University Students' Peer to Peer Knowledge Sharing Practices via SNS – A Network Analysis Approach (Short paper)

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Abstract

In this exploratory study, we suggest using network analysis as a method to investigate the spontaneous, day to day practices of students using SNS based study groups (specifically Whats App) in their learning. Asynchronous chat logs from five different groups were collected from bachelor students in the Hebrew University of Jerusalem. All the groups were formed by the students and managed without faculty intervention or knowledge. Educationally related discourse episodes were selected (N = 466). The information shared in the groups was analyzed by a human judge and qualitatively coded into different themes (types of questions or requests, actions, different speech acts i.e. explain, contradict etc.). These themes formed the nodes in the network, and the strength of the ties connecting them was derived from the number of times they appeared together in the same episodes. The network analysis approach allows a visualization of how different and essential parts of a dialogic learning (motivation to question, critical reasoning and agreed upon definitions) are densely connected in certain (albeit rare) interactions, proving that students do engage in rich, collaborative, knowledge-building activities.

Keywords: dialogic learning, SNS, self-learning, study groups, network analysis.

Introduction

Learning is a social activity, which happens in and through social interactions with peers and where thoughts, ideas and sometimes artifacts are shared (a/o, Alexander, 2005; Scardamalia, 2002; Vygotsky, 1978;). A distinction is made between peer knowledge sharing, the act of making knowledge available to others, and collaborative peer learning, activity in which peers engage in rich learning dialogs and build knowledge together (see Webb, 2009 for a review).

A collaborative dialogic peer learning instance is a combination of intrinsic motivation, which can be expressed in questioning (desire to better understand); critical thinking, expressed in reasoning speech acts such as claim, proof, criticism, etc. (Toulmin, 1958); and universal definitions, or 'grounding' (Dillenbourg, 1999). A learning dialog occurs only when these actions appear together (Mercer & Howe, 2012). Analyzing learning dialogs is difficult because in addition to identifying the different elements, only human judges can correctly interpret the data in its pragmatic context but then the qualitative data is hard to represent and analyze (Mercer, 2004).

Another problem is that learning dialogs were envisioned as free (non-forced) action of constructing knowledge (a/o Fernandez-Balboa & Marshal, 1994, Foucault 1972, Halliday, 1994), in which participants are equals in status and knowledge level, and are intrinsically motivated to communicate, share ideas and work towards a shared goal (Freire, 1974). In contrast, classroom dialogs were found to be mostly 'pseudo dialogue', as the teacher guides the

conversation and often has secret motivations which are not shared by the students (Peled & Blum Kulka, 2008).

Network analysis is based on graph theory, and is basically a mathematical way to examine how components connect to one another in a graph, thus observing relations of actors (or ideas) in a social complex (or in a conversation). (Borgatti, Everett & Johnson, 2013). By clearly defining and coding the themes arising in the discussion, it is possible to graph their detection in unrelated instances (Borgatti & Everett, 1997).

The present study

This study looks at how students communicate spontaneously and freely, on educational topics which concern them. We focus on the following research questions:

- Are SNS based study groups were used mainly as a knowledge sharing platform, or were they also used by students as a dialogic learning tool?
- If dialogic learning instances do happen, when and why do they occur?

Method

Asynchronous chat logs of five different students' WhatsApp learning groups were collected during the months of May – June 2017. The names and personal details of the chat's contributors were coded to protect the identity of all participants.

The groups' chat logs were first separated into episodes. An episode usually begins with someone posting information or asking a question, followed by responses. These episodes formed the first set of nodes in the network. Next, different themes were identified and coded. These themes formed the second set of nodes. Then, using a network analysis program (Pajeck), the network was transformed along the columns into a one mode network of topics adjoined by symmetric edges, weighted by the number of episodes that contain both topics. (Borgatti, Mehra, Brass & Labianca, 2009, de Nooy, Mrvar & Batagelj, 2005).

Main Findings

It was decided to analyze only educationally related conversations, 466 episodes remained. It should be strongly emphasized that students mostly used the groups for knowledge sharing practices. Either asking for or sharing lesson notes or reading materials summations (N = 444) or seeking technical information, such as the location or time of the class (N = 256).

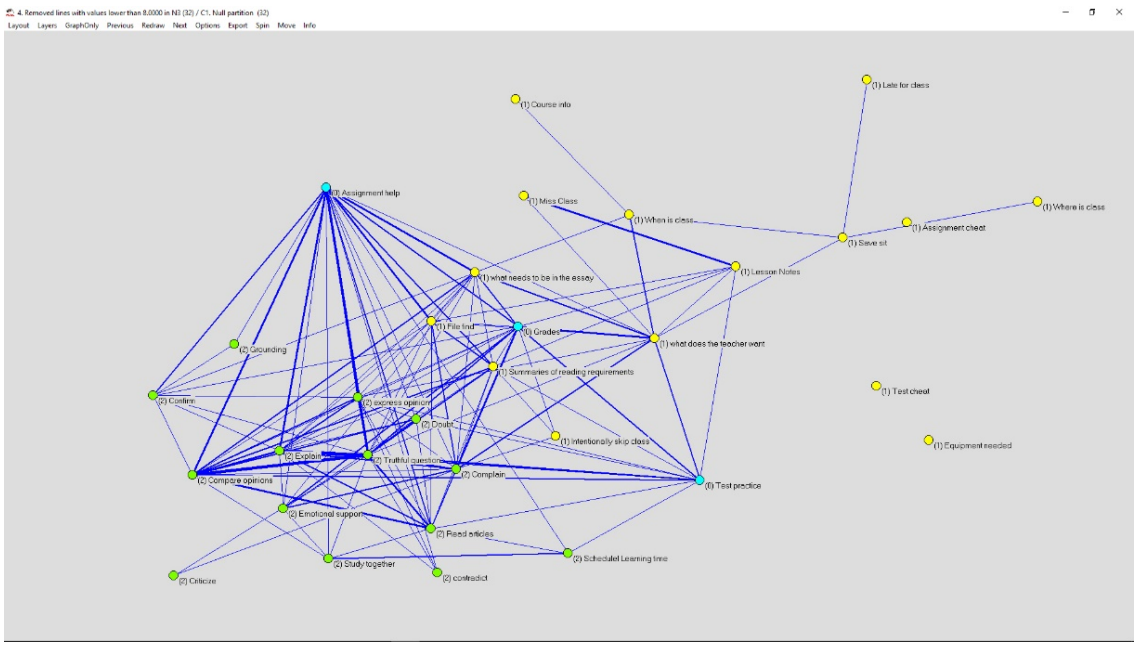

Figure 1. The network

As can be seen in Figure 1, the nodes 'assignment help', 'test practice' and 'grades' serve as sort of junctions between (almost clean cut) halves of the network – green and yellow. A conversation containing these topics could either lean towards cutting the work load by using peers' knowledge sharing practices (represented in this network by yellow dots) or towards a myriad of different acts that together form collaborate peer effort to better understand (represented here by green dots).

The green half, cases of collaborative learning processes, form a visible close-knit cluster around the node 'truthful question' (meaning showing a strong intent to understand). This node was highly connected to inductive speech acts such as 'explain' (v = 37), express opinion (v = 19), doubt (v = 16) and to acts like compare opinion (v = 37) and reading the assigned material (v = 27) which show that students are seeking universal definitions (see Appendix A for a detailed example). The yellow half, of peer knowledge sharing processes, resembles more of a chain then a cluster, where some actions form weak links (for example, sharing lesson notes is linked with skipping class v = 21) but most of them do not.

Conclusion

SNSs' based learning groups are mainly used for knowledge sharing, which reduces the work load and enables students to invest less time and still get better results. However, the network analysis approach has helped visualize the existence of connections between all the components of dialogic learning instances (questioning, reasoning and agreed upon definitions). Therefore, proving that spontaneous and unmediated instances of peer collaborative learning exist, albeit rarely.

The form of the network suggests that students mainly turn to the groups' help when practicing for tests, writing assignments or concerned about their grades – answering 'when' learning instances most often occur. The dialogic actions that formed around the node 'truthful question' suggests that this is an important trigger. Perhaps by encouraging more questions in the groups, it will be possible to increase the occurrence of such deep, engaging and collaborative learning instances.

The main limitation of the current project is it size. However, the fact that dialogical learning instances happened even in such a small database shows great promise for future and bigger endeavors. The second limitation is that the data was coded by only one researcher due to time

and budget scarcity. While it is possible that the human judge has coded some actions wrongly, what little strength the evidence presented here holds, lies in viewing the network as a whole.

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Appendix A

To better illustrate the process, here is a roughly translated example from one of the episodes analyzed, a discussion regarding a homework assignment given in an organic chemistry class.

1. 10/5/2017 22:51 – [redacted] Did anybody find a literature value for the utilization of the reaction before the reflex?
2. 11/5/2017 17:02 – [redacted] I'll try to answer by Tuesday
3. 11/5/2017 17:03 – [redacted] Do you mean before re-crystallization? I computed a 100% utilization, about 6.14 grams.
4. 11/5/2017 17:04 – [redacted] 6.14? that is a lot of utilization which I do not have.
5. 11/5/2017 17:05 – [redacted] I found a source that reported 16 percent utilization, and explained it mainly via the byproduct of biphenyl which takes a lot from the reagent.
6. 11/5/2017 17:07 – [redacted] http://1chemistry.blogspot.co.il/2011/11/grignard-synthesis-of-triphenylmethanol.html?m=1
7. 11/5/2017 17:07 – [redacted] That's the source reporting 16 percent utilization with a procedure very similar to ours.
8. 11/5/2017 17:07 – [redacted] I've seen this site, but it seems really unreliable.
9. 11/5/2017 17:07 – [redacted] and I'm looking for articles on this subject.
10. 11/5/2017 17:07 – [redacted] there isn't anything like this.
11. 11/5/2017 17:08 – [redacted] 6.14 grams that's 100% utilization – if everything reacted and there was no material loss.
12. 11/5/2017 17:08 – [redacted] when the limiting reagent is benzophenone.
13. 11/5/2017 17:08 – [redacted] with this I agree.
14. 11/5/2017 17:08 – [redacted] I'm just trying to find what to compare the utilization which I received.
15. 11/5/2017 17:47 – [redacted] and also, I received a utilization of 60%.
16. 11/5/2017 17:47 – [redacted] so 100% sounded pretty high.
17. 11/5/2017 17:56 – [redacted] I did it with the utilization after the re-crystallization, don't invest too much time in this…all the reports are only 10% (of the final grade).

As can be seen in the above example, the sequences start with a question (turn 1) which was classified as 'truthful question' as the student is intent on understanding (turns 8, 9, 14-16). Inductive speech acts that can be detected in this example are explanation (turns 3 & 17) or contradictions (turns 8 & 16). Finally, the students sought universal definitions by providing proof (turn 6) and taking time to reach mutual understanding, or 'grounding' (turns 11,12 &13). Although it is unclear whether they reached the right answer, and even though this experience was cut short by a student reminding everyone that the amount of points that will be gained rendered the whole assignment negligible – still this seems to be a genuine learning dialog.