Improving Synchrony in Small Group Asynchronous Online Discussions

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Abstract. Online courses often select asynchronous tools for teamwork as it allows temporal freedom for students who might come from different time zones or have busy schedules. These solutions work better with larger groups, where due to the quantity of participants, it is easier to get replies faster. In this study, we investigate challenges that arise in asynchronous discussions with small group (4-5 participants). Empirical data was collected from the *UNIPS* pedagogical employee training online course *Becoming a Teacher* and its teamwork period, where Google Docs was used as a discussion platform by 42 students. We observed that (1) discussion activity peaked around deadlines (2) students often came online in vain as their team members had not replied yet and (3) when students were online simultaneously, they were not able to take advantage of this by engaging in synchronous communication. As solutions, we propose improving the synchrony of the communication via more structured instructions and increasing the affordances of the communication tools.

Keywords: Asynchronous Discussions, Online Courses, Communication Tools, Google Docs

1 Introduction

In this study we look at asynchronous discussions in online courses where the number of participants is small. We observe ten groups of 4-5 students who were tasked to comment and discuss each others essays using Google Docs during a UNIPS pedagogical online course [19]. The aim and purpose of this work is to identify key issues in such discussions and propose theory-based solutions to improve engagement, participation and learning of students. This paper is structured as follows: first, relevant work is discussed in the background section. Then, the research methodology is presented followed by the results. The paper ends with discussion on the findings and ideas for future work.

2 Background

Historically synchronous communication required participants to be in the same place at the same time. When the term was adopted to describe online communication, the spatial requirement faded away leaving only the temporal, as the internet allows communication over distance. Thus, synchronous online communication is currently defined to be *conversations which take place in real time* [24] or *Communication in an online setting that requires simultaneous participation* [29].

On the flip side of synchronous communication is the asynchronous. In western society people partake in asynchronous discussions everyday. Emails, text messages, voice messages and discussion forums are just some examples of asynchronous communication. In e-learning and elsewhere, asynchronous discussions are widely used for their convenience - as participants do not need to be online at the same time, they can communicate at a time which they find convenient [4, 14, 25]. For many, it has become the preferable choice over synchronous alternatives. For example, the youth are showing a trend of preferring messaging over phone calls [3] and students have been found to rather communicate with faculty in an asynchronous manner instead of traditional or virtual office hours [21]. Also before synchronous meetings can even be held, they are often first agreed to asynchronously.

Asynchronous discussions are also criticized. They provide less diverse communication opportunities and lack the psychological motivating effects of synchronous discussions such as social arousal and increased exchange of social support [14]. Asynchronous discussions have been shown to hinder the outcomes of cooperation in comparison to synchronous communication [28]. These drawbacks can mostly be attributed to the root cause that defines asynchronous discussions: delayed feedback [26]. Immediate feedback has been found to motivate humans and allow them to take their ideas further [18]. This can be due to humans having limited cognitive capacity, and the working memory of humans will be filled with other things as time progresses, hindering the ability to effectively respond when feedback is delayed [8]. On the other hand, asynchronous messages can be re-read over and over again, providing the opportunity to meditate on specific parts that require thought.

2.1 Asynchronous Learning in Online Courses

A study by Swan identified three main factors affecting student satisfaction in online asynchronous discussions: clarity of design, interaction with instructors, and active discussion among course participants [30]. A more recent study took a different approach and looked at which one of the three, (1) commenting, (2) viewing and (3) voting had the biggest impact on peer learning and performance, and arrived in the conclusion that viewing had the biggest impact [6]. In light of these findings it seems that simply looking at commenting activity or even content does not reveal the whole picture on whether discussions are successful or not.

In online learning, an asynchronous discussion group of less than 10 students is considered small [5], and, when the discussions are non-mandatory, only a limited amount of students participate in commenting [5], even though more can be viewing comments [6]. Thus, to increase learner participation in asynchronous discussions, at least non-mandatory ones, increasing the amount of participants will also lead to an increase in discussion activity [5]. With regards to interaction with the facilitator, less intervention can lead to more comments made by the students [1]. Some moderation can, however, be needed in discussions, especially if participants maintain anonymity, as trolling can emerge and spoil the discussion [13].

For a team to operate effectively, simply using one type of communication (asynchronous) is typically inadequate. A delicate balance between both synchronous and asynchronous is needed [2, 9, 23, 33] as both have strengths and weaknesses [20]. Scholars including Lynette Watts have also reminded that there are technological and time-constraint aspects among others which need to be considered when looking for the optimal solutions for student peer communication in online courses [32]. Some online courses have allowed their students to pick their own preferred communication tools, but this only works in certain kinds of projects, as often in these cases course facilitators are unable to follow the group discussions, as they take place in an out of reach closed platform.

2.2 Issues with the binary categorization

Sorting all online communication into asynchronous and synchronous is commonly used in scholarly work (e.g [14, 27, 7, 24, 25]). Both types of communication have associated characteristics which are summarized below in non-exhaustive Table 1.

Table 1. Characteristics of Asynchronous and Synchronous Discussions

Asynchronous Discussions	**Synchronous Discussions**
Opportunity to study and re-read [22]	Rapid feedback on actions [26]
Less mundane interaction, more focus [22]	More interaction, more words [22, 26]
More meaningful messages [15]	Social support [14, 28]

However, it is easy to find counterexamples or at least examples challenging these characteristics. Same technologies and same forms of communication can be used for both synchronous and asynchronous discussions [29] such as Skype, WhatsApp, Facebook messenger and Telegram. Discussions can take place when people are united in the temporal dimension, but also when they are not. This can be seen in the message culture. When sending letters, it is common etiquette to begin messages with a greeting and sign them. However, in instant messaging the greetings and signing are often omitted, highlighting that it is the same continuous conversation, not a turn-based exchange of ideas where each message

is counted as its own entity. E-mails are currently in the process of this disruption as some, perhaps more formal communication, still include greetings while increasingly the greetings are omitted. All this constitutes to an increasing blur between synchronous and asynchronous communication and is a symptom of our society being "always online".

As the temporal dimension is in a key role in defining whether the form of communication is synchronous or asynchronous, we observe when participants engage in discussion during an online course. With this focus we seek to answer the following research question: *What are the key temporal challenges in peer communication during online courses?* Through identifying these issues we are then able to theorize solutions based on previous work.

3 Methods

For answering the research question, data from UNIPS employee training pedagogical online course *Becoming a Teacher* which took place in autumn 2017 is used. UNIPS is an open online repository of educational materials which can be self-studied or completed in guidance with local universities for certificates or ECTS credits [19, 17]. The course *Becoming a Teacher* is a micro-credential course worth one credit (ECTS), and has been shown to change conceptions of pedagogy especially for young learners [31]. 42 students who gave permission to use their discussions for research participated in a two week teamwork period where they used Google Docs to comment on each other's essays on how they see themselves as teachers. Groups of 4-5 students were formed, and all students were either PhD students or faculty at the university. The teamwork period contained loose instructions and minimal participation by the facilitator, and focused on peer-interaction. Participants were given three deadlines during the period which were: (1) submit your essay and introduce yourself to others. (2) Go write at least three comments on each others essays and discuss with them about the content of their essays and (3) Go reply to all the comments you received and continue the discussion.

As we analyze the temporal dimension of the discussions, we looked into obtaining the following information:

- *How often do participants come online during a two week discussion period?*
- *Are there students who are unable to discuss and develop their ideas further because their group members are not online often enough?*
- *Did the interaction change if two participants were online at the same time?*

4 Results

During the two-week asynchronous team work period we observed clear spikes in discussion activity right before deadlines. These spikes can be seen in Figure 1. One crucial aspect for the success of asynchronous discussions is that students are online often enough for discussions to be able to occur, which we found

was not the case. In fact, more than half the students commented the bare minimum, while some did not do even that. Zero students managed to comment on more than half the days the teamwork period was running. The amount of days individual students came to comment online can be seen below:

- 0-1 days: 3 students
- 2 days: 23 students
- 3 days: 9 students
- 4 days: 7 students
- 5 or more days: 0 students

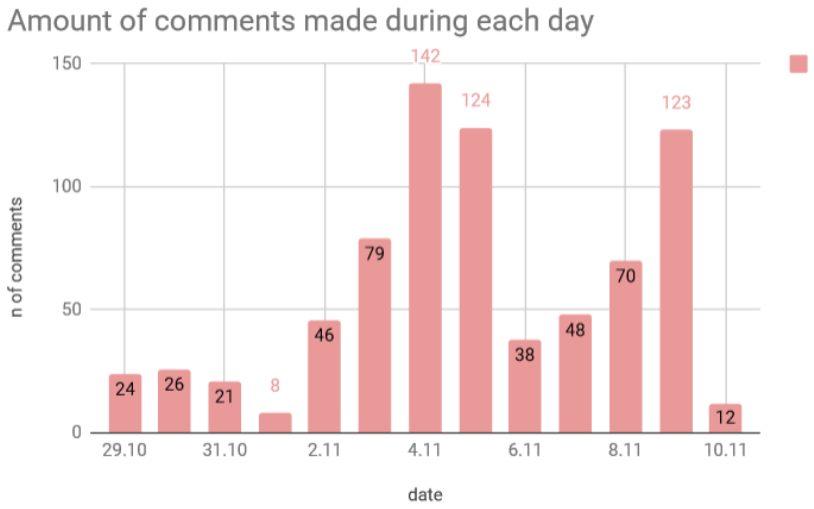

Fig. 1. Showing how student activity was highest right before or during the deadline dates 5.11 and 9.11.

The mean participation rate was two days, with the average amount of days student came to write comments being 2.45. According to these findings, the majority of students write their comments and questions on one day in the middle of the team work period and return to reply to the comments they have receive close to the deadline. This indicates most students are unable to produce effective discussions during the teamwork period, as their teammates are statistically not likely to be online for often enough.

Furthermore, we observed situations where *student A* came online to write comments and *student B* replied the next day as visualized in Figure 2. *Student B* then came online the next day, but as *Student A* had not yet replied, this time could not be used for discussion. Also cases occurred where both *Student A* and *Student B* were online at the same time, but due to the nature of the

communication platform, they were unable to utilize this simultaneous presence for more direct synchronous communication.

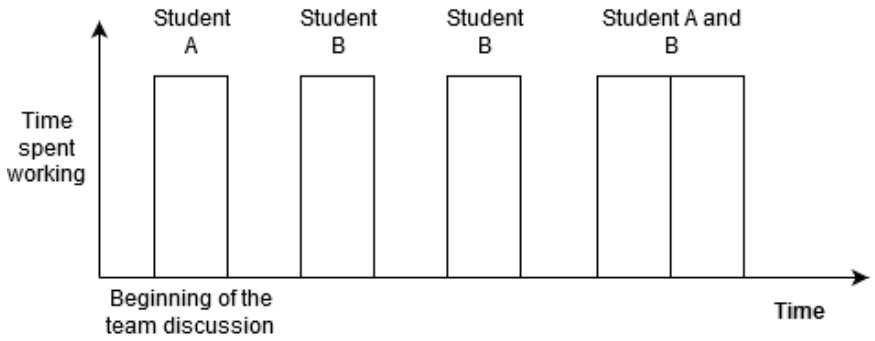

Fig. 2. The reality of asynchronous online discussions

5 Discussion

5.1 Key Findings

Observing the temporal dimension of asynchronous online discussions revealed the following issues:

- Discussion activity peaked every time an incremental deadline drew closer.
- Students reserved time to write comments on days where the rest of their group was yet to reply.
- Even if students were online at the same time, they were not able to harness this opportunity for more direct higher fidelity communication.

In order to make a better use of students time, the presented data indicates that more synchronization between students that take part in asynchronous discussions is needed when the groups are small. An ideal situation to aim for would be such where students take turns to come online and reply to each other, as visualized in Figure 3. But how to get there?

5.2 How to Add Synchrony in Asynchronous Communication

Academia has come up with solutions to combat the issues described above, such as the copyrighted Intelligent Discussion Boards [16] and incremental deadlines [10]. Also increasing the number of participants has been suggested in the context of non-mandatory discussions [5], however, it is unclear what kind of an impact it would have on mandatory communication. Simply forcing students to

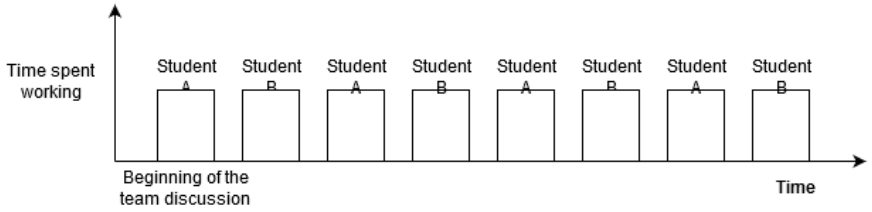

Fig. 3. A more even distribution of time spent.

come online at specific times defeats the purpose of asynchronous communication, as one of the reasons projects such as UNIPS are choosing asynchronous technologies for their courses is that students are not able to come online at specific times [19]. The trend of being more and more online [12], and the influence it can have on asynchronous discussions, is an interesting aspect for future research.

We notice cases where it is difficult to explicitly define whether certain communication is synchronous or asynchronous, such as instant messaging, where people can drift in and out of *synchronization* constantly. It can be argued that it is more fruitful to visualize communication based on delay, or the possible delay, between exchange of information instead of using the binary categorization. In an online message board a comment can be replied to immediately, or in two days, or never. To truly synchronize asynchronous discussion, solutions should be sought where this delay is minimized. This idea can be taken further by placing different forms of communication on an axis based on how much delay there is between exchange of ideas. This axis is displayed in Figure 4. If the delay in feedback is used as the sole defining feature of asynchronous communication compared to synchronous, then we arrive into the conclusion that there are *"more synchronous"* activities than others. Thus, we can increase the *synchrony* of asynchronous discussions.

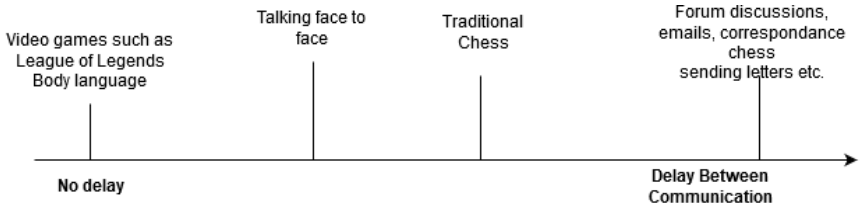

Fig. 4. Sorting Forms of Communication Based on the Delay in Feedback

5.3 Limitations

The empirical data collected in this study was from a specific course in a geographically limited area and used a specific technology (Google Docs) for organizing discussions. The instructions and behavior of the course facilitator influenced the discussion activity. Furthermore, increasing the intrinsic motivation of participants via, for example, giving them a concrete common goal which they had to achieve and which required cooperation might have increased the discussion activity.

All these limitations in mind, the purpose of the empirical data was to identify challenges which might arise in pure asynchronous communication. It is likely the findings are present in other asynchronous online courses as well. Currently UNIPS courses have shown to have a positive impact on students' learning despite the challenges in the teamwork period [31]. It is thus possible that participants learn also simply by viewing discussion instead of contributing to it themselves, as suggested by Chiu and Hew [6].

5.4 Future Work

The findings from this study mostly focus on identifying a problem with small group asynchronous discussions. The natural follow-up study would be to implement some of the proposed remedies in similar small group asynchronous discussions and measure the effects it has on student engagement, participation and learning. In terms of the proposed solutions, one of the interesting aspects is to shape the used technology to better serve the discussions. In the case of Google Docs, this could mean adding gamification elements to the mix such as awaring points for commenting [11] or prompting participants a synchronous communication option if they happen to be online simultaneously. Furthermore, the technology could alert students if they have received new comments and remind them to go reply if they have not done so in a certain time window.

6 Conclusions

We used empirical data from group discussions during a UNIPS online pedagogical course to identify three temporal issues in the asynchronous communication that took place: (1) Discussion activity peaked around deadlines (2) Students reserved time to write comments on days where there was nothing for them to do and (3) students were unable to discuss synchronously even if they were online at the same time. We theorize that these challenges could be mitigated if participants synchronized their activities better with each other. As a solution, the actions of the course facilitator, instructions given to participants and chosen communication technologies should be looked into. We also discussed what follows if activities are observed based on the delay between the exchange of ideas, and used this to place activities traditionally categorized as asynchronous or synchronous on a spectrum. Future work will include empirically testing the effects the proposed solutions will have on the quality of the discussions and consequently, on students' learning.

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