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Teammates as a Digital Evaluation Tool: An Action Research Approach to Mitigate Free Riding Issue

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Abstract:

Purpose – This paper focuses on the issue of free riders among students in completing group assignments given by the course instructor. Problems arise in diverse situations when a group of students is doing an assignment, thus one needs to determine an optimal way to complete the assignments in the best possible way. This study intends to minimize the free riding issue, so that full commitment and participation by the group members could be reached at an optimum level.

Methodology – To solve this problem, a peer evaluation strategy was conducted by using a TEAMMATES system. The methods employed were survey and semi-structured interview. The respondents for the study were 27 students selected using convenience sampling from the Group F of Foundation Centre of UUM that registered in the Introduction to Philosophy course. The total number of students were divided into groups of five or six students. The TEAMMATES were deployed with the aid of structured assignments to facilitate the identification of free riding and further interventions with targeted and all students, before going into another cycle which totals up to four cycles following the action research method.

Findings – The finding shows that the application of TEAMMATES is remarkably significant in combating free riders among students, as the result indicates that TEAMMATES has affected students' commitment and participation in completing the assignments.

Significance – This research is very significant in the fact that it can help to overcome the free rider problem among students and the course instructors to fulfil the course requirement and find ways to alleviate the problem through interventions proposed by this research.

Keywords: TEAMMATES, action research, free rider, peer evaluation.

1. Introduction

Free riding occurs in many organisations, and groups. Basically, a free rider is someone who does not contribute to a group's collaboration but insists on fair benefit sharing (El Massah, 2018). Specifically, any form of collaborative work would incur the risk of birthing free riders (Dingel et al. 2013; Roberts & McInnerney 2007). Free riders have also influenced the educational world from children up to university or tertiary levels (Dingel et al. 2013; Yang et al. 2018). The standards that are expected of university graduates require vigilance in eliminating free riding. Individual and group evaluations are an essential part of learning since it aids students in their learning. Besides, having the evaluation can help the course instructors to measure and evaluate students' understanding of the course taught. On the other hand, the objective of group evaluation is most crucial to educate the new members of the higher education student the importance of teamwork that will lead to 'esprit de corps' culture in the

university and later translated into the graduates and alumni culture that brings them into another level in their career endeavour.

Therefore, for this research, the Introduction to Philosophy subject, which is a compulsory course for the UUM Foundation Programme has been chosen. This course prepares students with the basic concept of philosophy and its application. The students will be exposed to basic philosophical thoughts, thinking and epistemology. Furthermore, throughout the semester, students will be assessed by a number of methods and types as this subject consists of 60% of coursework and 40% of the final examination. The coursework has been divided into four components: Final Examination (40%), Written Report (30%), Infographic Poster (15%) and Video (15%).

In order to fulfil all the course requirements, students need to work hard. One of the characteristics to produce a qualified outcome is good teamwork. Unfortunately, nowadays, students in Malaysia in general and in UUM Foundation Centre particularly have experienced free rider problems in group works. This problem is very crucial as it will give a significant impact on the quality, progress and productivity of the group work. Therefore, this research sets out to combat free riders, hence this issue will be resolved successfully through the use of the TEAMMATES system. TEAMMATES is a free online system for organising student peer evaluations and other feedback pathways. It is a cloud-based solution for educators/students utilised by hundreds of academic institutions worldwide. The system allows confidential peer evaluations, anonymous peer feedback, shareable instructor comments and searchable student records (Goh et al., 2011).

Objectives

1. To explore the existence of free riding issue among UUM Foundation students.
2. To investigate the application of TEAMMATES in mitigating free riding issue.
3. To evaluate the application of TEAMMATES in identifying the free rider(s).

Research Questions

RQ1: Does free riding issue exist among UUM Foundation students?

RQ2: How does TEAMMATES help to mitigate free riding issue?

RQ3: How does TEAMMATES able to identify the free rider(s)?

Theoretical Framework

Teamwork is an important aspect evaluated by employers during the selection process (Planas-Lladó et al., 2020, p. 195). However, students still have issues in understanding their role in a group due to their lack of experience in the area. Thus, by conducting the study of peer evaluation using TEAMMATES as the evaluation platform, the study is able to investigate the effectiveness of the peer evaluation and the effect on teamwork. This study was conducted based on the research cycles as seen in the diagrammatic model in Figure 1 by Zuber-Skerritt (2010). The researchers are responsible and accountable for minimizing the free riding issue through a cyclical process of (1) planning, (2) acting, (3) observing and (4) reflecting the results of (1)-(3) and determining the next cycle of action research – that is, a revised plan, followed by action, observation, and reflection, and so forth.

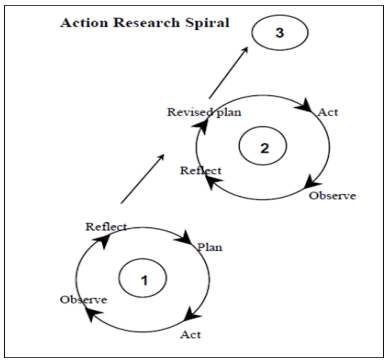


Figure 1: *Action Research Cycle*

Note. Classic spiral of action research cycles. From "Action Learning and Action Research: Paradigm, Praxis and Programs" by O. Zuber-Skerritt, in Sankaran, S., Dick, B., Passfield, R. and Swepson, P. (Eds*), Effective Change Management Using Action Research and Action Learning: Concepts, Frameworks, Processes and Applications* (pp. 1-20). 2001, Southern Cross University Press, Lismore, Australia. Copyright 2001 by Southern Cross University Press. Reprinted with permission.

2. Literature Review

Roberts and McInnerney (2007) have shown that there are problems associated with online group learning which include free riders. Due to the Covid-19 pandemic, online group learning has since been implemented as part of any course teaching and evaluation (Doyumğaç et al., 2021; Kamarudin et al., 2020; Shaharanee et al., 2020). Online learning provides advantages over classroom lectures. One evident advantage is the availability of online tools that can be used to support a course's objectives. Online learning also accommodates group projects, which foster leadership and teamwork. Carter (2018) and her associates discovered that students have good perceptions of online collaborative work. In practice, however, both faculty and students must accept the shift from face-to-face to online. The transition must be smooth for online group learning to 'create a vibrant, engaged environment' (Carter et al., 2018). Such an environment, according to Carter and friends, is the ideal learning environment.

Cases have shown that what is achieved in one learning environment might not be transmitted properly to the other learning environment. An example can be taken from Saghafian and O'Neill's (2018) comparative study of teamwork in both face-to-face and online student teams. They concluded that students who work in face-to-face teams may not be as effective or efficient in online teams. In contrast, Wu (2019) discovered that students from diverse courses tended to focus on 'individual components solely' and 'did not appear to integrate with other teammates considerably'. In other words, teamwork in the project is non-existent. Wu (2019) explains this to be the consequence of differences in prior knowledge amongst the students as well as their different learning attitudes and skills.

These examples inform us that online collaborative work for students is not an easy task. Challenges are aplenty for both course instructors and students. Trammell and LaForge (2017) listed challenges specifically for instructors who have to teach large online courses. Among them include organizing the course design and maintaining instructional effectiveness (Trammell & LaForge, 2017). Conversely, Hilliard (2020) and his colleagues discovered that online collaborative projects cause anxiety in students. Online collaboration is also hampered by free riders. Free riding is not caused by devices or software, but by human weakness.

Online technologies are helping researchers reduce free riding in online group projects. Previously, researchers like Joyce (1999) reduced free riding by rotating group members. Free riding can also be reduced by constant supervision of group members' contributions to group tasks (Swaray, 2012). Online tools have certainly made efforts to reduce free riders easier. Viberg et al. (2019) for example utilized the three modules' CLASS system that was developed in Sweden, which comprises student's self-reflection, peer-grading evaluation and examiner feedback. After browsing through various case studies on collaborative work, Kloppenburg and associates (2018) recommended a few online free riding prevention or reduction strategies. The first is by implementing evaluations. Here the use of peer evaluation is essential. However, studies have shown that peer evaluations have their own weaknesses. Students are either biased towards their peers or evaluating them unfairly. Other tactics include group awareness tools, group size, and team morale.

To the best of our knowledge and research, there is minimal prior research of free riding that utilizes the TEAMMATES peer assessment online tool. This study is the first to implement this tool in an effort to reduce free riders in a university context through 'action research' (Masters, 1995). Action research is a method of inquiry that has four fundamental themes: 'empowerment of participants; collaboration through participation; acquisition of knowledge; and social change' (Masters, 1995). The term 'action research' denotes the interventions or 'deliberate practical changes' that are implemented in its investigations. In other words, 'action' implies 'what you do' and 'research' is about 'how you learn about and explain what you do' (McNiff, 2016). Because peer assessment is based on active learning, the active interventions and investigations necessary in action research are particularly suitable (Koç, 2011). Thus, action research and peer assessment go well together.

The beneficial connection between action research and peer evaluation necessitates the use of action research for collaborative work - the foundation of peer assessment. Smith, Cooper and Lancaster (2002) used action research in an effort to improve the quality of undergraduate peer assessment of posters in Psychology. Papinczak, Young and Groves (2007) utilized action research to investigate medical students' perceptions of peer assessment in problem-based learning. Fauzan (2016) studied the effectiveness of peer assessment in improving third-semester students' speaking ability. The most recent example of the use of action research and peer assessment in an educational context is by Yaacob and Asraf (2021) who explored students' reflexive thinking via reflective collaborative learning.

The study described in this article arose from instructors' concerns regarding free riders among their students. Although investigations about free riders have been done in the past, for example by McCormick, Matzat (2010) and Prasad and Kumar (2018), none has yet tackled the free rider problem amongst foundation students. Furthermore, this study incorporated peer evaluation through both action research and the use of the TEAMMATES online peer evaluation tool.

3. Methodology

This study is an action research project using a mixed-method approach. The study employed semi-structured interviews and a constructed survey by using a peer evaluation platform called TEAMMATES. As this research focuses on the issue of the free rider among students, the research chose to undertake students of Cohort 7 of the Foundation Centre of UUM. The 2-month study, beginning from early February until the end of March 2021, had applied convenience sampling where 27 UUM Foundation students from Group F were selected out of 200 of the total population of Cohort 7. This group was chosen specifically due to accessibility by one of the researchers who was the course instructor for Introduction Philosophy for this group, thus making the interviews and survey easier to be conducted within the limited timeframe. Moreover, during the period of the data collection, only the UUM Foundation students were readily available since the undergraduate students were on their semester break. The students had been divided into five teams as it could provide a rich platform for cooperative learning; and free riders exist when there is a teamwork nature of the project (Maiden & Perry, 2011). With this sampling procedure's benefits, researchers were able to easily monitor students' engagement while also quickly collecting data for analysis. The selection of this group enabled the researchers to investigate the solution of the free rider's problem and to what extent the TEAMMATES platform may influence their commitment and participation as a group member.

Research Instruments

Semi-Structured Interview

The interview provides a good way of accessing people's perceptions and the meanings and definitions they attach to situations and constructions of reality (Punch, 1999). These interviews provided an opportunity for group leaders and the free riders to voice their opinions and raise their concerns and issues (see Appendix 1). Interviews are flexible, allowing the interviewer to 'follow up on leads, probe, ask for clarification, and give more depth and information' (Hashim, 2006). The content of the interviews focused on many aspects related to the research questions. The interviews were about the free riders, the teaching and learning that takes place within them and how the free rider has affected their teamwork productivity.

Peer Evaluation via TEAMMATES

This investigation utilised an online tool, the "TEAMMATES-Online Peer Feedback'' to explore further the existence of the free riders. There are a total of 15 questions that have been designed by the course instructor (See Appendix 2). In order to check the order of questions and to identify any ambiguous or confusing wording, these questions were piloted by four course instructors from different academic and research backgrounds and supervised by an expert from the School of Education, UUM. This pre-testing of the instruments was beneficial in making the researchers aware of the potential responses and possible misunderstandings that might occur during the TEAMMATES sessions. The questions were quite straightforward and matched the objectives of the research. Initially, the questions have been duplicated from the software itself, however, in order to provide further accuracy

for the research, some additional questions and changes were made as a result of the feedback that was received. The UUM Foundation students from Group F have been invited to join the TEAMMATES via the university electronic mail (E-Mail) account services to protect security and privacy.

Data Collection Procedures

The interview questions covered the following areas: experience, problems, feedback, and suggestions. The researchers emphasized that the information supplied for the study was confidential and would not damage the interviewee or others. Because this study seeks information on the group leaders' experiences, their identities must be protected to prevent them from being vulnerable. In particular, questions about their experiences, problems, concerns and issues can be quite sensitive and personal subjects that can cause discomfort to the free riders. For convenience and psychological security, interviews were conducted privately via WebEx.

The TEAMMATES, on the other hand, have three built tasks developed by the course instructor to fit the philosophy topics and promote the group and cooperative learning. Moreover, to make it a proper group-based project, the assignments were designed to be summative evaluations that will be included in their final marks. Hence, this will motivate the students to do their best and eliminate the chances of a "falls-free rider". This means when the evaluations are included in the final grade, the free rider that exists is a pure free rider.

Evaluation Process

The process of the evaluation started with the introduction phase where all the researchers discussed the plans and actions that need to be taken, anticipated the feedback and results to be observed, as well as the reflections to be considered in identifying the free riding issue. The next step was providing the students with their first group-based assignment (the written report). After the submission of the assignment, the course instructor sent a peer evaluation form via the TEAMMATES to the email provided by the student. Thus, the data collected through TEAMMATES for the first group-based assignment would be analyzed. After the score results have been collected, the course instructor has made some reflections with the group leaders regarding the free rider's issues. This was intended to motivate the student to do better in the next round of group-based assignments.

The second TEAMMATES evaluation started one week after the second cycle. Similarly, to maintain uniformity of the process, the same procedures have been employed as the first TEAMMATES. However, the second group-based project was the infographic poster preparation and presentation. The course instructor has successfully detected the free riders and arranged a counselling session to recognise their problems as well as to give some motivations and advice. Finally, the third TEAMMATES was meant for evaluation based on the video project. Again, the same procedures as cycle one were used to collect the data. This was the final cycle because the result indicated that the numbers of free riders were decreasing. The whole process of evaluation is displayed in Figure 2.

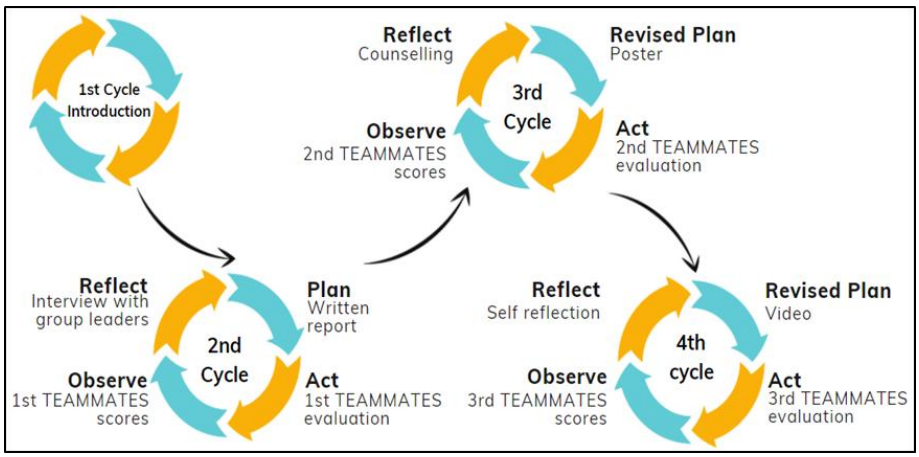


Figure 2. Evaluation Process

Data Analysis

Regarding the structured interview, it employed a variety of analytic strategies that involved sorting, organizing, and reducing the data, as well as assembling and interpreting it (Hashim, 2006). The first major step in analyzing the data was to organize the materials so that portions of the data could be readily retrieved. The analysis of the data began with transcribing interviews. In this process, the main task was to identify the key terms and sort out the important messages from each interview and data. Meanwhile, for the TEAMMATES, once the results have been gathered in the TEAMMATES software, all the 15 questions were analyzed according to groups and individuals to get deeper findings. The descriptive statistics on several individuals were determined to gather some crucial information on free rider's identification. The results are discussed further in the result and discussion sections.

4. Results

Below is the data gathered from the interviews with the group leaders and peer evaluation through TEAMMATES application in order to identify and solve the free rider problem among the Foundation Centre students in UUM.

Data from the Interview

The interviews were done to answer RQ1, to identify the free rider issue. Hence, the interview session was very quick. In fact, there were only three questions for students to answer. Based on Question 1, Group 1 and 5 have reported that they have free riders in their group. As claimed by both group leaders that:

Group 1:

"I have a problem with my group members. One of them did not give good cooperation in completing group assignments. She did not join the meetings and she was difficult to be contacted".

Group 5:

"We have a free rider in our group. She did nothing. I think it's not fair!"

When asked about how to tackle the free rider problem, each of them has his/her own suggestion as mentioned below:

Group 2:

"We have reported to the lecturer. Hope their marks will be deducted".

Group 3:

"I never experienced the issue of free riders. But to be fair, students need to be punished".

Finally, the students have been asked about the need to solve this problem. The majority agreed that this problem should be solved immediately as stated below:

Group 1:

"*Absolutely, it is because this issue is one of the crucial issues nowadays".*

Group 2:

"Of course, if everyone just is quiet, this problem cannot be settled".

Peer Evaluation from TEAMMATES

In this study, in order to answer RQ2, we had conducted three TEAMMATES peer evaluations for the group-based project. For each peer evaluation, all 27 students were divided into five teams, where Group 1, Group 2 and

Group 3 consisted of five members while Group 4 and Group 5 had six members. All the groups were labelled as G1 until G5. There were 15 questions in each peer evaluation that they needed to rate, known as Q1 until Q15. From the responses, we then calculated the mean (average) and standard deviation of every peer evaluation for each group, as seen in Table 1.

Group 5 (G5) had consistently scored the lowest average scores for all the peer evaluations compared to other teams. The average of 3.73 in Peer Evaluation 1 showed that Group 5 could have severe issues of free riders. The Peer Evaluation 2 and 3 again confirmed the lowest average scores of 3.78 and 3.85, respectively. This can also be seen in Figure 2 in which the green line representing Group 5 is at the lowest points than other teams. Nevertheless, even Group 5 scored the lowest among the groups, the trend of having fewer free riders is still in consensus with other groups.

This was followed by Group 1 (G1) which had the second lowest average scores of 3.95, 3.84 and 3.93 for Peer Evaluation 1, 2 and 3, correspondingly. Relative to Group 5, Group 1 could face mild issues of free riders. The blue line in Figure 3 representing Group 1 was just above the green line indicating a slightly better position than Group 5. Meanwhile, Group 2, 3 and 5 all obtained almost perfect scores in all three peer evaluations. Due to these differences, to answer RQ 3, further investigations were then made for Group 1 and Group 5 by looking into the details of scores gained by each group member.

Table 1. The Average Scores of Peer Evaluations by All Groups

Evaluation	Peer Evaluation 1					Peer Evaluation 2					Peer Evaluation 3				
	G1	G2	G3	G4	**G5**	**G1**	G2	G3	G4	**G5**	**G1**	G2	G3	G4	**G5**
Mean	**3.95**	4.00	4.00	4.00	**3.73**	**3.84**	4.00	4.00	4.00	**3.78**	**3.93**	4.00	4.00	4.00	**3.85**
Std. deviation	**0.06**	0.00	0.01	0.00	**0.04**	**0.11**	0.00	0.01	0.00	**0.03**	**0.09**	0.00	0.00	0.00	**0.10**

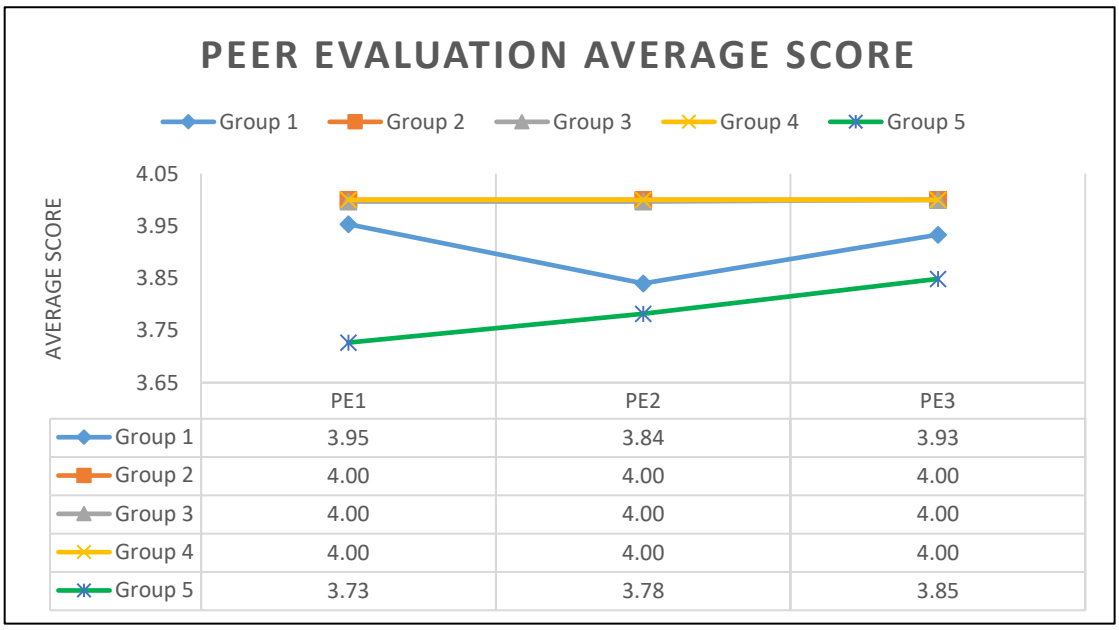


Figure 3: The Average Scores of Peer Evaluations by All Groups

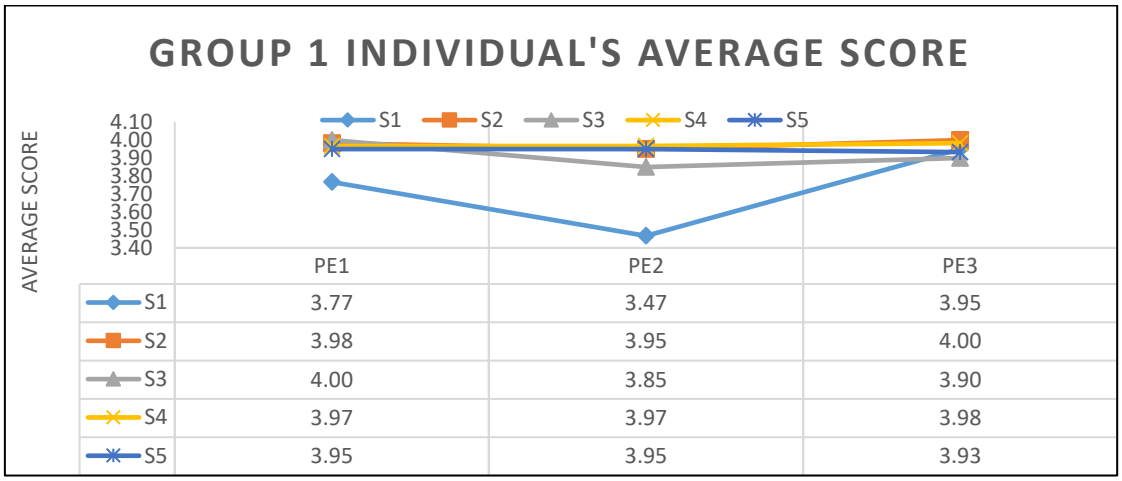
Meanwhile, Table 2 and Figure 4 summarised the average scores of all members in Group 1. During Peer Evaluation 1, Student 3 (S3) had scored the lowest average of 3.90, which was still relatively considered as a high score. Nevertheless, the scores for Peer Evaluation 2 had shown that Student 1 (S1) got the lowest average score

of only 3.47 and again the lowest in Peer Evaluation 3 with an average score of 3.77. The blue line in Figure 3 demonstrated the scores given by other group members to S1 in this Group 1.

Table 2: The Individual Average Scores of Peer Evaluations by Group 1

Evaluation	Peer Evaluation 1					Peer Evaluation 2					Peer Evaluation 3				
	S1	S2	**S3**	S4	S5	**S1**	S2	S3	S4	S5	**S1**	S2	S3	S4	S5
Mean	3.95	4.00	**3.90**	3.98	3.93	**3.47**	3.95	3.85	3.97	3.95	**3.77**	3.98	4.00	3.97	3.95
Std. deviation	0.10	0.00	**0.16**	0.06	0.15	**0.40**	0.19	0.26	0.09	0.10	**0.22**	0.06	0.00	0.13	0.14

Figure 4: The Individual Average Scores of Peer Evaluations by Group 1

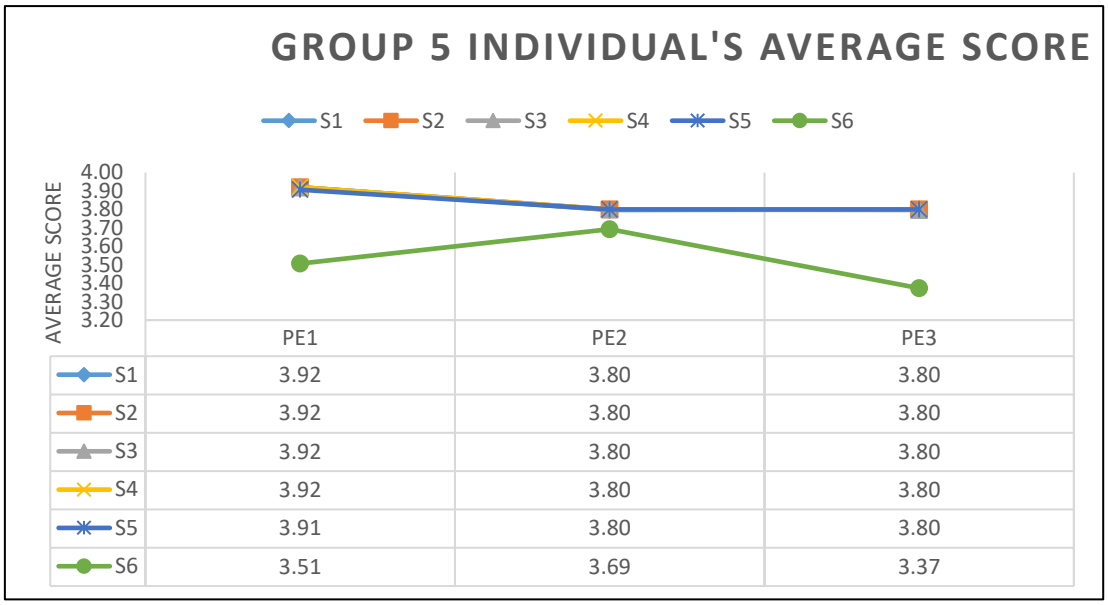


All average scores of each member in Group 5 for all the 15 questions were tabulated in Table 3. From the six members of Group 5, it was noticeable that the scores by Student 6 (S6) were distinctively lower than the rest of the group members. In Peer Evaluation 1, the average score by S6 was only 3.37 whereas the others achieved an average score of 3.80. A similar pattern was also found in Peer Evaluation 2 and 3 where the scores by S6 were again the lowest in the group.

Table 3: The Individual Average Scores of Peer Evaluations by Group 5

Evaluation	Peer Evaluation 1						Peer Evaluation 2						Peer Evaluation 3					
	S1	S2	S3	S4	S5	**S6**	S1	S2	S3	S4	S5	**S6**	S1	S2	S3	S4	S5	**S6**
Mean	3.80	3.80	3.80	3.80	3.80	**3.37**	3.80	3.80	3.80	3.80	3.80	**3.69**	3.92	3.92	3.92	3.92	3.91	**3.51**
Std. deviation	0.00	0.00	0.01	0.00	0.00	**0.24**	0.01	0.00	0.00	0.00	0.00	**0.18**	0.10	0.10	0.10	0.10	0.13	**0.15**

Figure 5 had illustrated this pattern and it was clearly shown that the dark green line denoting S6 was the most bottom of all the lines in the line chart. Although there was an increase during Peer Evaluation 2, the score fell again in Peer Evaluation 3.



	PE1	PE2	PE3
S1	3.92	3.80	3.80
S2	3.92	3.80	3.80
S3	3.92	3.80	3.80
S4	3.92	3.80	3.80
S5	3.91	3.80	3.80
S6	3.51	3.69	3.37

Figure 5: The Individual Average Scores of Peer Evaluations by Group 5

5. Discussion

The findings in this study are presented based on the diagrammatic model of Zuber-Skerritt (2010) in Figure 1. Based on the data gathered from the interviews with the group leaders (to answer RQ1) found that there were free riders in group works. Consequently, it has affected the group progress and productivity. Nowadays, most students in Malaysia in general and UUM, in particular, are facing free rider issues in completing their group assignments. This is due to several factors such as the distance, mode of teaching, unsupportive environment and lack of resources and facilities. These factors have become more crucial especially in the climate of the Covid-19 pandemic (Doyumğaç et al., 2021; Kamarudin et al., 2020; Shaharanee et al., 2020). Thus, the study planned to introduce some interventions to combat this issue.

The study believes using TEAMMATES was able to reduce the free riders, control, and reporting mechanism to the instructor (to answer RQ 2). Without a doubt, this software is beneficial in detecting free riders. Before implementing the TEAMMATES, the course instructor would begin by explaining to the foundation students the importance of teamwork and getting together in accomplishing an assignment. A written report assignment was given to the students and after the submission of the written report, the students were given a set of questions for the peer evaluation using TEAMMATES. The result of the second cycle (first TEAMMATES evaluation) was surprising, as it is the opposite of what was expected. It is hoped that students will be very careful in their commitment to the group assignment. Ironically, the result showed that the number of free riders was quite crucial, particularly in Group 5 which scored the lowest average of 3.73 compared to other teams. The low standard deviation of 0.04 indicated that there was less variation in the scores reflecting a lack of indifferences of the scores from the members of the group. Group 1 also suffered quite a low score. Meanwhile, the other three teams had not shown any problems with free riders since they had perfect scores.

For Group 1 and Group 5 specifically, perhaps, the low scores were due to several factors such as the students would focus more on ‘individual parts only and did not appear to integrate with other teammates substantially’ (Wu 2019, p.14-15). Secondly, this trend was also because most of the students are using TEAMMATES as a medium to report and portray their dissatisfaction with the group member whom they deemed as a free rider. The results of the first TEAMMATES look like file and report stages for all the students since it is the first time the teammates are being introduced and deployed; the students are eager to try. The findings were correlated with the previous studies that found that experienced students (year 2 and above) are more competent in teamwork and behaviour (Planas-Lladó et al., 2020, p. 195).

For the third cycle, the students have been given another assignment called an infographic poster. Each group needed to do an infographic poster based on the topic given. Similarly, after the submission has been made, the students were asked to evaluate their group members again by using TEAMMATES. Due to the decreasing numbers of free riders giving no significant difference, after doing a reflection, the course instructor insisted to have another intervention which was the counselling session. Indeed, the counselling sessions are very important in coping with this issue as it provides rooms for the free riders to share their problems, obstacles and concerns while dealing with the group assignments.

The second peer evaluation using TEAMMATES has given changes to the percentages of the free riders' involvement. The changes have made a reduced number of free riders reported in Group 5 where the average score was slightly higher at 3.78 than in the first peer evaluation. Unfortunately, an opposite result was found for Group 1 where the score was lower of 3.84 than in the first peer evaluation. This could be due to students realizing the functions of TEAMMATES, and thus being honest in the evaluation of their group members. Nevertheless, the research needs to be further investigated into another level to ensure the data and findings are reliable. Therefore, even though in the second peer evaluation there are positive indicators that TEAMMATES do reduce the number of free riders, another cycle is needed to ensure that the research reflects on the true value and spirit of the research.

For the fourth cycle, the students were required to produce a video of their presentation. The result of this final cycle becomes crystal clear and better as compared to the previous cycles in the fact that it helped in reducing the free rider issues among foundation students in UUM. This could be seen from results from the third TEAMMATES peer evaluation where both Group 1 and Group 5 obtained higher scores of 3.93 and 3.85, respectively. Undoubtedly, online tools such as TEAMMATES have certainly made efforts to reduce free riders easier (Viberg et al., 2019).

From all the peer evaluations conducted in this research, we found out that Group 1 and Group 5 had been facing the problem of the free rider. Thus, we continued our investigation for these two teams to identify which students were considered as free riders in their respective teams (to answer RQ3). In Group 1, all but Student 1, had obtained scores in the range of 3.90 and 4.00. In the first TEAMMATES evaluation, Student 1 only scored 3.77, the lowest score among the group members. This student's score was even lower in the second TEAMMATES evaluation of only 3.47. The intervention from the course instructor had probably alerted the students on the importance of giving honest evaluation for the group assignment, thus prompting the group members to critically evaluate each other. Student 1 was believed to cooperate and contribute better to the group assignment and finally scored 3.95 in the third TEAMMATES evaluation, as par with other group members. Overall, we could see the effect of the use of TEAMMATES in overcoming the free rider problem in Group 1.

In the meantime, Group 5 had faced a more serious issue where Student 6 consistently gained the lowest scores from the first until the third TEAMMATES evaluation. Even though there was an improvement of the score in the second TEAMMATES evaluation, the third TEAMMATES evaluation had seen a drastic fall where Student 6 only scored 3.37, the lowest of all scores. The instructor then realized that a more serious intervention should have been done in understanding the root cause of this free rider issue. A counselling session was then given specifically to Student 6 in order to emphasize the importance of teamwork and the consequences of failing to contribute to the group assignment. In this research, it seems that the students evolved from reporting the issues of free riders by using the TEAMMATES in the second cycle; understanding the consequence of being labelled as free riders that make the third cycle intervention less free riders and acting their best to not be identified as a free rider makes the fourth cycle even fewer free riders reported.

Undeniably, TEAMMATES offers a comprehensive peer feedback and peer assessment process with a high level of flexibility. The system makes it simple to add a new assessment item and the questions/response criteria. Using TEAMMATES does help with one of the primary potential issues with group-based evaluations. To sum up, the study believed that the peer evaluation platform - TEAMMATES was useful to evaluate student engagement and collaboration in a group. Furthermore, the students also notice that working in a group is an important skill they have obtained through group assignments. The TEAMMATES helps the students to be conscious and aware of their behavior and responsibility towards group works.

Limitations

The present research has several limitations. The respondents in this study were from one university programme during one semester of study only. Thus, the information obtained was inadequate given the short time frame. Moreover, a limited budget hinders this research to be conducted to other batches of students.

Recommendations

Further research is suggested to be carried out across different programmes or courses as part of the university' assessment of human values among the students. Comparative research of different education institutions could be carried out too.

6. Conclusion

The anchor of this study is based on the action research, which focuses on the result produced during the study and after the study was conducted. Secondly, the study is based on several cycles to test and ensure that the result is reliable. There are no minimum and maximum cycles but depends on the need of the research whenever applicable. However, currently, the findings are based on the four cycles: First, introduction phase of plans, actions, observations, and reflections that would be carried throughout the overall evaluation process. Second, introducing the TEAMMATES. Third, continuing the TEAMMATES and a counselling session with the free riders. Fourth, final peer evaluation through the TEAMMATES to test the effectiveness of the teammates and interventions being used.

Notably, the uniqueness of this research is that it deploys the use of the digital tool as a mechanism to detect and reduce the free riders' issues among university foundation students of UUM. Indeed, the findings were very interesting that not just successfully detecting and signaling the free rider's existence in the groups but most importantly after several assignments, the free riders can be reduced in number. Overall, the TEAMMATES system provides positive experiences for peer evaluations in mitigating free riding issue due to its simplicity, flexibility, and notable features.

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Appendices

Appendix 1: Interview with The Group Leaders

1. Have you experienced free riders in your group?
2. How did you tackle this problem?
3. Do we need to solve this problem? Why?

Appendix 2: TEAMMATES Questions

Q1: Attends group meetings regularly and arrives on time

Q2: Contributes meaningfully to group discussions

Q3: Completes any given task on time

Q4: Prepares work in a quality manner

Q5: Demonstrates a cooperative and supportive attitude

Q6: Contributes significantly to the success of the project

Q7: This student has tried his/her best most of the time

Q8: Sincerely, has he/she really contributed to your group work?

Q9: Are you sure that he/she really works for the group?

Q10: God as your witness, do you really think, he/ she cooperates during your group work?

Q11: Is he/ she willingly to cooperate with your group member in accomplishing your group work without hesitation?

Q12: Sincerely, do you think he/she has given the best commitment during group work?

Q13: With utmost truth and in the name of justice for all, do you think he/she has given his/her best in completing your group work assignments?

Q14: Do you agree that NONE of your group members is a free rider?

Q15: Do you agree that your group member is FREE from a ‘free rider’?

Appendix 3: TEAMMATES Online Peer Evaluation System