

Group Assignment Management System (GAMS) for University Students

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Abstract

Within the university curriculum, students are required to fulfill group assignments as part of their assessments. There are many platforms available that students can use to organize group assignments, such as WhatsApp. Based on a survey conducted among students at a university in Malaysia, WhatsApp was the preferred platform for most students. However, many students encountered challenges and issues while using it during group work. 100% of the respondents identified an excessive volume of cluttered messages within WhatsApp groups as a noticeable issue encountered during group work. While 76% of the respondents became confused due to too many roles in multiple tasks, 64% overlooked assignment deadlines. Thus, a new system called the Group Assignment Management System (GAMS), which is a web-based system that assists a group of students in managing their group assignments was developed and proposed to university students to solve the problems found. The Waterfall model is applied in developing GAMS. There are three users in the GAMS: administrator, leader, and member. In a nutshell, GAMS allows group partners to review and track different tasks performed individually online, including assigning tasks, keeping track of teammates' work progress, and getting SMS notifications regarding task deadlines. Hence, it is hoped that this system will improve the management process of group work by moving from manual practice to an online system as well as be beneficial to students and lecturers. The system's usability was also tested using the System Usability Scale (SUS) survey and obtained a good score of 70.44, which means that this system is acceptable to use.

Keywords: Group Assignment, Web-Based Management System, University Students.

Introduction

One of the many benefits of group assignments is to challenge students' ability to think about their ideas and explain them to others. As students, they must be prepared for the assignments that will be assigned as part of the continuing learning process. Assignments will be assigned to students in groups or individually. In the classroom, this technique is characterized as a group of usually two to six persons (Brame, 2019). Group assignments are an effective method of learning and cooperating with others, to learn via group collaboration and encourage all students to engage in the learning process.

When team members work collectively, work efficiency will increase. According to Adwan, (2016), a team must work together long enough to develop a basis for working together, which is rarely seen in the classroom. This is especially important for faculty that is implementing online group projects. This type of group activity requires special consideration because the students may or may not know each other, and the virtual learning environment may not encourage students to form close bonds with other group members. However, it is widely known that group assignments can be difficult to manage, especially for the group's leader (Xu, 2022).

Working in a group, particularly at university, may be challenging. There are a variety of issues that might arise during group work. Therefore, an online survey for students was created using Google Forms to get information about the group assignment. Based on the online questionnaire that has been distributed to students at one of the higher institutions in Malaysia shows that all 25 respondents choose WhatsApp as the platform they generally use to organize group projects. While Telegram and Google Docs are two relatively popular methods, both were only 24% of respondents' choices. According to the survey, 100% of them have dealt with an issue in a group project and 96% want to clear up any misunderstandings in the group. 80% of respondents have no prior experience with group assignments management system, according to the comments and suggestions section. 84% believe that a group assignment management system will improve group work structure and 100% would like to use it.

Three major issues were identified by the survey. The first issue identified by the survey was that too many cluttered messages in a WhatsApp group make it difficult for the leader to track the completion of certain assignments (Ameri, 2022). 100% of respondents that carried out chose this issue and addressed it. The second issue found by the survey was that students are confused because of having too many roles in various assignments (Gjestvang et al., 2021). 76% of respondents are affected, making it difficult for group members to manage their work. The third major issue identified by the online survey was the overlooked assignment deadlines, which were selected by 64% of respondents. This is because WhatsApp does give starred message features, but it does not provide notification for a specific message by date (Ameri, 2022).

However, the three issues mentioned are due to using an inappropriate platform which is WhatsApp, but they can be overcome by using the existing systems created, for example, Microsoft Teams. The students reported that they encountered some technical difficulties with the file structure on Microsoft Teams (Thi & Loan, 2021). They believed that the file structure was difficult for users to understand and that some tools on Microsoft Teams were similar and redundant. According to Sobaih et al (2021), students did not think Microsoft Teams was a useful tool for support, participation, or assessment. They stated that they did not receive proper support and participation in MS Teams activities. This meant that they did not believe Microsoft Teams was a sufficient tool for receiving appropriate support and participating in course activities.

Thus, a web-based system, namely Group Assignment Management System (GAMS) was proposed to develop. For this system, the leaders play an important role in organizing tasks and their team members. Three objectives were set based on the issues obtained. GAMS will provide a task update feature for all group members. Members can update their task status so the leader can see how each member is doing on the allocated assignment. Moreover, while creating assignments or projects, GAMS enables leaders to assign members

to specific tasks. This will make each member of the group clear of any doubts about the task in progress. Hence, it will result in a variety of consequences, especially the loss of scoring in group work. Aside from managing functions such as assigning tasks with their own deadlines, GAMS also sends out SMS reminders to team members about approaching deadlines for projects.

Literature Review

Management Information Systems (MIS) is the study of people, technology, and organizations, as well as their interactions. MIS was chosen to develop GAMS as it can study the interaction between people, technology, and organization. This is important because it can overcome the problems found in requirements gathering and analysis which is that the leader is having difficulty tracking the completion of the assignment delegated. Effective management information systems may help the organization function smoothly by ensuring that the team works together to complete the task (Soni, 2020).

Writer (2021) stated that the benefit of MIS for group work is that data is centralized. Data is one of the most important components of any organization as well as being the foundation of every operation. Data such as assignment due dates, for example, assist students in allocating time to complete assigned tasks. Users can collect data and store it in a single system because the MIS software is cloud-based. Moreover, the smooth flow of processes is one of MIS's advantages (Natsir, 2023). MIS also assists organizations in making use of them. As previously stated, the information gathered is used for future planning or decision-making. Thus, the MIS can also be used for the planning stage such as assisting students in creating new assignments and publishing them for use by team members. Students can use the web application to save data such as project titles and due dates. They can use these in this system project details later. The ability to perform these processes in a single software application aid in the smooth flow of things and processes. Since everything is done through one channel, there will be less room for errors or mishaps.

A web-based student task management system was previously created by Nurzi and Ab Wahab (2022) to assist University College of Yayasan Pahang students in managing their assignments without missing the deadlines. The system includes task tracking and recommendation capabilities that assist students in better managing their duties and determining the most important or critical activity to complete first. Therefore, the system was successful in resolving the issue of managing students' tasks and assisting them in being more productive and efficient in their studies. Other than that, to improve social presence on the web, video-based assignments (VBAs) were used De Gagne et al (2018) to encourage students to interact with each other. This study discovered that social presence and engagement are positively related to student learning and satisfaction in Web-based courses. Besides, Siddiqui et al (2018) provide a new system which is web-based group decision support system for the Academic Term Preparation (ATP) problems. Their new system replaced a semi-automated spreadsheet tool and gave better timetable quality. The system also reduced lead times and human errors.

Methodology

The methodology used in the development of GAMS for university students is the Waterfall model. In this section, the methodology is divided into four phases, gathering data

requirements, designing, developing and testing. The proposed system focuses on implementing web-based GAMS for university students to benefit both the leader and the rest of the team by eliminating grouping work conflicts. Since it is web-based that is responsive web, users will be able to access it from anywhere with the touch of a fingertip using any sort of device such as a smartphone, laptop, or tablet. The proposed system was developed with the PHP (Hypertext Preprocessor) programming language and the MySQL database. The system consists of three users which are the admin, the leader, and the members of the group. Following that, the admin will be able to view a report of all projects and tasks that have been created.

Table 1 discusses in detail the activities that are involved in every phase. The methodology consists of the four phases: i) requirement gathering and analysis, ii) design, iii) implementation and iv) testing.

Table 1

Activities and deliverables in methodology

Phase	Activities	Deliverables
Phase 1: Requirement Gathering and Analysis	<ol style="list-style-type: none"> Literature review Prepare a set of questionnaires questions Distribute the questionnaires to university students Analyze the requirement 	<ol style="list-style-type: none"> Definition and related studies Online questionnaires form Data from the online survey List of system requirements using descriptive analysis Use Case
Phase 2: Design	<ol style="list-style-type: none"> Design the system interface Design system database Document the system design 	<ol style="list-style-type: none"> Storyboard for system design Entity Relationship Diagram (ERD) Software Design Documentation (SDD)
Phase 3: Implementation	<ol style="list-style-type: none"> Develop the web-based system based on requirements 	<ol style="list-style-type: none"> A functional and complete web-based system
Phase 4: Testing	<ol style="list-style-type: none"> Distribute a survey 	<ol style="list-style-type: none"> System Usability Scale (SUS)

Findings and Discussions**Phase 1: Requirement Gathering and Analysis**

The data obtained from the online survey carried out was analyzed to identify and finalize the requirements for developing GAMS for university students. The data was presented in descriptive statistics. Figure 1 shows that WhatsApp is the most common platform that is currently used by respondents to organize group projects. Figure 1 shows 86% of the respondents used WhatsApp as the current platform, followed by Microsoft Teams, Telegram, Google Docs, and Classroom.

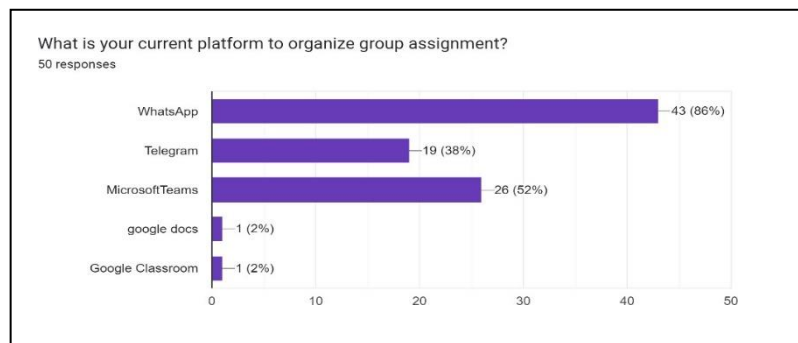


Figure 1 Current platform to organize group assignment

Figure 2 illustrates that the highest satisfaction scale of respondents was at scale 2. It shows that 30% of the respondents are dissatisfied with the current platform used to organize group assignments.

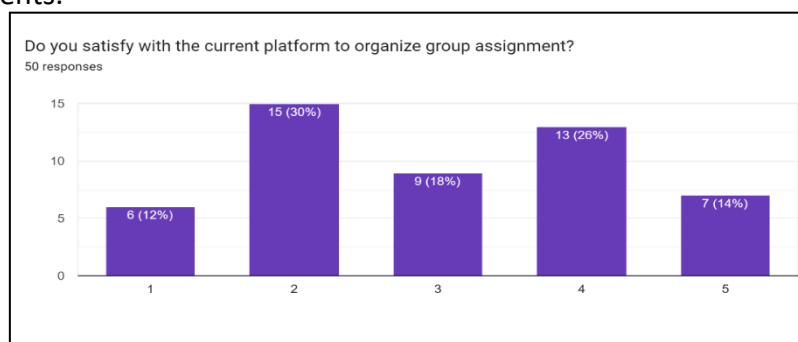


Figure 2 Level of satisfaction with the current platform to organize group assignment

Figure 3 revealed that most respondents encouraged the development of a new special system for group assignment management because the highest percentage (44%) were respondents who chose the scale 4 (agreed).

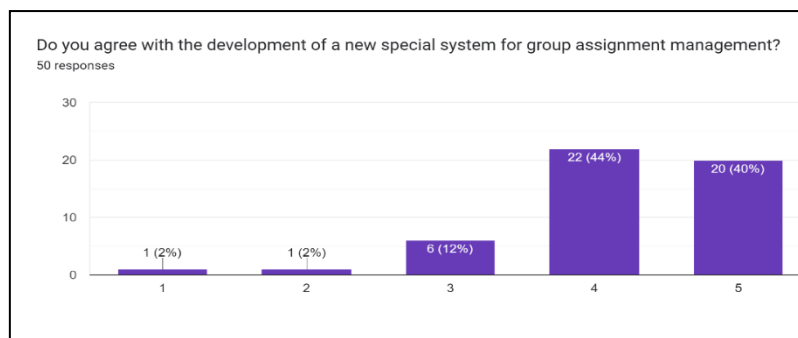


Figure 3 The development of a new special system for group assignment

According to Figure 4, respondents provided some features or suggestions for involvement in this GAMS. Despite the small number of responses, it still counts as a suggestion, and the characteristics provided are quite insightful. This is due to the most proposed features with 86% updating task progress, being appropriate to address the issue of group leaders who find it difficult to track the tasks of their group members. The clock-in feature is a smart suggestion because it allows the group leader to see whether his or her

group members are actively performing tasks assigned through GAMS. Furthermore, email notification chosen by 48% of respondents is a good feature to remind members of the deadline of certain tasks and projects. Finally, respondents appear to be interested in the leader assigning each task to each GAMS member.

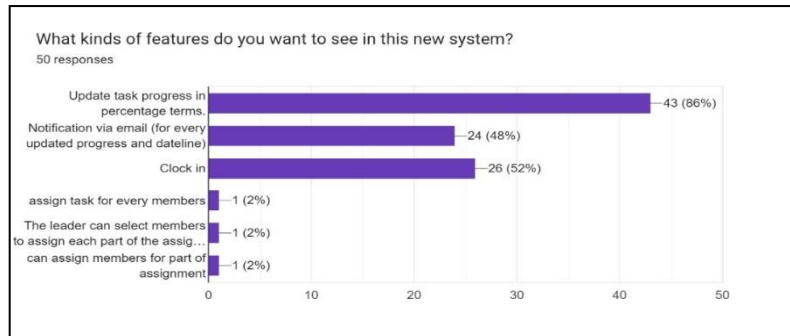


Figure 4 Suggested features in GAMS

Phase 2: Design

A use case is a collection of possible sequences of interactions between systems and users in a specific environment that are related to a specific goal. Figure 5 depicts a use case that was developed following the gathering and analysis of system requirements. This is a high-level view of the project that gives a general overview. Users can either be leaders or members. This system enables both group leaders and members to manage group tasks. With the update progress and assign member features as in Figure 5, this system will make it easier for the leader to manage group tasks. Furthermore, depending on the needs of its users, the system will provide a variety of functions.

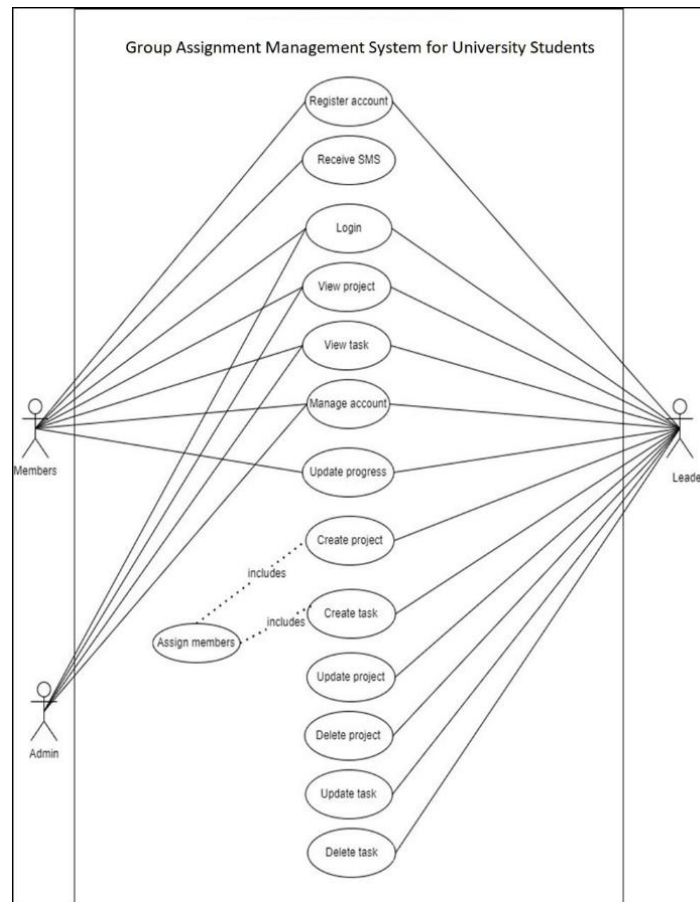


Figure 5 Use case diagram of GAMS for university students

Several activities are completed during this design phase, including the creation of a storyboard for the user interface and the creation of an Entity Relationship Diagram (ERD) to demonstrate the data flow for the project database. The user interface storyboard is created to assist in visualizing how the system is working. Meanwhile, ERD, known as the entity-relationship model, is a structural diagram used in database design. All activities from this phase will be documented in the Software Design Document (SDD). This document is primarily intended to be a reference for developing the first version of the system for the development team. Next, GAMS was developed using PHP, HTML, CSS, and a MySQL database.

Phase 3: Implementation

Figure 6 depicts the user interface for a project list that is sorted by title, date started, due date, project status, and action that can be taken. It also includes an *add new project* button.

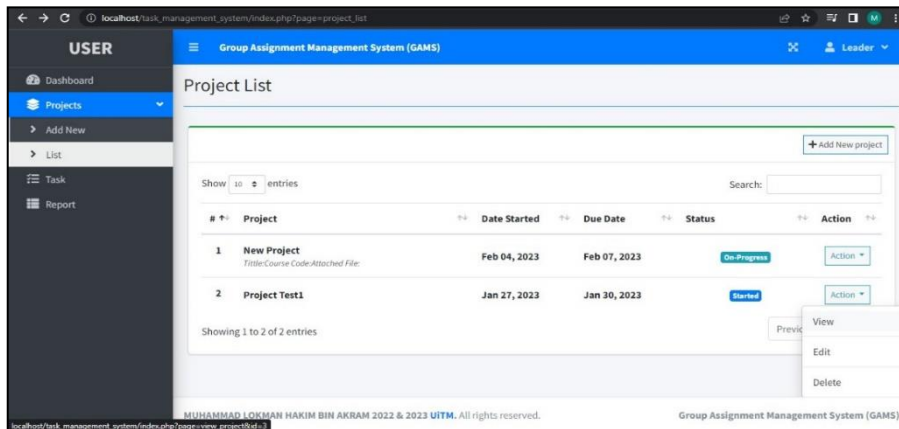


Figure 6 User Interface for Project List

Figure 7 depicts the user interface for the "Project Test1" view project. The project details are displayed, including the members assigned and the task list. It also shows that the leader has already created a new task with the status "Small Task Project 1" and is in progress status. Users must click action and view the task to update their progress.

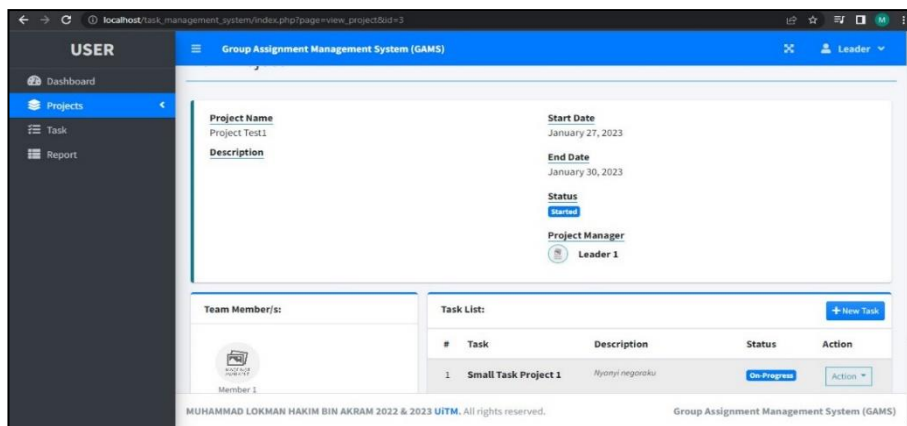


Figure 7 User Interface for View Project

Figure 8 depicts task details that the leader can update, which include the task title, description, and progress status. The user now wishes to change the status from *On-Progress* to *Done*.

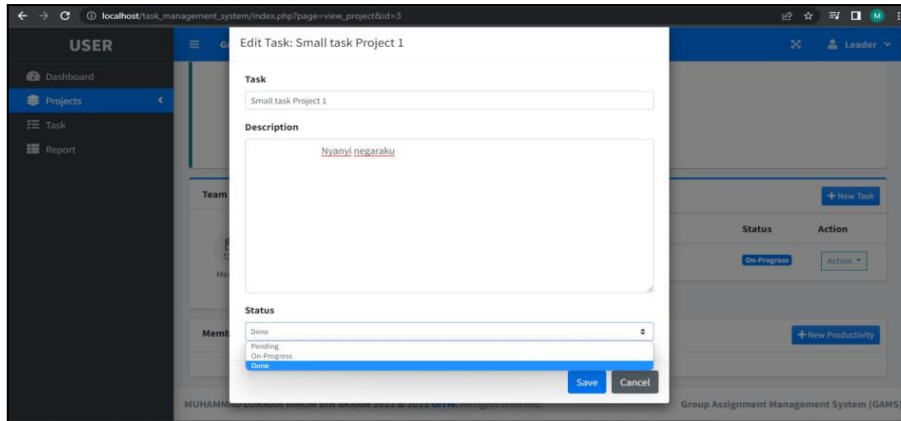


Figure 8 User Interface for Update Task and Update Progress

Figure 9 depicts the updated project list interface with the successful completion of an updated task progress to the Done status. On the left side of the task list, we can see the group members who have been assigned to this project. The system allows the leader to add multiple members.

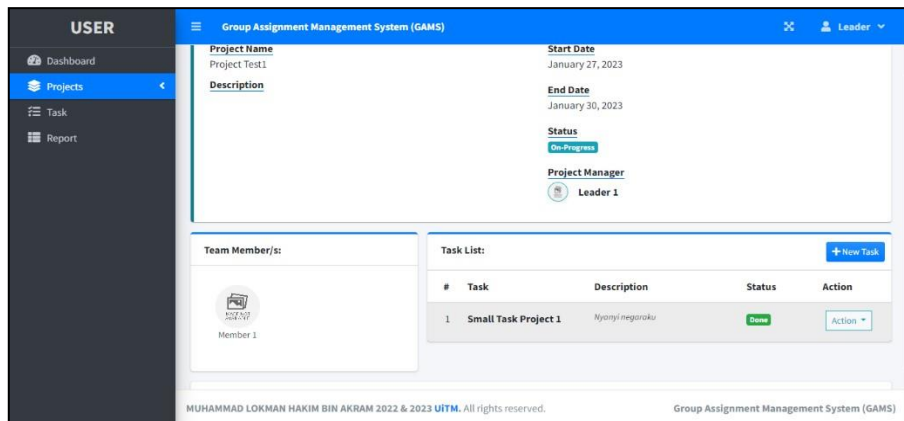


Figure 9 User Interface for Updated Project List

Figure 10 shows the leader's interface adding a new project to the new project form. The leader can also assign group members who have registered with the system with a single click in the members' field.

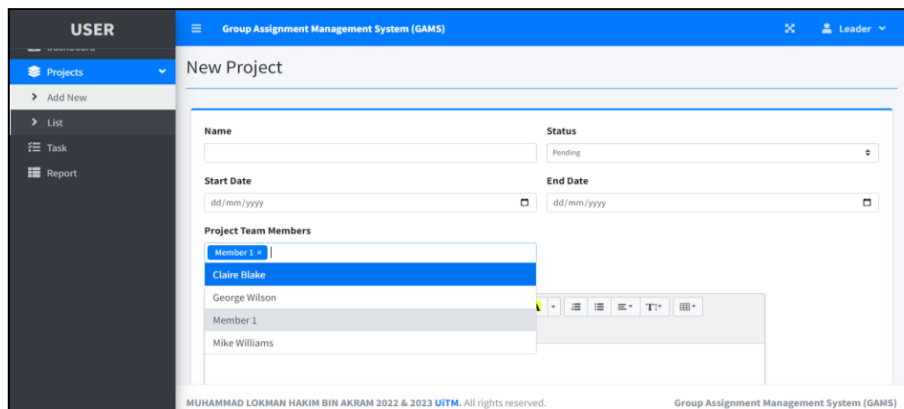


Figure 10 User Interface for Add New Project

Figure 11 depicts a screenshot of the SMS notification, in which the system automatically sends an SMS to the assigned group member after the group leader assigns them to a project. The SMS contains the project name, start date, and due date, as well as sender information. Figure 12 depicts the administrator dashboard, which allows the administrator to monitor the project's progress more closely. This is since the number of assignments assigned in each project, as well as the work duration for group members to complete assignments, are displayed.

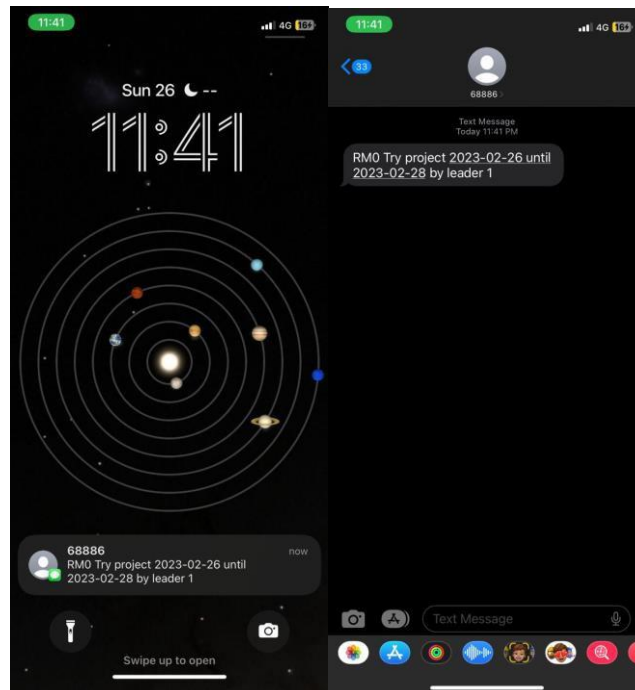


Figure 11 Screenshot of SMS notification

#	Project	Task	Completed Task	Work Duration	Progress	Status
1	CTU Due: 2023-02-28	1	0	0 Hr/s.	0% Complete	Done
2	ENT Due: 2023-02-25	2	2	16 Hr/s.	100.00% Complete	On-Progress
3	Fyp Due: 2023-02-23	1	0	0 Hr/s.	0% Complete	On-Progress
4	Fyp2 Due: 2023-04-21	0	0	0 Hr/s.	0% Complete	Started
5	High Rise	0	0	0 Hr/s.	0% Complete	Started

Figure 12 User Interface for Admin

Phase 4: Testing

The System Usability Scale (SUS) surveys was used to evaluate the feedback systems developed. Table 2 shows the items in SUS that consists of ten items. The 17 participants rate the SUS questions on a scale of 1 (strongly disagree) to 5 (strongly agree). However, according to Brooke's scoring, the outcome of these responses is rated on a scale of 0-4. The odd-

numbered questions in the SUS have positive meanings, whereas the even-numbered questions have negative implications (Kaya et al., 2019).

The SUS score is calculated by subtracting 1 from the user’s score for odd-numbered items (1, 3, 5, 7, and 9). For items with even numbers (2, 4, 6, 8, and 10), subtract the user’s score from 5. Calculate the sum of the modified ratings and multiply by 2.5 to get the final score, which is usually between 0 and 100. Higher scores indicate better usability. A score of 70 is considered above average and acceptable, and scores over 85 are considered excellent, suggesting a user-friendly system (Brooke, 1996). Table 3 concludes that the system considers received ‘above average’ level of usability acceptance.

Table 2
The items in the SUS

No.	Item
1.	I think that I would like to use this system frequently.
2.	I found the system unnecessarily complex.
3.	I thought the system was easy to use.
4.	I think that I would need the support of a technical person to be able to use this system.
5.	I found the various functions in this system were well integrated.
6.	I thought there was too much inconsistency in this system.
7.	I would imagine that most people would learn to use this system very quickly.
8.	I found the system very cumbersome to use.
9.	I felt very confident using the system.
10.	I needed to learn a lot of things before I could get going with this system.

Table 3
SUS score

Participants	Items SUS										SUS Score
	1	2	3	4	5	6	7	8	9	10	
1	2	2	3	3	3	2	4	2	4	4	72.5
2	3	4	3	1	4	4	4	3	3	1	75
3	3	2	4	1	4	2	4	3	3	2	70
4	4	3	4	2	4	3	3	3	3	3	80
5	3	2	3	1	3	2	3	2	3	1	57.5
6	3	1	4	3	3	3	4	4	3	3	77.5
7	3	3	3	3	3	3	3	3	3	2	72.5
8	3	2	3	2	3	3	4	3	3	1	67.5
9	3	2	3	2	2	3	3	3	3	3	67.5
10	4	4	2	2	3	2	4	2	3	2	70
11	4	2	3	1	4	3	4	4	4	0	72.5
12	3	3	3	2	3	1	4	2	3	3	67.5
13	3	3	3	2	3	4	3	4	3	3	77.5
14	3	2	3	0	4	1	3	2	3	2	57.5
15	2	2	2	4	2	2	3	2	2	2	57.5
16	4	2	4	3	3	3	4	3	4	2	80
17	3	3	4	2	3	2	4	4	4	1	75
Average SUS Score											70.44

Conclusion and Recommendations

With the current and advanced technology in group assignment methods, the GAMS can be easily accessed and used by students at any time and everywhere with the availability of wireless connection. Moreover, from System Usability Scale (SUS) survey, the functionality and validation of the GAMS scored 70.44 which is above average and acceptable. The scores obtained prove that the GAMS effectively and efficiently satisfy the end user. Therefore, it is hoped that with GAMS, it can improve the group assignment management process from manual practice to online system. However, to ensure system smoothness and user demands, this system requires recurring enhancements such as providing group video conferencing feature as well as other group chat invitation features.

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