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Developing a Cybersecurity Educational Community Using Discord During the COVID-19 Pandemic

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ABSTRACT

The COVID-19 pandemic has been a hectic time for faculty at the higher education and K-12 levels. With many institutions being forced to switch to remote learning, faculty had to find tools and resources that could be used to create virtual educational communities. In this milieu of remote learning, the technology tools must foster a thriving educational environment and facilitate communications. In the undergraduate Cybersecurity and Network Management (CNM) program at Murray State University (MSU), the faculty adopted Discord for teaching classes, lab work, and for social events. Discord has been used by the CNM faculty for over a year now and has shown positive results. Students like using Discord for streamlining the communication process and for having the ability to establish real-time communication with faculty. In this paper, the authors present their approach to developing and managing the use of Discord in the CNM program at MSU.

Keywords

Virtual communities, cybersecurity, Discord, online education, pandemic education, informal learning

INTRODUCTION

When the COVID-19 pandemic hit, education professionals at all levels were scrambling to develop online educational environments that were highly flexible for the students to communicate, while at the same time help the students achieve their educational goals during the pandemic lockdown requirements. In Murray State University's (MSU) undergraduate Cybersecurity and Network Management (CNM) program, some of the faculty adopted the use of the Discord server. As the pandemic lockdown began, Discord provided real-time communications with the students using multiple device platforms. The idea to use a Discord server for the CNM program originally stemmed from the need to provide students with an online community where they could discuss lab problems and help troubleshoot issues as they occurred. The CNM program uses both a virtual lab environment (Netlab NDG) and a hands-on physical lab.

The goal was to create an online educational community in which students could find value in both educational purposes and in community. To ensure that the educational community would be successful in its development, MSU faculty aimed to include the following components that had been successful for others in developing a virtual community: social presence, cognitive presence, and teaching presence [1]. These components are the foundation for the Community of Inquiry framework that are used to drive the success of an online educational community. Table 1 illustrates how the presences are defined in their operations of a virtual community [2].

When MSU faculty evaluated Discord as a possibility for an online educational community for its program and cybersecurity courses, they verified that the platform had these operational functions. They made sure Discord offered students a social presence with open communication where they could bond in a risk-free learning environment and express themselves. Discord integrates cognitive presence through its ability to link in news, media, and virtual activities in which the students can participate for cybersecurity exploration. Faculty verified Discord had efficient organizational capabilities that would be effective for using in courses, as a social community, and as a networking platform. These were the main factors under consideration when deciding which platform to use.

ELEMENTS	CATEGORIES	INDICATORS
Social presence	Open communication	Learning climate/risk-free expression
	Group cohesion	Group identity/collaboration
	Personal/affective	Self-projection/expressing emotions
Cognitive presence	Triggering event	Sense of puzzlement
	Exploration	Information exchange
	Integration	Connection ideas
	Resolution	Applying new ideas
Teaching presence	Design & organization	Setting curriculum & methods
	Facilitating discourse	Shaping constructive exchange
	Direct instruction	Focusing & resolving issues

Table 1. Operational Definitions of the Presences

The initial adoption of Discord for the CNM program went well because students were already familiar with Discord. Before the COVID-19 pandemic, students used Discord for special interest groups, although Discord was originally created specifically for gamers to communicate via voice, video and chat [3]. The CNM program faculty decided to use Discord based on how well it was being utilized with the university esports team and the positive feedback students were providing the esports staff sponsor. Other tools, such as Slack, were considered since other programs on campus used them to connect faculty with their student organizations (although student usage was low). One of the main buy-ins that attracted students to Discord instead of the other platforms was the ability of the user to seamlessly join and move between multiple 'servers' (different communities on Discord) which allows them to participate in several communities through one app [4]. The decision to use Discord was made on a trial basis during the spring semester of 2020, and it was only used for the cybersecurity course labs. The intent was to have an initial rollout to a small set of students to see how they utilized it and how it impacted student-to-faculty communication. Based on how well the students utilized Discord as a supplementary tool to communicate, the faculty then decided to expand its use to more classes and add more discussion areas. The cybersecurity courses were selected mainly because of the faculty's willingness to use the system and because the nature of the cybersecurity curriculum is more practical and lab heavy. The students used Discord as a supplementary tool to communicate with the faculty and classmates while all their assignments and data remained on MSU's Canvas learning management system. In this setup, no sensitive information was on Discord, and if a student needed to discuss information related to the Family Educational Rights and Privacy Act (FERPA), that was accomplished through university sanctioned resources and practices. Discord is utilized as a communication tool between students and other classmates or faculty to receive desired real-time responses, but it is not used for official university business like grades or registration.

As the pandemic lockdown continued, students utilized Discord as a tool for both social and academic purposes. With the change to using Discord as an educational tool, additional organization and access controls were implemented in the platform, adding general channels as well as course-specific voice and chat channels. The configuring of access control on the server was critical in defining the requirements for students that wanted access to the Discord server. Students had to change their usernames to their real names so they could be identified on the platform, as well as use the Discord bot to request their roles on the server. If students failed to do either of these requirements, they would not receive any roles and would be unable to interact with the community. Students used the general "Free-For-All" channels on Discord to chat, discuss nonacademic material like memes, topics on

cybersecurity, or post, and find job opportunities. Discord further enabled MSU's CNM program faculty to stay in touch with students who graduated, several of whom remain active on the Discord server. Having CNM alumni stay active on the Discord platform has helped current students with course questions and job leads as they prepare to go out into the industry.

As the COVID-19 social distancing restrictions remained in place, the Discord server offerings continued to expand. For example, the CNM undergraduate student organization was added to the server. This organization used Discord for events like game and movie nights which helped the CNM students to stay connected by having virtual social activities as the pandemic restrictions continued. Overall, the Discord experience was propitious for both the students and the faculty.

RELATED WORK

Other universities have used Discord in their undergraduate and graduate programs to communicate with students for conducting labs, for teaching classes, or to host community events [4]. The use of Discord has been found to be highly effective. Faculty are utilizing Discord to communicate with students in real time, automate tasks like taking attendance, and post project-based assignments [4]. A study was conducted at Melitopol State Pedagogical University in which 102 teachers and students were surveyed about the use of Discord The results showed that 75% of the respondents considered their communications to be improved after implementing Discord, and 80% reported that their pedagogical capabilities were better after adopting Discord [5]. Another example of efficient use of Discord was demonstrated within the University of Alaska Anchorage's tutoring program. After two and a half semesters, the institution had 261 active users spanning multiple disciplines. These students used Discord to socialize, find study partners, and participate in other community-building activities [6]. The university has received positive feedback from the students about their Discord experience [6]. Another example of how Discord has created a virtual community can be seen in the Harbormen Gaming Community study, which researched how a group of gamers used Discord to grow their community and culture [7].

In the Petroleum-Gas University of Ploiesti study, the professors implemented a Discord setup for both their undergraduate and graduate computer science students during the COVID-19 pandemic and found that the platform made it easier to provide support for classes, homework, exams, and study groups [3]. Another major finding from the University of Ploiesti, as with other studies, was that using Discord created a resilient community for the students and faculty to continue with their educational endeavors and acted as a support system [3]. Even before the COVID-19 pandemic, higher education institutions were starting to utilize Discord in their programs, including the University of Houston-Clear Lake's computer science and information technology program. Research by this institution found that 85% of the students in the study thought that Discord helped their team communicate and collaborate effectively during their group projects and that they planned to continue using it after the course [8]. One of the lessons learned from that study was that even though students are familiar with Discord, students needed more training to better understand how to totally utilize Discord features like direct messaging, pinning important information, and screen sharing [8]. Another takeaway from the study is that even if students are familiar with Discord, they have to actively choose to look at the notifications and respond, and that motivation is something that the technology cannot fix [9]. One way to help promote engaging students with Discord is by having it configured in such a way that it is easy to use, and their groups are organized. The next section will discuss how to configure Discord for use in higher education classes and virtual communities.

DISCORD SETUP

The first step in getting Discord ready for use in a class or program is creating a "server" (or community) to which the students can connect [9]. For the server creation, the faculty may use a name that reflects the class or the program and a recognizable image to help students identify the server. Discord does have premade templates designed for school clubs, gaming communities, and study groups that can be deployed to quickly create the channels and roles for the Discord server. MSU's faculty created a customized server for its CNM program and generated its own roles and channels. The structure is essential to the flow of the community and should be established prior to students joining the server; otherwise, students may lose interest immediately. After server creation, it is critical to start developing the roles for the Discord server. Discord uses role-based access control to

determine the environment of the users, such as what channels they can access and what they can do. The CNM program configured its Discord roles by creating a base role that is applied to every verified user who joins Discord to give them access to general channels, as well as additional roles that give them access to their course channels or other special statuses (alumnus, club member, etc.). The course number and subject are used in the role name for identification purposes and the role can be color coded to aid in identification in the Discord users list. The roles the faculty created for the students were named based on the course name and content of the course, while also playing on some cultural terms in cybersecurity to demonstrate cultural competency to the community. For example, "script kiddies" is a cultural term in the cybersecurity community given to those who are just learning foundational concepts of cybersecurity, so that was the name applied to the entry-level cybersecurity course role.

Figure 1 provides an example of the roles of the Discord server.

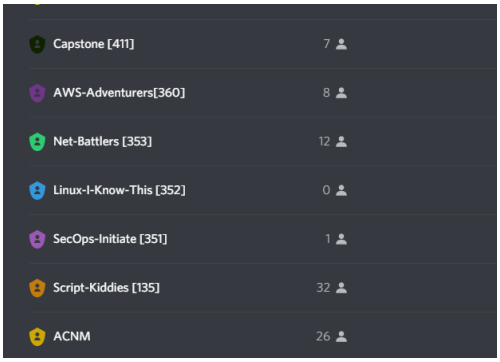

Figure 1. CNM Discord Roles

After the roles have been created, the next step is to create the categories and channels for the server. As previously mentioned, the "Free-For-All" channel group contains channels the entire community can access and all verified users who receive the base role gain access to this group. In this Discord category's "general" channel, students are given freedom on what is discussed, though faculty moderate it to encourage group chat rather than just one-on-one conversations (which should be relegated to direct messages). MSU also has a channel focused on current job opportunities and current events related to cybersecurity. The course-specific text and voice channels are ones that only students with that course role can access. Figure 2 illustrates what the CNM server's "Free-For-All" and "CNM 135" course channels look like.

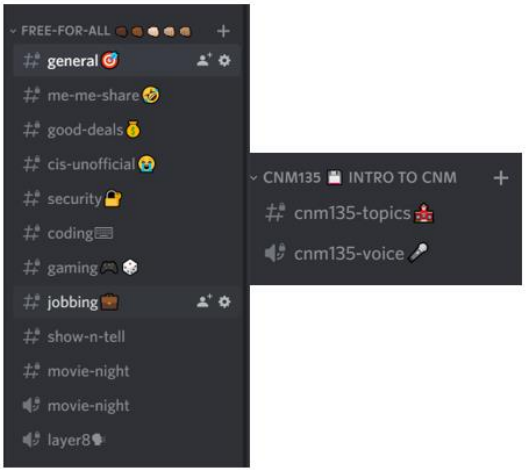

Figure 2. CNM Channels

With the channels and roles created, the next step is to add the students into the server. Students use a customized URL to join the server and, once joined, they go into a sorting room where they are required to change their screen name to their actual name. In the sorting room, they can also join their course roles using bots, or they can be assigned roles manually (which is MSU's current process). Students also see the server rules as soon as they join the server, which explains these requirements. Figure 3 shows the rules that are used to govern the server. The faculty act as the main moderators for the entire server.

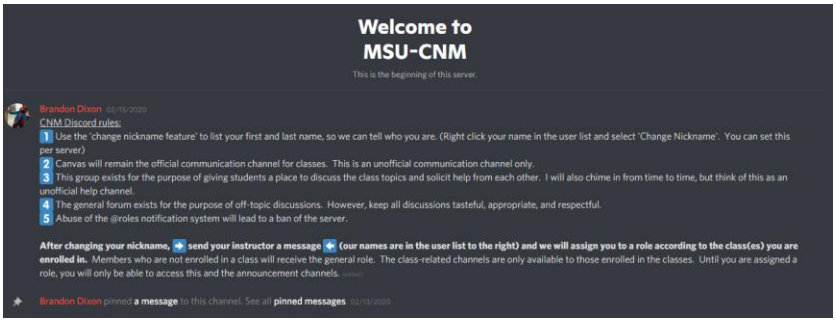

Figure 3. CNM Server Rules

In general, students have faithfully followed the rules of the CNM server and have been very respectful of each other as well as faculty. As the CNM program continues to use the Discord server, more courses and channels are added, such as an alumnus and student club channels that were added for the students to have a virtual space restricted to those groups.

RESULTS

With the CNM Discord server being established, active, and in place for the last year and a half, MSU faculty have seen good results as well as helpful feedback from students, providing a better understanding of what is effective and what needs to change to make the server better. Although the CNM program has received much feedback, for the results of this study, the authors selected some of the better examples of qualitative information. The following quote from student number one reveals how Discord provides a more casual platform for class communications and that the professors respond faster to questions with Discord:

"I like Discord because it provides an organized, fast, and easy way to communicate with and meet many people with similar interests. It has been especially useful during COVID, both through the esports and CNM discord servers, because I could reach out to others for help with topics such as building my computer and help with class work. Additionally, it provides a much faster and easier way to quickly communicate with professors without using email, which is usually much slower when you have time-sensitive issues, [and] it is easier to track, and communications do not get lost in tons of emails. Discord servers also provide a more casual platform for intra-class communication without the academic, pressured, and usually graded platform discussion boards offered on Canvas. Especially for a technology related field like CNM where most users are already on Discord, it is an invaluable supplement for getting to know students and professors in the program and my classes better, and it provides a low-pressure atmosphere with broader communication capabilities than Canvas and email provide."

A quote from student two explains more about how Discord is easier for students to use to operate within their classes and how it works wonderfully if students follow the rules.

"*I enjoy using Discord for college because of its aid in communication in a way most people can follow and understand. Sometimes Canvas is confusing and convoluted (especially for new students) to navigate and submit assignments correctly. With Discord, most people understand how messaging applications function and how to*

navigate them, so it becomes [simpler]. This, and announcements become easier too. You can ping a group or entire class (using roles) and message them all at once and have it out in the open and highlighted in a specific place so it's easy to go back to as well. Discord allows creativity and introductions to STEAM; introducing bots that require commands to use them, importing (and sometimes needing to compress) files for custom emojis and shared media, and so on, and introduces aspects of Computer Science to new students of whom may not know these basic things. As long as names and profiles are appropriate within the academia Discord channel, I don't see why it isn't used as frequently, especially in a STEAM related field."

The quote from student three shows how Discord has helped him be social in his personal life during the pandemic, and how it has broadened his community and exposure to different cultures. The student also describes how he enjoyed the functionality of using Discord in his coursework in the program and how the server can have custom emojis.

"The first reason is the people you meet. I'm an active member in two different Discord servers. One is primarily made up of people that live near to Murray, who play games and have fun with each other almost every night. The other is a server made up of people all over the world, with my subsection I participate in being dedicated to three Irish people, a German person, and myself playing Dungeons & Dragons. I feel welcome in both and have distinct, fun experiences in both. I have met wonderful people I never would have through Discord, a very dear friend from Germany, and my girlfriend from Martin, Tennessee. I learn so much about other places from talking and making connections with people that even though I haven't been able to go anywhere since the pandemic, meaningful experience with another culture is just a message away. It has certainly helped me through a lot of issues the pandemic has caused. Discord provides voice, text, file sharing, screen sharing/streaming, developer support, user created bots for unique functions, and complete administrative control of servers for free. On top of this, servers can have their own emotes on top of normal emoji provided standard. This gives each server a unique atmosphere as you can provide people ways to express themselves in a manner unique to your community."

Another example of student feedback that the CNM faculty received about the use of the Discord server demonstrates how the student has never used Discord before but enjoyed the experience. It has allowed the student to feel more social and to be part of a community during COVID-19 that may not have been possible if it had not been for Discord.

"*I had never used Discord before this semester. As a new user of the platform and a new student at MSU, I can attest to Discord's value. From a social standpoint, it allowed me to feel more socially involved during this period of quarantine. I was very worried about starting back to school and not knowing any of my classmates. Discord allowed me to ask questions, learn from, and interact with people that I may never have met otherwise. From an academic standpoint, I was able to garner some important information from articles and stories shared in Discord. I am doing a paper on cyber security for ENG 105 and the current events and knowledge shared by my peers and from staff on Discord proved to be invaluable to my project. My opinion of Discord is that it is the virtual equivalent of talking with your professor or peers in the hall after class. It's a place where stories can be shared, extra questions can be asked and where further learning can happen, all in the company of those who share your interests and passions."*

Student also did also provide some critical feedback on how to improve Discord and some aspects of what they did not like with the community. One reoccurring theme that several students had was they wanted a Help Chat text channel added where they could discuss common questions about the campus and classes. Another critical piece of feedback that we received was that upperclassmen and alumni should be able to see all the channels in the server where they could assist students with issues if the professors could not respond quick enough. The final feedback we received from the students was that we need to change how we allocate roles to students because some felt that we assign roles based on ability and that could cause confusion with their class standing where a senior could be confused with a freshman. Obtaining this type of critical feedback about the Discord server helps give the faculty new perspectives and ideas on what they could change to better the resource for the students. The critical feedback from students can be seen below.

Maybe a help chat related to MSU. Common questions about where something is like where is printing services

A general help channel so that if someone has a question about a class someone can answer if they had that class.

Well sometimes I wish I could see the chats for the classes so upperclassmen/alumni could help students struggling when the professors can't. also I feel like a lot of times the roles make you associate their role with their ability so sometimes a senior will get mistaken for a freshman, sophomore for a junior, etc

The feedback from the students about how the CNM Discord server has helped them through the last three semesters has been critical in understanding how to better serve the students and what changes would make the Discord server even more useful for the students. From the feedback provided, students using the CNM Discord had an easier time going through the COVID-19 pandemic and had a greater sense of community. Discord allowed them to expand their social and personal communities and kept them connected while being isolated during the pandemic. Discord also helped them with success in their educational endeavors throughout the pandemic and gave them exposure to different cultures and communities that they may not have had exposure to if they did not use Discord. With these examples, it is easy to see that the utilization of Discord has helped students though the COVID-19 pandemic.

DISCUSSION

Based off the student feedback the CNM program received, the Discord server has been a great resource for a virtual community and helped the students succeed during COVID-19 when online education was the only option. From the study discussed previously, students from the University of Houston-Clear Lake enjoyed using Discord and had the following feedback:

"Even without voice channels, it makes everything easier since we can have our discussions and documents in the same place, all in real-time without having to wait for emails or separate texts and files. The fact that Discord keeps a record of all their conversation" [6].

Feedback from the University of Houston-Clear Lake shows the students embraced using Discord and preferred using it over email and the school's learning management systems. Students perform better using technology with which they are comfortable and familiar. It has also been shown that students do better when they are part of a community. In the study conducted at James Cook University, researchers implemented online discussion in their course, which led to a deeper understanding of the course content, and students were not as reluctant to jump into the course discussion [10]. Another qualitative study of using Discord was conducted in a K-12 environment. This study found that Discord is a convenient, effective, practical, lighter application that helps teachers create an interactive and productive classroom [11]. Looking at the CNM program results as well as results from other studies focused on Discord, one can see that Discord is a great application for creating a virtual community and environment for students to achieve their educational endeavors.

However, there are a few caveats for using Discord to create a productive educational environment. The first is that the Discord server needs to be configured correctly, well organized, and have clearly defined rules. Although this study's results show that students have embraced the use of Discord, MSU wanted to make sure that the server was organized and that they had the proper roles and display names when they were on the server. Another lesson learned from these results and other studies are that Discord should be used as a supplementary form of communication for the courses. Some students still do not want to use another application as a form of communication for a course; they prefer using the traditional group text message or email since everyone already uses those forms of communication. Discord can be a great asset for faculty to create virtual environments and to enrich a course, but it should only be used as a supplementary way to communicate with the students. Finally, some students did not stay connected to the platform or infrequently connected and missed out on important announcements, so it was not effective as a tool for important updates 100% of the time.

Some of the challenges that were experienced with implementing Discord into the program and courses were both technical and cultural. Technical issues were encountered with implementing Discord, such as determining how to design the groups and channels for courses, or asking questions such as whether they all needed text and voice

channels or just text, resulting in design through trial and error. The other issue that the program had was how to distribute the invitation URL and whether to set it to expire after the first week of class in an attempt to ensure that only the students in the courses and program were joining the server and assigning their roles correctly. However, because MSU courses are small (due to physical space limitations in the labs on campus), usually having around sixteen students per section, this made it easier to track users as they joined Discord. The faculty also made it clear that the students were not required to use Discord.

The Discord server was just another communication channel that could be utilized in addition to email, phone, and Canvas messaging to get in touch with the faculty. One of the common themes that were found with the students that did not want to join Discord was that they were typically a nontraditional student, that they were an online student who didn't come to the main campus before the pandemic, or that they had a full-time job and mainly completed coursework at night or on weekends. These students typically do not engage with their classmates or instructors traditionally, so this was not a surprise. It was more surprising when online students did join the Discord community and participate, something faculty never witnessed through traditional means of email or the learning management system. Some simply complained about having to install another application or that it was just something else for the user to monitor when they already had so many communication channels.

Overall, the students that joined Discord have followed the rules, been respectful toward each other, and demonstrated good Internet etiquette. One theory of why this has worked so well is that students have respect for the community after seeing how easy it has made communication with faculty to get real-time responses instead of waiting for emails and Canvas messages. Another possibility is due to faculty closely monitoring the channels through message notifications, so actions can be taken in real time, allowing quick interventions should something inappropriate occur.

In the future, the CNM program will add more classes to the Discord server to allow more meshing of the cohorts of students. Also, the student organization, Association of Cybersecurity and Network Management (ACNM), now has its own channel added to the server to allow students with that role to communicate about club activities and socialize, since most are already a part of the Discord server. With the addition of the Alumni channels, MSU faculty are eager to research the growth of alumni involvement. Since the students will be allowed to stay on the server as they graduate out of the program, it will be interesting to investigate and monitor how the alumni help mentor the future students through the community and how they share opportunities with the students like internships and jobs. Those are some of the opportunities for future research for a longitudinal study of how the use of Discord has affected student and faculty experiences.

CONCLUSION

In conclusion, the CNM program's experience of implementing a Discord server during the COVID-19 pandemic has been a great success and it has enhanced the students' educational experiences. Discord has also allowed the students to create their own community and form bonds through difficult times during the pandemic. Discord has given the students the opportunity to expand their knowledge and continue to network with students from their cohort and upperclassmen to obtain that sense of community, which would not have been possible during COVID 19 pandemic if it were not for Discord. The overall outcome of integrating Discord into the CNM program was very fruitful and, through the use of Discord, students were enabled to continue on their educational journey, work, and connect with faculty in real time while having a positive educational experience.

REFERENCES

1. Anderson, T. (2004). Teaching in an online learning context. Theory and practice of online learning, 273.

2. Akyol, Z., & Garrison, D. R. (2008). The development of a community of inquiry over time in an online course: Understanding the progression and integration of social, cognitive and teaching presence. *Journal of Asynchronous Learning Networks, 12*, 3-22.

3. Discord. (2021). https://discord.com

4. Vladoiu, M., & Constantinescu, Z. (2020). Learning during COVID-19 pandemic: Online education community, based on Discord. In *2020 19th RoEduNet Conference: Networking in Education and Research* (RoEduNet) (pp. 1-6). *IEEE*. https://doi.org/10.1109/RoEduNet51892.2020.9324863

5. Kruglyk, V., Bukreiev, D., Chornyi, P., Kupchak, E., & Sender, A. (2020). Discord platform as an online learning environment for emergencies. *Ukrainian Journal of Educational Studies and Information Technology, 8*(2), 13-28. https://doi.org/10.32919/uesit.2020.02.02

6. Mock, K. (2019). *Experiences using Discord as platform for online tutoring and building a CS community.* In Proceedings of the 50th ACM Technical Symposium on Computer Science Education (pp. 1284-1284). [conference paper] https://doi.org/10.1145/3287324.3293769

7. Anderson, M. (2020). *Discord and the Harbormen gaming community*. https://mayajanae.com/wp-content/uploads/2020/01/Discord-and-the-Harbormen-Gaming-Community.pdf

8. Lacher, L. L., & Biehl, C. (2019, June 7). Investigating team effectiveness using Discord: A case study using a gaming collaboration tool for the CS classroom. *International Conference Frontiers in Education 2019: CS and CE 15 (1), 199-204*

9. Schwartz, D. (2021). Using Discord to facilitate student engagement.. *UNLV Best Teaching Practices Expo.* 122

10. Cameron, L. (2006). Teaching with technology: Using online chat to promote effective in-class discussions. In Proceedings of the 23rd Annual Conference of the Australasian Society for Computers in Learning in Tertiary Education: "Who's Learning? Whose Technology? Sydney, Australia.

11. Ramadhan, A. (2021). Student's response toward utilizing Discord application as an online learning media in learning speaking at Senior High School. ISLLAC: *Journal of Intensive Studies on Language, Literature, Art, and Culture, 5*(1).

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