STUDENTS' BEHAVIOUR IN GROUP DISCUSSIONS DURING ONLINE TEACHING

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ABSTRACT

Group discussions are used as a tool to increase student activity. In this paper students' behaviour in group discussions during online teaching is investigated. The students' activity and participation in the group conversations led the teachers to believe the online learning activities were successful, however, an anonymous questionnaire uncovered that many students had challenges and were uncomfortable in the situation. This study was done in a preparatory physics course for engineering education where the majority of the 56 students have a vocational background. The questionnaire contained both quantitative and qualitative questions and 27 of the students responded. The qualitative data were analysed with inspiration from the constant comparative method of analysis. This systematic analysis resulted in categorising the students' behaviour as either taking actions, that promote learning, or as dominated by a lack of initiative, something that hampers learning. A relationship between the students' use of webcams and behaviour that promotes learning is found. Further, the students who use webcams perceive the students who do not use webcams as passive and less interested in learning. This paper aims to shed light on challenges perceived by the students in an online teaching format.

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1   INTRODUCTION

1.1 The background for this study

For the autumn semester of 2020, the two authors designed online teaching activities in a preparatory physics course for engineering educations adapted to the covid-19 situation. The aim was to create a learning environment where the students have productive discussions in groups. Most of the students have a vocational background, and it is several years since they went to school. Usually, these students would have all classes on the campus. Instead, the students had a three hours session of online teaching activities two days a week, and one day a week the students met at the campus for a two hours session of group work with their cohort, a smaller group, according to the covid-regulations at the time. In the campus sessions, the students performed practical experiments aimed at improving their understanding of physical concepts. Before the online teaching activities, the students watched recommended learning videos. During the online sessions, the students discussed topics from the videos using guided questions and worked with calculus-based exercises. The discussions took place in smaller groups, which were created randomly using the breakout rooms function in Zoom. The same groups were kept during a three hours session, and the students were guided through the session by the teacher who alternated between group work in breakout rooms and giving explanations or summaries in the plenum. This teaching method was explained in several ways, by a written document, verbally in class, and a video. During the online sessions, the students were encouraged to use the chat, a webcam, and their microphone. In plenum many students used the chat, approximately half the students used a webcam, but no one used their microphone. In the breakout rooms, more students used their webcams, and they discussed verbally.

Based on the students' activity and the conversations in the groups, the teachers found the online learning activities successful, however, in the first meeting with the reference group (following the university's system for the quality assurance of education [1]), it became clear that some of the students did not like the online sessions. Students had reported misliking the use of random breakout rooms.

Two teachers (the authors of this paper) shared the responsibility for this class, both have an interest in developing group work sessions for the students to learn collaboratively. We noticed that it was always the same students who used a webcam, and these students appeared more active just because of this. Since students had reported misliking the online group discussions we were interested in how these were perceived, and the possibility to take action. We, therefore, decided to investigate the following research questions:

How do the students perceive the online group discussions?

How is the use of a webcam related to the students' participation?

1.2 Theoretical framework

This study is placed in the sociocultural view of learning where students actively learn together through interactions and compromises using language according to the learning theory of Vygotsky [2,3]. Our intention by planning for the students to work in groups was to promote active learning since active learning is found to improve students performance [4]. We think of active learning as defined by Freeman et al. "*Active learning engages students in the process of learning through activities and/or discussion in class, as opposed to passively listening to an expert. It emphasizes higher-order thinking and often involves group work*" p. 8413 in [4]. Both the online group discussions and the sessions at the campus were designed for collaborative learning, that is, a specific kind of group work, in which the students actively work together on the same task, where the intention is for the students to learn together [5].

2 METHODOLOGY

2.1 Data collection

Data was collected through an anonymous online questionnaire, which was sent to the students by e-mail. To get detailed and rich information about the students' experiences the main emphasis was on open questions in combination with some closed questions. As conferring Robson and McCartan [6] p. 272, "*the main purpose is to simplify many individual responses by classifying them into a smaller number of groups, each including responses that are similar in content*". The questions were:

About the use of webcam:

- Do you use a webcam? (Options: Yes/No)
- Why? (Text answer)

About the online group discussions:

- How have the breakout rooms worked for you? (Text answer)
- How often do you start talking in the breakout rooms? (Options: Always/ Often/Sometimes/Almost never/Never)
- What is the reason for your answer? (Text answer)

This is a small scale study out of the 56 students, 27 responded over a week.

2.2 Method of analysis

We followed a standard procedure to copy all responses to a particular question on a large sheet of paper [6], that is, all responses of *always* to the question *How often do you start talking in the breakout rooms?* were put together with the corresponding answers to the open questions *How have the breakout rooms worked for you?* and *What is the reason for your answer?* Hence the questions concerning the breakout rooms were divided into five sheets of paper one for each of the options. A similar procedure was used for the questions about the use of a webcam.

The basic principles of the constant comparison method guided our analysis [7]. In short, using the constant comparative method the researcher compares data to form

codes, codes are compared to form categories, which then again are compared to form a core category [7]. As the researcher is going through the three phases of the constant comparative method, more and more abstract categories are generated, and a theory is developed when data is reduced to concepts. We did the first phase, open coding, separately, asking ourselves "What is this the case of?" or "What is the student expressing by this?". We went through the students' answers one sentence at a time and attached codes to the sentences, a code could be in the form of a sentence describing our reflection over what the student is expressing. In the second phase, axial coding, the researcher makes connections between the codes from the first phase. We extracted our preliminary categories separately before we met for a discussion. In practice we read out loud the students' answers, discussed our codes from the first phase before we did a thorough comparison of our codes, to create a common set of categories in the second phase. After comparing categories to codes for each of the five sheets corresponding to *How often do you start talking in the breakout rooms?* we compared categories to find the main categories in the third phase, and we quantitatively compared how many of the students used a webcam. Hence on our way to the third phase, the selective coding phase, where the main categories are extracted from the data we discussed and reflected together during the process of analysis. The result was a shared and deeper understanding of the students' answers and a common set of categories. In addition, we recorded our conversations, something which was helpful when writing the results afterwards and summing up on the developed theory grounded in the data. A theory grounded in the data is here understood as the connection between the main categories, which are students having: *A behaviour that promotes learning* (section 3.1)*, A behaviour that may promote learning occasionally* (section 3.2)*,* and *A behaviour dominated by a lack of initiative* (section 3.3). These main categories explain the students' behaviour in the breakout rooms seen in the light of their use of a webcam. Students' reasons for not using a webcam are described in the last main category: *Reasons for avoiding the use of a webcam* (section 3.4).

2.3 Ethical considerations and quality

The students were informed verbally and in writing at the beginning of the questionnaire that their anonymous answers could be used for research and development purposes. Further, it was voluntary to give answers. To ensure the quality of the work, all students in the class received an earlier version of this paper by e-mail with an invitation to give feedback. One student replied with a confirmation of our description.

3 RESULTS

An overview of the quantitative data is shown in Table 1, where the number of answers to *How often do you start talking in the breakout rooms?* is shown together with the number of students answering *yes* to *Do you use a webcam?*

Table 1. Quantitative answers.

	Always	Often	Sometimes	Almost never	Never
Starting talking	1	12	8	4	2
Yes to webcam	1	9	2	1	0

We see the number of students using a webcam is higher for those who start talking *always* and *often* as compared to the rest of the students. This is indicating a more active attitude among these students.

3.1 A behaviour that promotes learning

The students answering *always* or *often* write explanations showing that they take responsibility for their own and other students' learning by initiating a discussion, thus exhibiting a behaviour that promotes learning. As expressed by this student, *"I like to participate in discussions, and is happy to start them if no one else is talking"*. Or by another student answering: *"The breakout rooms have worked quite well, but I wish everyone was more active".* The students in this category seem to have recognized the benefit from sociocultural learning activities*, "I feel I can contribute to my group, and I know I learn from discussing the exercises in physics"*.

Even though these students take action by initiating discussions they still prefer to work together with students from their cohort. *"I have a low outcome from discussions with students I don't know, as they often participate very little in the collaboration. There is a big difference from working with someone you know".* Or as this student expresses: *"It is more difficult to start a discussion with someone you have never met before ... with my cohort we manage good discussions, and learn from each other".*

Students within this category are more likely to use a webcam, as seen from the numbers in Table 1. The data shows that these students perceive students without a webcam as less interested in learning, since *"if fellow students do not participate with a microphone or a webcam they rarely wish to contribute in a collaboration".* It is challenging (or impossible) to discuss with other students if they don't see (or hear) them.

As opposed to the rest of the students, most of the students answering *always* or *often* uses a webcam, and they *always* or *often* start talking in the breakout rooms and initiates a discussion either because they like to discuss or they see they benefit from it. Though they do prefer to discuss with students they already know, they try to initiate a discussion when they are in a group with students they do not know.

3.2 A behaviour that may promote learning occasionally

This category, a behaviour that may promote learning occasionally is based on the explanations from students answering they *sometimes* initiate a conversation. These students start talking only if they feel like, "*it depends on the situation*" writes a student. Since these students may "*say something in the breakout group only if I*

have a question" or *"usually I don't need to ask anything, then I don't bother to talk".* That is, these students may or may not participate in the online group work, depending on the situation.

As for the students described in section 3.1, these students also indicate they prefer to work with people they know. *"Randomly formed breakout rooms have led to only little discussion, but I haven't had the need to discuss either".* Or *"when you come together with four students you don't know in a breakout room, then very often it results in no one saying anything, then I have to start talking myself otherwise no one will start the discussion".*

For these students their personality may inhibit them from starting or joining a discussion, *"I'm pretty shy, but I try to take an initiative. Breakout rooms have worked poorly for me since if I don't know those I end up with, there will be almost no one who talks".*

The students answering *sometimes* do not feel a responsibility for the group. They start talking only if they themselves wonder about something, this is in contrast to the students described in section 3.1, who feels a responsibility for the whole group, and would start a discussion even if they don't feel like it or for some because they like to discuss.

3.3 A behaviour dominated by a lack of initiative

The students answering they *almost never* or *never* start talking in breakout rooms appear to have a personality that prevents them from taking part in the online group work, as a student explain *"I don't like to talk".* Another student writes: *"because I don't know the people it feels odd to have a conversation with them, when they are shy, too".* A quote which might indicate that this lack of action is due to social insecureness within the class. *"Sometimes there is nobody who talks because you don't know each other".* Though one student does *"start talking if I feel like I need it. It's okay that people do not talk if we are doing exercises, as it can be difficult to discuss if there is something you do not understand".* These students have not learned or experienced how it is to learn in a sociocultural learning environment, where discussions are a natural part of the activities. Expressed as *"I'm not able to talk when I end up in groups where no one gives any feedback".* The students in this category have in common that they have bad experiences from the online group work, as *"random groups work very poorly"* or *"no one is using a webcam and microphone, then it's just a waste of time".* The random breakout rooms have not worked as intended for these students. The students were not left alone when working in the breakout rooms, the teacher visited the groups from time to time, to follow up or they could use the raise hand option.

The students within this category experience weak relations with other students from the class, and since they are shy online breakout rooms have worked poorly for them. In addition, since most of them do not use a webcam they send a signal which by the students from section 3.1 is perceived as these students are not interested in participating in the group work.

3.4 Reasons for avoiding the use of a webcam

Out of 27 students responding to the questionnaire, 14 of them do not use a webcam. We categorised their explanations for not using a webcam into, problems with equipment (5 students), the surroundings (3 students), being uncomfortable showing oneself (5 students), or they find it unnecessary (3 students). Some students gave more than one explanation.

Problems with equipment, like a bad internet connection, or sound problems are mentioned. Students mentioning their surroundings as the reason write *"I work at the kitchen table and live with several people who don't want to suddenly appear in the background"* or *"I find it uncomfortable to use a camera when I'm at home, I can spend a lot of time thinking about how I and the room look, also I live with others who may not want to appear in front of 60 students".* The students who feel uncomfortable showing themselves have more personal reasons. *"I find it uncomfortable that people I don't know can look at me through the screen."* Or they *"feel like others are looking at me".* They also say: *"I don't need to show my frustration to other students".* The students who find it unnecessary to use a webcam have no good reason, *"I have no good reason, I'm using it only a little, lately".* Thus all these students have reasons for not using a webcam, it is worth considering this behaviour in the light of how other students perceive this behaviour in a learning situation.

4 DISCUSSION

We see that the covid-19 circumstances, where the students were encouraged to stick to their cohort and only to get to know a small group of students made it unnatural to get to know each other across the cohorts in online teaching. When we decided to use random breakout rooms it was with the intention that the students would get to know each other across the cohorts and that this could contribute to better learning over time, since the students would discuss with more people not only those from their cohort. It was also the intention that this would contribute to a strengthening of the learning environment in the class as a whole. Previous students have reported that a random group setting for group work at the campus has resulted in more focused group work, we experienced here that this was not directly transferable to the online teaching format. In the case, studied here we continued to use breakout rooms, but now only for fixed groups, the cohorts. To facilitate the group work process we visited the breakout rooms more frequently. After finishing the school year we experienced, from a teacher's perspective, that only half of the fixed groups worked as intended. We, therefore, believe that randomly formed groups are preferable since the students get to know and discuss with all the students and get access to more views and perspectives.

This study has limitations as all information is collected through the questionnaire. We planned to do interviews to obtain a deeper understanding of the students' behaviour and experience, however, the increased covid-19 restrictions made this too complicated.

5   SUMMARY

The analysis showed that the students either took responsibility for their own and others' learning by initiating discussions or they had a more passive behaviour in the breakout rooms. We found a connection between the students who use a webcam and have a behaviour that promotes learning. Furthermore, these students perceive the other students without a webcam as less interested in learning. When students in breakout rooms do not use a microphone or a webcam, this sends a signal which is perceived by other students as if they don't want to participate. The students reported different reasons for not using webcams, differing from technological difficulties to consideration for others and social discomfort. Our analysis shows that many students experience weak relations with fellow students and a form of social insecurity that prevents them from being active in online group discussions. The students who take responsibility for their own and others' learning like to discuss and therefore starts talking in online group discussions. Therefore the online group discussions studied here only worked occasionally, depending on who ended up together in the random breakout rooms. Many students across all categories write that online group discussions can work, or work the best if they are together with their cohort because then they know each other and dare to talk. As described in the discussion this may be the case only as long as the students in the fixed groups have productive collaborations.

6   ACKNOWLEDGEMENTS

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