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# Facilitating Online Casual Interactions and Creating a Community of Learning in a First-Year Electrical Engineering Course

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**Abstract**—The increase of online resources and the transition to a more “blended” course delivery in traditional face-to-face courses should be supported by an active and engaged online community to facilitate student-student and student-lecturer interactions. However, current learning management systems (LMS) and communication tools found within them do not assist this goal. The aim of this paper is to provide a brief review of online tools that are used or can be used for the purpose of facilitating student-student interactions, and also provides a first report on a trial in a first-year electrical engineering course at UNSW Sydney to create or facilitate a casual community of learning using Discord. Findings from formal and informal surveys, formal evaluations and informal conversations show that there is both interest and value seen by the students in both increasing engagement and improving learning. Higher education institutions should consider a more systematic approach in creating and maintaining engaged online communities.

**Index Terms**—student-student interactions, student-teacher interactions, community of learning, online resources, discordapp.

## I. INTRODUCTION

The main elements of tertiary education can be classified into three broad categories, *i)* the participants (i.e. students), *ii)* the facilitators (i.e. lecturers and other academic staff), *iii)* the content [1]. Typically these are integrated through a learning management system (LMS). An effective and above-satisfactory learning experience that achieves the predefined learning outcomes (LOs) of a course/unit should aim to create strong interactions between all three of these categories.

There are certain interactions that carry significantly heavier weight within a course. A review of the existing literature identifies three major interactions that can influence the level of both student learning and satisfaction.

- 1) **Student - Content** interactions that refer to how the students extract information from the materials of the course (i.e. individual student learning).
- 2) **Student - Facilitator** interactions that refer to all forms of interaction between the students and the academics including content delivery, feedback, questions during and outside class hours.
- 3) **Student - Student** interactions [2] that refer to exchange of information and ideas that occurs among students. This can be formal or informal and may occur regardless of the presence or absence of the facilitator.

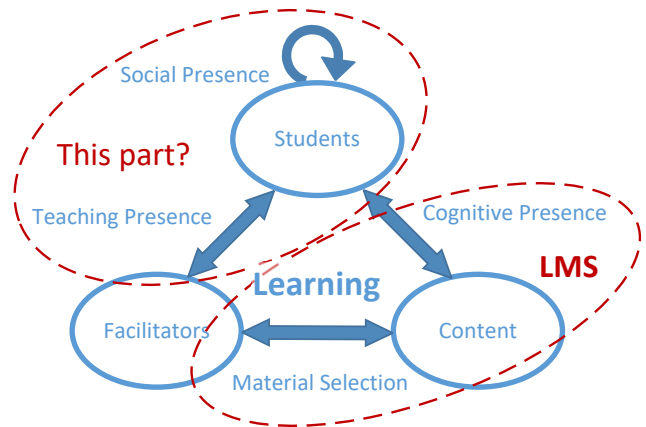


Fig. 1. A conceptual view of learning, including elements and key interactions. While LMSs have developed to facilitate material selection/presentation and cognitive presence, there is still a lot of work to be done in the areas of social and teaching presence outside of the classroom.

The value of student-student interactions becomes extremely important as institutions move from a more traditional face-to-face to an on-line or blended environment enhanced with technology [3]. This, in fact, has been very well identified within the context of online environments in distance education [4] that physical presence is not possible or only occurs in small and discrete occasions. A major criticism typically associated with distance learning is the loss of these interactions, especially as they are considered an indispensable component of education to the overall success and effectiveness of a program. The current literature [5] illustrates typically low-level interactions (e.g. simple information sharing, asking basic questions, etc) that decrease over time and that depend primarily on a limited number of highly-engaged participants.

An increase in both the quality and quantity of interactions is linked to increased satisfaction [6]–[8]. Besides increased satisfaction, an increased number of interactions is linked closely to the students having a stronger sense of belonging, with a social presence being a prerequisite to the establishment of a community of learning. [9]. Garrison [10] argues that simple interactions are not sufficient to enhance learning and

teaching and a more structured approach with clear leadership is required in the context of online learning.

All of the above become especially important with the increased use of online resources to enhance traditional lectures and the transition towards more "blended" course delivery [11], [12]. The main goal in facilitating both social and teacher presence in an online environment that supports and complements a typical class is the increase in engagement and the creation of a *community of learning* between the students to support their ongoing learning endeavors. It is acknowledged [1] that both creating and maintaining a community within the context of a degree can be very challenging and this becomes a lot more challenging with individual courses. The most critical element is engagement from students who should be both interested and comfortable in active participation, engagement and sharing.

The aim of this paper is to provide a brief summary of different available tools that can be used to create and facilitate social presence, teaching presence, student-student engagements and a community of learning. A review of typical requirements and the how well the available options rank against each other is also provided. A first report of a trial from a first-year electrical engineering course, that combines results from a short survey together with student feedback and comments and our current experience is also provided.

The article is structured in the following manner. Section II provides a summary of the available tools and Section III evaluates and compares these based on a set of broadly defined requirements. Section IV reports on a trial during UNSW's ELEC1111 course in the first semester of 2017, and discussions together with a conclusion and recommendations for future work are provided in Section V.

## II. TOOLS FOR ONLINE COLLABORATION AND INTERACTION

We consider a variety of tools that are both integrated with the LMS or not and can support either asynchronous or synchronous forms of communication. It is apparent that both synchronous and asynchronous forms should be available as they function in a complementary to each other so the following are presented based on their potential to impact the community of learning.

### A. Integrated with the LMS

a) *Forum*: This refers to either a normal or an advanced forum within Moodle [13] (or any other LMS) that can facilitate a two-way discussion students and facilitators. They can range from standard forums to specific participation and Q&A forums and can be presented in a typical forum or in a blog-like format.

b) *Anonymous Forum*: This refers to an advanced forum within Moodle that allows students to post anonymously. They are identical to forums in any other functional manner.

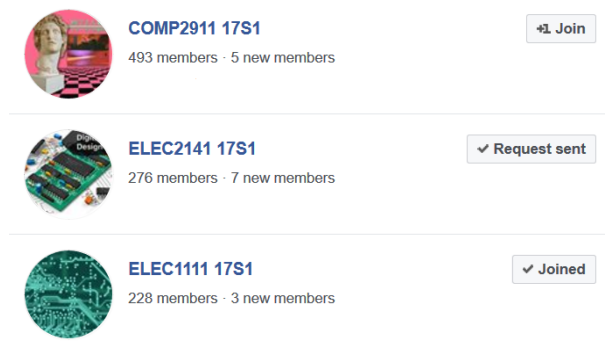


Fig. 2. The gap in online student engagement platform is clear as students create "unofficial" groups for their classes on Facebook.

c) *Wikis*: A wiki is a page that allows users collaboratively modify content and structure directly from the web browser and the LMS. Wikis can be useful for knowledge building throughout the course but lack on communication features.

d) *Chats*: The Chat tool in Moodle is a text-based discussion tool that allows for real-time, synchronous text-based discussion within the LMS environment. A similar chat tool is also available in Open Learning (OL), an alternative LMS that is used at UNSW [14]. The main difference between the two is that the Moodle chat requires a student to join a particular chat, while in OL all active users enrolled in a class automatically participate.

### B. Through third-party software/applications<sup>1</sup>

a) *Facebook*: Although a social networking website and not education oriented, Facebook [15] is very commonly used amongst students as a platform for informal interaction and sharing of material due to its unanimity and high degree of familiarity [16]. Students typically create a group, sometimes public but in most cases closed, specific to a course and a cohort (Fig. 2).

b) *Yammer*: Yammer [17] is a business oriented social network that includes collaborative elements and messaging capabilities. The major advantage of Yammer is its integration with Office 365 and other online collaboration tools that are used within UNSW. However, at this point this is only available to staff and not to students.

c) *Skype*: Skype [18] is a VoIP and instant messaging application by Microsoft.

d) *Google Hangouts*: Google Hangouts [19] is a communications platform offered by Google that provides instant messaging, VoIP and video chatting capabilities.

e) *Slack*: Slack [20] is a team-oriented instant messaging and collaborative environment. It is primarily targeted towards teams within companies and offers integration with commonly used tools such as Dropbox, Google drive etc.

<sup>1</sup>It should be noted that the following list is not and does not aim to be a comprehensive summary of services and tools. There are many alternatives to the each and those used below are examples of popular/commonly used services.

f) *Discord*: Discord [21] is an integrated text and chat platform. Primarily used for gaming purposes, its ease of use has transformed it to a modern IRC alternative, hosting channels for many online communities.

### III. EVALUATION AND COMPARISON

This sections provides a brief summary of the considerations and an evaluation of the previous tools and services as well as a comparison between them. These criteria have been defined broadly and a more detailed evaluation based on defined functions may be considered in future work.

#### A. Criteria

a) *Functionality*: In functionality, we consider aspects that facilitate both teaching and social presence, communication focused aspects such as text-based messages, inclusion of multimedia, voice communication, scripting and etc. Ease of sharing material and content for the purposes of discussion, search functions, log history, and structure of the communication channel are also part of this broad category.

b) *Accessibility*: In accessibility we consider aspects such as integration with an existing LMS, visibility across the cohort, support for multiple platforms and OSs, support for mobile devices, but also tools for user information and user anonymity with regards to online presence.

c) *Familiarity*: Use for other purposes outside of education, and how familiar are students already using this service/application.

d) *Hosting*: If the application/service is hosted locally or if it cloud-based.

Table I  
COMPARISON OF TOOLS FOR ON-LINE COLLABORATION AND ENGAGEMENT

Option	Function	Familiarity	Access	Hosting
Forums	✓	✓	✓✓	In LMS
Anon. Forums	✗	✓	✓✓	In LMS
Wikis	✗✗	✗	✓	In LMS
Chats	✓	✓	✓	In LMS
Facebook	✗✗	✓✓	✓✓	External
Yammer	✗	✗✗	✗	Both
Skype	✗	✓✓	✗	External
Hangouts	✗	✗	✗	External
Slack	✓✓	✗✗	✓	External
Discord	✓✓	✓	✓	External

#### B. Discussion

Options that are directly linked to an LMS have the advantage that they are accessible to *all* students of a course without the need for additional registrations etc. However, the tools that are currently available (Forums, Wikis and chats) do not offer the possibility for multi-participant synchronous communication. Additionally, courses typically include forums in the LMS, so the goal is to extend these functionalities.

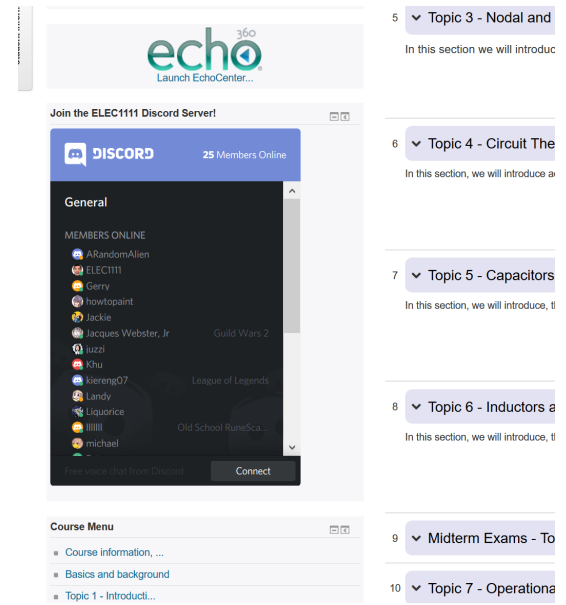


Fig. 3. Integration of the Discord app in UNSW's LMS (Moodle).

With regards to tools and services that are not integrated with the LMS, the main barrier is student participation, as they need to typically register for an additional service. This is the biggest advantage of Facebook, as the majority of students are already members, however, the "social" orientation of the website and its functionalities and the limited (if any) interaction with teaching staff in the platform are major drawbacks. It will, however, remain a very common tool of social presence for students.

Other options are generally less easy to access in the scale that is required for a course (i.e. Skype and Google Hangouts require individual invitations to a general group rather than a single invitation for participation), or are less familiar to students (i.e. Slack is very common with professionals, Yammer has a broader use in corporate environments). Additionally, a lot of these services/applications lack the moderation tools necessary when dealing with large numbers of participants.

Based on the above, and as a balance between all the requirements, Discord was the platform of choice for supporting our on-line community. Although not directly integrated with the LMS, an access link can be very easily included (see Fig. 3). Additionally, due to its gaming origin and target audience, it is a very familiar environment for a large proportion of the student cohort.

Some additional functionalities offered by Discord are *i)* the use of invitations for joining the channel, *ii)* the required level of verification (a medium level of verification was selected for the course channel, which requires registration and a 5-minute delay before posting), *iii)* an integrated filter for explicit content that helps with moderation of the channel, *iv)* an audit log to track activity in the channel, and *v)* notifications for individual members or all participants of the channel depending on authorisation level.

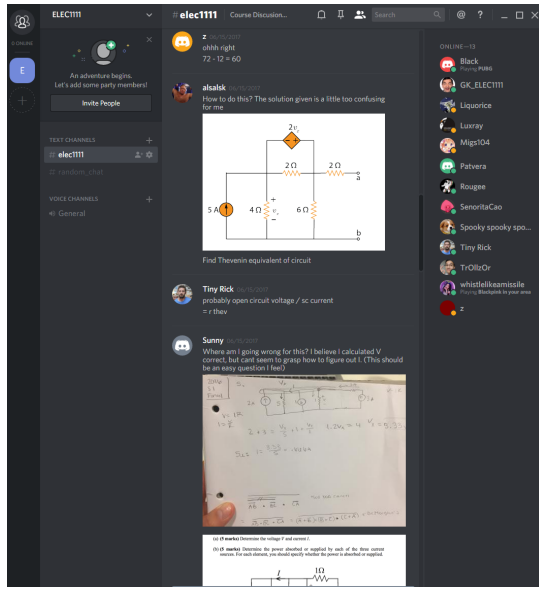


Fig. 4. An snapshot of the ELEC1111 Discord channel during Semester 1, 2017 showing the environment and some common ways of student-student interaction.

The above functionalities are combined with some very useful characteristics that include the native support for a number of multimedia formats (e.g. images, videos, links etc), a log of all discussions going back to the creation of a channel and ease of sharing drawings from MS OneNote directly to Discord through a simple copy-paste function, which is critical in an engineering course with long analytical derivations and/or significant graphical content.

#### IV. A FIRST TRIAL

##### A. General Overview

ELEC1111 (Electrical and Telecommunications Engineering) is first of the two electric circuit analysis courses offered from the School of Electrical Engineering and Telecommunications (EE&T) at UNSW Sydney [22]. It is offered in Lecture/Tutorial/Lab format in both regular semesters and with online lectures during the summer semester. The course is mandatory for students in Electrical, Mechanical and Mechatronics, Computer Science and Renewable Energy Engineering and is also an elective offered to the all engineering students as well as international exchange students. Typical enrollments are between 350 - 500 students each semester, making it the largest course offered by the School of EE&T.

The Discord channel (Fig. 4) for the course was created during the 2016/17 summer semester and was properly introduced during the first semester of 2017. The aim was to enhance existing tools in Moodle that included topic-based forums, a general discussion forum and an anonymous forum. As shown in Fig. 3, a link was introduced to the LMS but access and participation was voluntarily and not part of any requirement for the course. It should also be noted that Discord uses aliases and nicknames for identification, meaning that the identity of individual students remains anonymous.

Over the whole semester, more than 60% of the student cohort joined the channel at one point or another and approximately 65% of those joined participated in the discussions (Fig. 5). This number does not include those who used the direct message (DM) functionalities, but only those that used the main channel of the course.

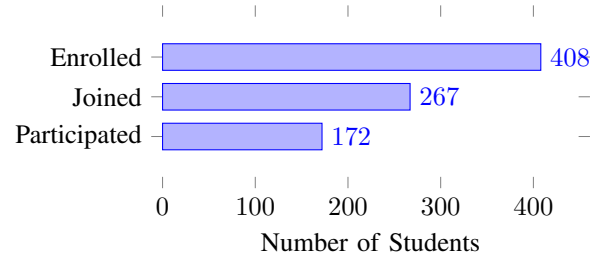


Fig. 5. Number of enrolled students and those who joined and participated in the on-line channel.

A very interesting point to mention is the average number of active users<sup>2</sup> during a day as shown in Fig. 6. As expected the number (and similarly the number of posts/interactions) significantly increases at the end of the day which also coincides with typical non-working hours. Also students would typically interact quite late into the night on a daily basis, providing a learning exchange that cannot be as easily achieved with the existing asynchronous means through the LMS.

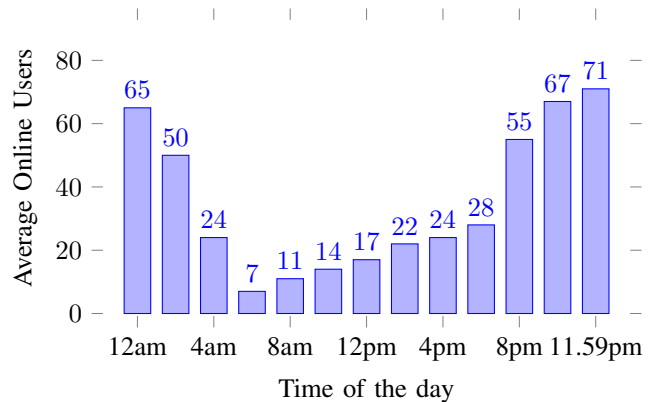


Fig. 6. Daily average active users in the ELEC1111 channel. Note the increase of active users in the evenings and late nights.

As expected, participation would fluctuate depending on student and semester schedule as well as the assessment tasks for the course (and sometimes other courses that the students would be enrolled). These create the peaks in the daily post graph over the semester, shown in Fig. 7.

##### B. Feedback from Student Surveys

As part of feedback and continuous improvement for the course, an anonymous online survey was conducted in the middle of the semester (end of April) that also included

<sup>2</sup>In channels with more than 100 users, offline users are not displayed. Discord offers the option to appear offline while still remaining part of a channel. These users do not appear in the numbers of Fig. 6.



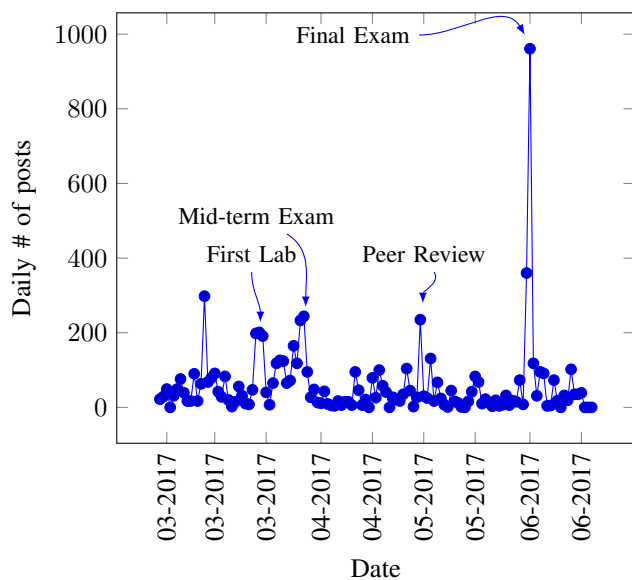


Fig. 7. Number of daily posts in the main Discord channel of ELEC1111.

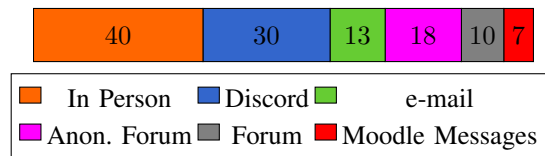


Fig. 8. First choice preference of students asking questions about the course.

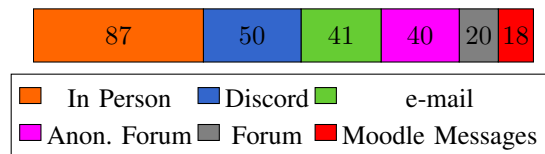


Fig. 9. Two-choice preference of students asking questions about the course.

questions related to the Discord channel and the student opinions. The survey ran over 4 days and was answered by approximately 35% of the students.

Approximately 80% of the participants answered that they are aware of the channel and one quarter of them use it on a very regular basis. Similarly over 80% of the respondents answered that they find the channel "somewhat or very useful" for the course and less than 8% of the respondents mentioned that they do not feel comfortable asking questions (related to either course content or administration) in the channel. On the same note, the use of such an on-line channel ranked second in single-choice (Fig. 8) and two-choice (Fig. 9) preference in a question of how do students prefer to ask questions related to the course.

One survey question focused on anonymity in online environments and whether students preferred using their actual names or remain anonymous. The answers to this question are shown in Fig. 10 with those who prefer to remain anonymous

outnumbering those that prefer using their names by a 3:1 ratio. This is quite an interesting result and a major difference between interactions within the LMS and in Discord. The last question of the part of the survey on on-line interactions asked the students whether would like to see similar channels used in their other courses. The majority of the respondents answered "Yes" while a very small minority expressed negative opinions to this question (Fig. 11).

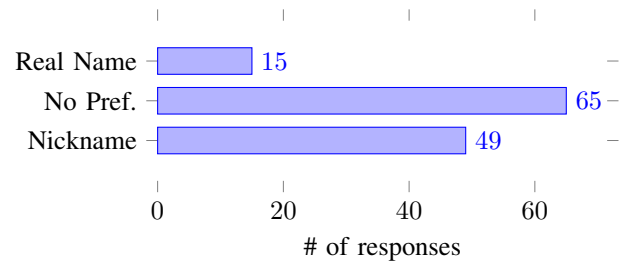


Fig. 10. Answers to the survey question: "What is your preference in on-line environments such as the ELEC1111 Discord Channel?"

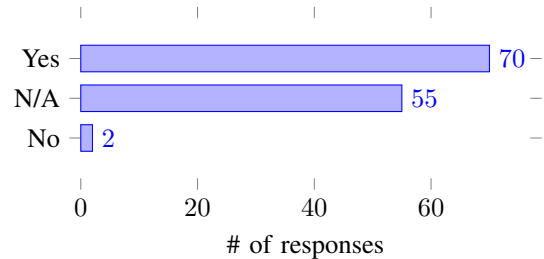


Fig. 11. Answers to the survey question: "Would you like to have similar channels for other courses?"

### C. Student Perceptions

At the end-of-semester course evaluations students are asked on the best aspects of the course and how the course can be improved. These questions are general and open-ended, but the Discord channel was specifically mentioned as one of the best aspects. More specifically students commented on the value of the channel: "found the Discord channel and [...] to be very helpful," "the Discord channel is very good.", "Discord is very good", "the Discord server, very useful to get help with questions", "The best thing was the online Discord chat which allowed us to get help quickly when we had questions.", and that it offered multiple ways to interact "many different methods of communication (Discord, email, in person, moodle forums etc)", "[...] the discord channel, giving a whole different way to have contact with peers and lecturer".

Other positives mentioned by the students were the more casual atmosphere in such on-line environments "A laid-back yet helpful presence on Discord", and the simple and functional way of interaction "discord is most preferable, other platforms are not as simplistic and clear" compared to other alternatives. Anonymity is a positive, "Discord server

allowed us to ask questions anonymously and receive prompt answers - let's be honest, hardly anyone checks the moodle forums". Finally, the applicability to other similar courses was emphasised: "...the discord server is a brilliant idea and similar chats should definitely spring up in the other classes".

## V. DISCUSSION AND CONCLUSION

The issue of student and teacher presence in distance and online education has been addressed in the existing literature. However, similar issues can be observed traditional face-to-face and "blended" courses. On-line casual interactions and the creation of a community of learning can significantly enhance student experience and help them meet learning objectives.

From the summary and comparison of the available tools to support online engagement, we identified a need to extend the currently available options in the LMS (Forums, wiki and Chat) with functionalities that enhance synchronous communication, online engagement and the sense of community. The available tools offer different levels of functionality and accessibility, based on which Discord was chosen as the tool of choice. The main advantages we identified were familiarity, ease of access and LMS integration, possibility of anonymity and the multimedia conversational interaction. We should, however, mention that there is a lack of clearly set criteria in the literature in terms of both functions and requirements of collaborative tools and services and how they can support learning and teaching objectives. Further research is necessary to identify the needs and weights of each criterion as well as the barrier that the use of online learning discussion tools from outside the LMS may create for student participation.

Our findings from formal and informal surveys, formal evaluations and informal conversations following a first trial use of Discord in a first year undergraduate electrical engineering course, show a very positive response from students that identifies both interest and value in such an initiative both through increased engagement and assisting with learning. We should note that, although there were no issues throughout the whole semester, such an endeavour does require additional effort from the facilitators and relatively active moderation compared to forums and other LMS-based activities.

Over the last couple of years, there has been a trend towards gamification and inclusion of gaming elements for improving learning and teaching. It is equally important to utilise the community and interaction elements inherent to on-line gaming when considering successful on-line communities. Our recommendation is that higher education institutions should consider a more structured approach to nurturing on-line learning communities, identifying *i)* the needs of students, *ii)* the requirements for on-line interactions and *iii)* the currently available solutions and their capabilities in an environment that integrates and collaborates with existing LMSs. Further study of whether the more conversational online learning interactions found in Discord are more effective for collaborative learning than the nonlinear branching structure typical of forums, as suggested by [23], would be interesting.

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