics. The result shows higher improvement when the Buddy System programme was assisted by mentors appointed amongst students compared to lecturers appointed as mentors. Students find it comfortable to team up amongst themselves and can open up discussing the courses. Buddy System programme should be considered as an extensive series of initiatives to help average students in certain courses achieve better understanding, develop strong peer support and create an effective long-term outcome. Buddy System programme is in line with the university's efforts in equipping students' independent learning culture and keeping averagely performance students occupied for the whole semester by interacting continuously with the mentors. This programme is one of the alternatives focusing on a supportive network facilitated by committed mentors and a quality module. However, improvement of the results may be influenced by some uncontrolled factors such as the difficulty level of exam questions and the capabilities of the students.

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