



Journal of Advanced Research in Applied Sciences and Engineering Technology

Journal homepage:
https://semarakilmu.com.my/journals/index.php/applied_sciences_eng_tech/index
ISSN: 2462-1943



Engaging Learners using Discord Application During Signals and Systems Online Class

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ARTICLE INFO

Article history:

Received 24 June 2023

Received in revised form 5 October 2023

Accepted 18 October 2023

Available online 3 November 2023

Keywords:

Distance learning; online learning;
Discord; class engagement

ABSTRACT

Discord is a chat application akin to Skype or TeamSpeak, as well as professional communication systems such as Slack. It was designed exclusively for video game players, including ways for them to find one another, coordinate play, and communicate while playing. It allows users to communicate in a variety of ways including video calls, audio chat, and text. During distance learning, students feel lonely and isolated in online classes. Furthermore, Discord makes distance learning systematic and easy for the educators to monitor all the students throughout the semester. Therefore, this work discusses strategies on how Discord can be used to create an interactive class and brings educator-students closer as a class during distance learning. In this work, the implementation had been done in the Signals & Systems course. Thus, it is a good example for engineering-related classes. Students' feedback and final grade were analyzed to identify either Discord provide interactive environment during online classroom or not. Results discussed in this work are based on behavioral engagement, emotional engagement, and cognitive engagement. In addition, individual participation had been analyzed and compared with the final grade. In conclusion, the implementation of Discord in the Signals & Systems online class received positive feedback on the students' engagement and the final grade. Also, Discord is suitable to conduct synchronous or asynchronous online classes and increase students' engagement.

1. Introduction

Many countries have ordered the closure of all educational institutions due to the COVID-19 outbreak in 2020. Therefore, three academic models for 2020-2021 were proposed by the Office of Teaching Effectiveness and Innovation, Clemson University [1]. The first model is blended or hybrid which means an instructor delivers the course content simultaneously to an in-person group of students and online students. Therefore, the instructor should engage with the in-person group of students and the online group at the same time. The second model is traditional fully in-person which is quite similar to normal class before the pandemic and the third model is fully online. The fully

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<https://doi.org/10.37934/araset.33.2.244253>

online class can be delivered synchronously or asynchronously. Synchronous means engagement through Zoom or Webex or another online meeting platform that can involve polling or breakout sessions for the more interactive session. Asynchronous engagement is like flexible text communication or giving YouTube videos to the students to watch before the class.

The COVID-19 outbreak had affected Malaysia when the first case was reported in January 2020 and the number rose abruptly in early March 2020. Consequently, the Malaysian Government announced a Movement Control Order (MCO) on March 18, 2020, to help the Ministry of Health keep the spread and deaths under control [2]. Therefore, universities are closed and dramatically changed the education landscape [3]. As a result, educators and students were forced to adopt e-learning technologies. Although online learning has long been introduced, the challenges in its implementation continue to build up.

Five categories of student challenges in the online class have been identified in [4] which are self-regulation challenges (SRC), technological literacy and competency challenges (TLCC), students isolation challenges (SIC), technological sufficiency challenges (TSC), and technological complexity challenges (TCC). Another two categories of challenges have been introduced in [5] which are learning resource challenges (LRC) and learning environment challenges (LEC). SRC refers to students' behavior to achieve learning objectives. TLCC refers to the ability of students to use technology effectively for online learning. SIC relates to students' emotional discomfort where they feel lonely and isolated. TSC is students' experience in accessing technology while TCC is students' experience with complex technologies. LRC refers to the challenges related to instructional materials and library resources and LEC refers to the students' learning space. LRC and LEC were particularly introduced for developing countries.

The focus of this work is SIC where isolation challenges in online learning have been discussed in [6-9]. The key solution to the isolation problem is students' engagement [10]. Newmann et. al defined student engagement as "the student's psychological investment in, and effort directed toward learning, understanding, or mastering the knowledge, skills, or crafts that academic work is intended to promote" [11]. Basic of online learning have been identified in [12] which are student-content, student-instructor, and student-student. Class design using Discord to engage students in online classes using Community of Inquiry Framework has been discussed in [13].

2. Online Engagement Model using Discord

Discord was introduced in 2015 for the social gaming platform. It is a free application incorporating text chat, voice, and video. It can be accessed via desktop app, mobile app, and web app. It enables instructors and students to communicate using one platform. Figure 1 shows the online learning model using Discord.

As can be seen in Figure 1, Discord is an all-in-one platform for the online class where it is a combination of WhatsApp or Telegram, LMS, and an online meeting platform. Therefore, easy to organize online classes. Discord features can turn online classes becomes more interactive. The strategy of using Discord for online classes is discussed in the next section.

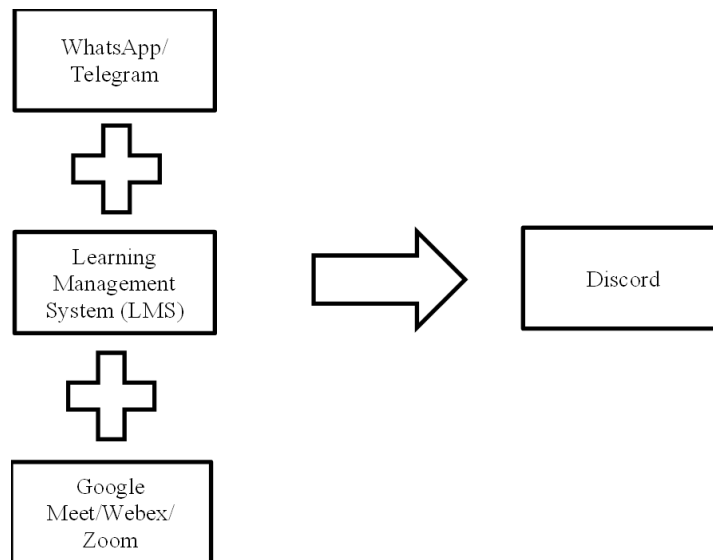


Fig. 1. Online learning model using Discord

3. Discord Implementation

In Semester II, 20192020 when MCO was announced, Google Meet had been chosen for lecture and WhatsApp for the group class [14-20]. The problem was the instructor feel lonely during the class besides difficulty monitoring the students. In addition, the instructor was overwhelmed by WhatsApp groups due to Work from Office (WFO) and kids' class groups. One of the students suggested Discord for the online class. That was the first time the instructor heard about Discord and started to explore and use it for the online class in September 2020.

Figure 2 shows Discord's interface and how it is designed for the online class. The diagram on the right is the continuity of the diagram on the left (need to scroll down in Discord).

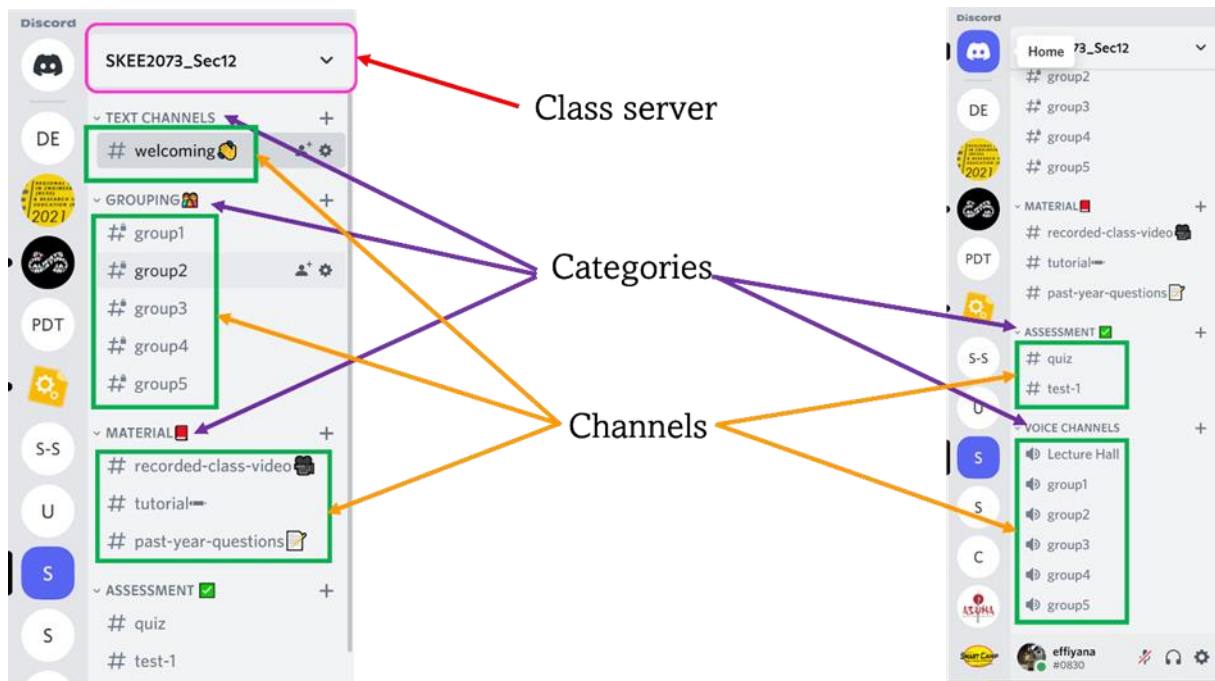


Fig. 2. Discord interface

As can be seen in Figure 2, there is a class server, categories, and channels. The class server is created for each class or section. In Discord, there are two channels which are the text channel and the voice channel. The text channel functions as a text group to replace WhatsApp and Moodle while the voice channel functions as voice communication to replace Zoom or Webex as a virtual meeting platform. Channels can be grouped into categories. As shown in Figure 1, there are five categories of channels, which are Text Channel, Grouping, Material, Assessment, and Voice Channels.

Under the Text Channel category, there is a Welcoming channel where all the students who joined the server will be greeted in this channel. The Grouping category listed a private text channel for each group of students. It is called the private text channel because that channel can be seen by the members and instructor only as shown in Figure 3. Therefore, the students can use this channel to discuss the assignment, homework and this group act as their group discussion as well.

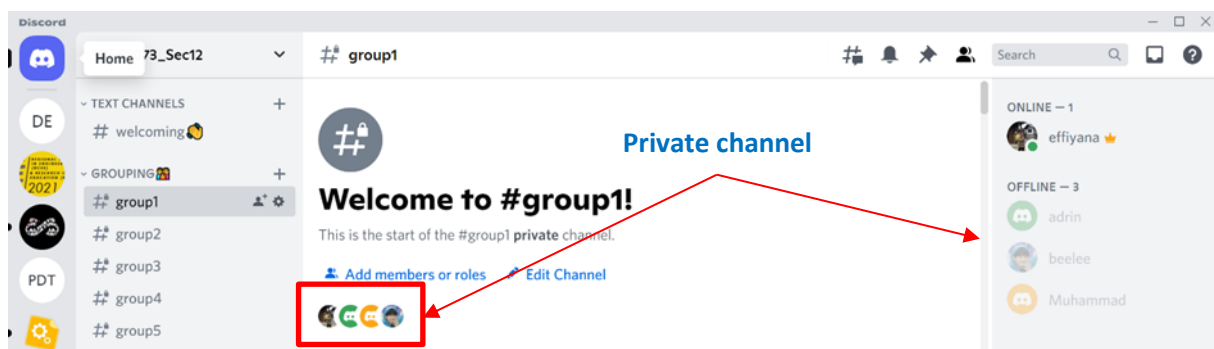


Fig. 3. Private group channel

Other categories are Material and Assessment, function like Moodle. As can be seen in Figure 2, there are three channels under the Material category, recorded class video, tutorial, and past year questions, and two channels under the Assessment category, Quiz and Test 1. Therefore, the students do not need to log in to Moodle anymore to get these materials since they can be placed in this channel. Easy for them to access the materials. Channel can be easily added by the server creator (instructor) therefore if the instructor needs another channel like lecture notes, it can be created under the Material category. It is very structured thus do not need to scroll the channel as in WhatsApp.

The last category is Voice functions for communication. Under this category, the general voice channel is created for each group because the instructor wants the students to freely move from one group to another group as in physical class. The group voice channels are similar to the breakout room in Zoom or Webex. The difference in Zoom or Webex cannot monitor all the breakout room at the same time but in Discord everyone can see people who are speaking or sharing their screen in other breakout rooms. Furthermore, more than one user can share their screens where this feature has been used in programming cause. The students shared their screens simultaneously and compared their coding for discussion. This feature is illustrated in Figure 4. The reason the general voice channels are created for all groups is if the students want to join another group discussion, they can just click the group number and join the discussion therefore the class is very lively.

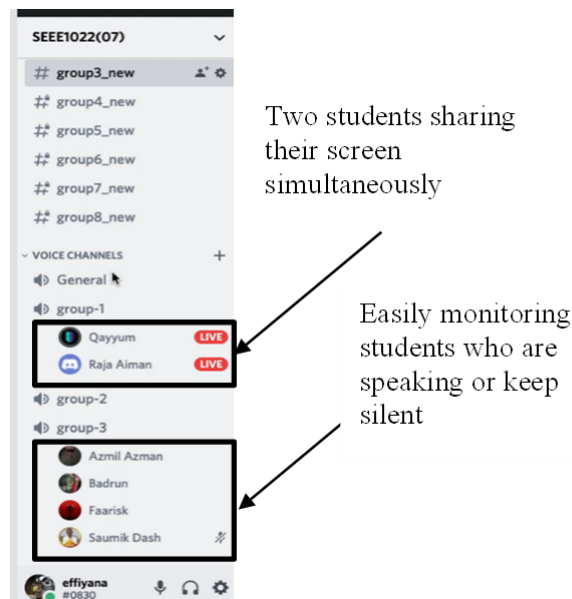


Fig. 4. Voice communication feature

Another feature is a user can join different voice channels and text channels simultaneously. For example, when the instructor joins group 3 voice channel and the instructor finds that group 4 is using the group's private text channel to communicate rather than the voice channel, the instructor can read group 4 private text channel while listening to group 3 discussion. This cannot be done in Zoom or Webex, where the instructor feels isolated when the students are in the breakout room. In addition, students who want to call the instructor, they can just tag the instructor in their private group text channel. If the instructor is still in another group discussion, the instructor can just reply to their text and mention will be joining shortly. Thus, can avoid miscommunication because the students know the situation.

Discord is integrated with the Google platform where the instructor created a folder for each group then the students can freely add Google Docs, Google Slides, or Jamboard for class activities. The reason is easy for the instructor to keep track of each group's work. Then, the link of the folder is shared with each group in their private group text channel and the message is pinned as in Figure 5.

When the students finish with their task, they will tag the instructor in their private group and the instructor will check their work which is normally created in that Google Drive using Google Docs or Google Slides. From the instructor's perspective, it is more structured and easier to monitor all the students' work. The students use the private group text channel to discuss their tutorial and assignment. The discussion happens casually, and the instructor can monitor all groups throughout the semester. Normally, the instructor will give a good emoji reaction to their discussion if they are on track and conduct an additional discussion with a group that has misconceptions or difficulty in understanding the materials or lectures.

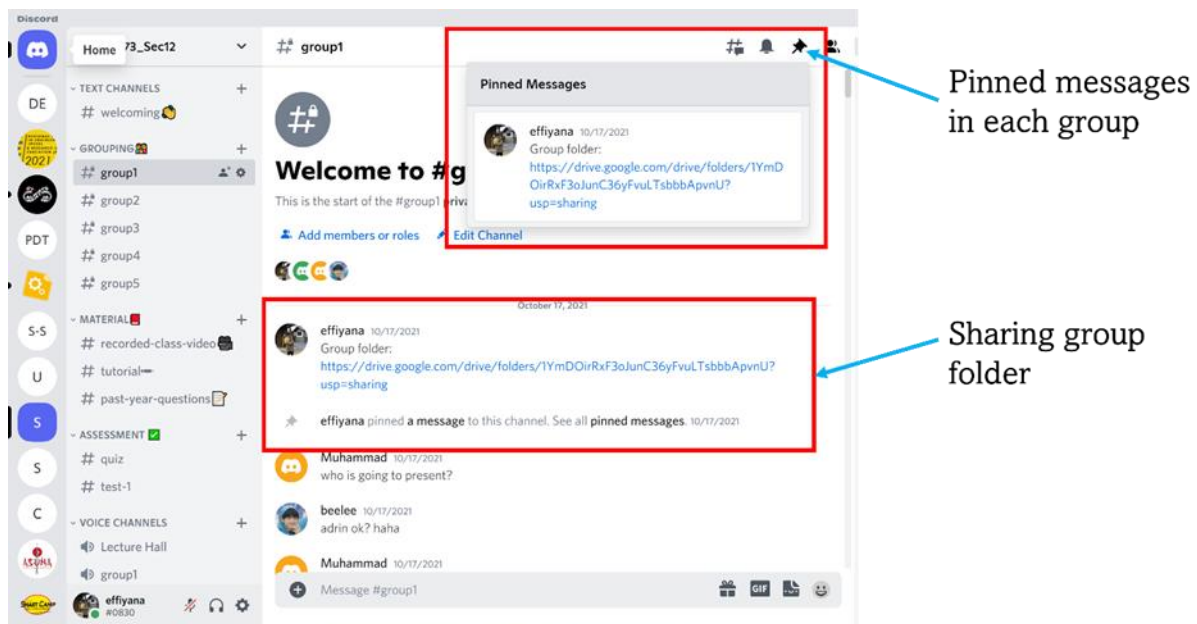


Fig. 5. Integrate the Google platform with Discord

4. Findings and Discussions

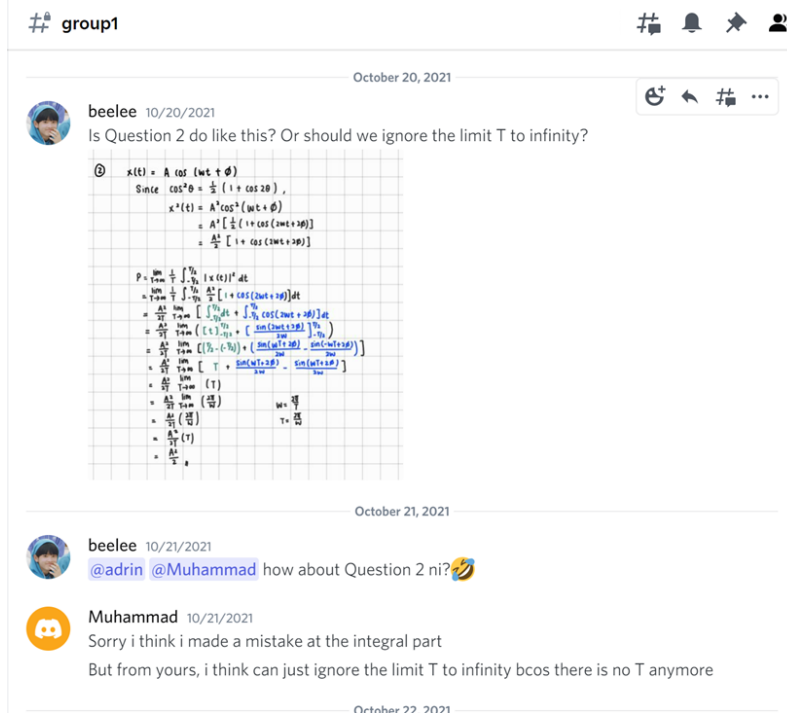
The effectiveness of using Discord as the platform during online classes has been assessed by the students in the Signals & Systems course. Students' feedback is tabulated in Table 1 based on behavioral engagement, emotional engagement, and cognitive engagement [21]. Behavioral engagement refers to students' participation in class, emotional engagement relates to the students' feelings towards subjects, instructors, and peers while cognitive engagement refers to students' motivation and investment in their learning. Analysis has been done from students' feedback and final grade that they obtained from the course.

Further analysis to investigate how this engagement helps in the achievement in the course had been analyzed based on individual message counts throughout the semester in each private group in Discord. Table 2 shows the relationship between the final grade and the message counts.

As can be seen in Table 2, students who actively participated in group discussions throughout the semester achieved better results. Two students from Group 1 and Group 3 failed this course and it was predictable since they were not actively participating in group discussion and group work. The instructor identified that students who like to teach other group members got at least A, such as Member 3 (Group 1), Member 2 and Member 3 (Group 2), and Member 3 (Group 4). Nevertheless, a few students did not perform well in the final examination which cause a lower grade for example Member 2 and Member 4 from Group 3 as well as Member 1 and Member 2 from Group 5. All these students got higher carry marks and were able to get an A if they can perform in the final examination. Maybe the pandemic situation, where a few of them were in close contact and need to be quarantined, give an effect to their emotion during the final examination. Furthermore, in this class, the instructor can identify a student who loves to work alone such as Member 4 in Group 6. Even though he got an A, he less communicated with his group members or other classmates. He just worked with other group members to complete group assignments. He contacted the instructor directly to discuss the course.

Table 1
 Students' feedback

- Behavioral Engagement**
- Easy to carry out group discussion and monitor every team member's work
 - For me, Discord is very useful because we can discuss using video call or chat platform and everything you put in the chat will stay there
 - I can contact my classmates easily in one platform
 - It has individual group chat and group voice chat that other is hard to interfere
 - Yes. Discussing between members become easier and can call lecturer with just mentioning in the private group channel
- Cognitive Engagement**
- Encourage group discussion



- Emotional Engagement**
- When someone stays in the voice channel and studying, it motivates me to join with him or her and share our ideas
 - It motivates me to learn more. I can discuss with my friends in Discord when we face academic problems
 - Discord has several bots that can help us to study, e.g. Mathbot. Also, another feature of discord is that it can play music and I often listen to music when I do my revision
 - Yes, because I feel like in a classroom where everyone is chatting in calls or listening while in lecture. After class, everyone can go to our group voice channel to chat or discuss and Discord offers many features rather than using another online meeting.
 - Because it feels like in CLASS, where it has the voice channel where you can turn on the camera, share screen, and in-text channels, you can send messages, documents, etc.
 - WhatsApp and Telegram, you can chat but cannot do online meetings with a lot of people and for GMeet and Webex you can do the online meeting, but your message will be gone after the meeting, and you cannot upload images, files, and video in the chatbox. For zoom, I'm not sure because I forgot about it.

Table 2
 Individual message in private group vs final grade

Group	Total Individual Messages	Final Grade
Group 1		
Member 1	1	D-
Member 2	35	A
Member 3	78	A+
Member 4	21	A-
Group 2		
Member 1	25	B+
Member 2	157	A
Member 3	141	A
Member 4	57	A-
Group 3		
Member 1	0	E
Member 2	134	B+
Member 3	96	B+
Member 4	134	C
Group 4		
Member 1	78	B-
Member 2	98	A
Member 3	329	A+
Member 4	144	A-
Group 5		
Member 1	206	C+
Member 2	139	C+
Member 3	198	B-
Member 4	32	B-
Group 6		
Member 1	94	B+
Member 2	111	A
Member 3	137	A-
Member 4	33	A

5. Conclusions

In conclusion, Discord can be used in a creative way to offer engagement in online classes. Educators or instructors can design their class in Discord and suit the need of their students. The implementation of the Discord in Signals & Systems course proves that it can be used for engineering courses as well as sciences courses.

Discord for online classes can achieve the three engagement strategies which are student-content, student-instructor, and student-student. Students' feedback shows that the three types of engagements were also achieved. Furthermore, students' participation in Discord shows that they can achieve a better grade, which reflects the feedback from the students. Therefore, this work benefits (1) online instructors who are looking for a platform that offers interactive classes, (2) instructors who plan to use Discord for an online class, and (3) instructors who are looking for an all-in-one platform for online classes.

Acknowledgement

We thank the Ministry of High Education Malaysia (MOHE) and Research Management Center of Universiti Teknologi Malaysia, for financial support under Transdisciplinary Research Grant scheme (Vot No 05G78). Special acknowledgements to the Faculty of Engineering, Universiti Teknologi Malaysia (UTM) for the financial support under Vot No 143.

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