

Student preferences and behaviour in anonymous collaborative learning

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Abstract: Anonymity has been researched from different perspectives in Computer Supported Collaborative Learning (CSCL), e.g., peer assessment, writing, debating, etc. Although some negative implications have been found, positive findings are more abundant; for example, many students prefer anonymity because it facilitates more equal participation. However, little is known about what students prefer compared with what students do: Is their behaviour consistent with their reported preferences? In this preliminary paper, we compare students' opinions and their actual technology-mediated conversations when collaborating in anonymous vs. identified mode. The results indicate a more unproductive atmosphere in anonymous mode. In future research, we propose new iterations of the modes of online collaboration to optimise the potential benefits of anonymity.

Introduction

The effect of anonymity in groups has been studied in different disciplines and from different perspectives. Research about anonymity has been applied to better understand the processes of deindividuation (Social Identity model of Deindividuation Effects, or SIDE theory), brainstorming, decision-making, and social influence in groups. According to several studies, anonymity can have both negative and positive effects (Howard et al., 2010; Postmes et al., 2001; Roberts & Rajah-Kanagasabai, 2013). On the negative side, it can channel anti-normative or anti-social behaviour. On the positive side, it can increase group cohesiveness and attraction towards the group if a common group identity is salient. Furthermore, studies on anonymity from the learning sciences and computer-supported collaborative learning (CSCL) fields have arrived at similar conclusions: In anonymous mode, quiet students might find a voice (Chester & Gwynne, 1998). Voting and debating (Ainsworth et al., 2011), peer assessment (Rotsaert et al., 2018), writing (P Woodrich & Fan, 2017), and giving feedback (Howard et al., 2010) are some of the contexts in which anonymity has a positive effect on equity (gender, status, race) and the quantity and quality of participation. However, anonymity also has some disadvantages. For example, despite boosting participation, many students have reported that they tend to avoid making anonymous contributions (Hoadley, 2002), or that anonymity allows for jokes, insults, or an unproductive group atmosphere (O'Sullivan & Flanagan, 2003).

Some of these studies have surveyed students' perspectives, for example, by comparing their behaviour online with their behaviour in face-to-face classes (Chester & Gwynne, 1998) and asking them about their perceived problems during collaboration (Le et al., 2018) or their experience with peer assessments in anonymous vs. identified mode (Vanderhoven et al., 2015). Roberts and Rajah-Kanagasabai (2013) asked students to rate their preferences regarding posting in anonymous vs. identified posting on discussion boards; however, the boards provided were simulations, so students did not actually collaborate, and their real behaviour could not be measured. Thus, there is a lack of research focusing on understanding students' reported preferences and experiences compared with their actual behaviour when engaging in anonymous and identified collaborative tasks online.

In this study, we focused on first-year engineering students, and we used the Pyramid-App (Manathunga & Hernández-Leo, 2018), a tool that facilitates the implementation of the Pyramid pattern (Hernández-Leo et al., 2006) to shape a collaboration structure that promotes the participation of all students. Our goal was to obtain preliminary findings from students' reported behaviour and their opinions about anonymous and identified collaboration and to compare this data with quantitative data from the Pyramid-App logs. This manuscript aims to contribute knowledge about why students prefer anonymity or identified mode and if this is related to their behaviour, thus a factor in the quality of their collaboration. The following research question guided this study: How did the anonymous vs. identified modes of the tool (Pyramid-App) affect the students' collaboration in terms of the quantity and quality of their participation?

Methods

We used descriptive statistics to analyse the answer to a questionnaire and content analysis to examine the logs of the collaboration tool. Both are described in the Instruments section.

One class of engineering university students ($n = 74$) participated in four lectures of the Introduction to Information and Communication Technologies course, which is commonly offered in several engineering programmes, at a public brick-and-mortar university. Each teacher proposed a discussion exercise related to the topic covered during the lecture. Of the 74 students, 40 were male and 34 were female. The students participated in a face-to-face classroom setting using the Pyramid pattern. After the four lectures, the post-activity questionnaire (described below) was answered by 63 students (33 males and 30 females).

In the first phase of the Pyramid pattern during each lecture, the students were divided into groups of five to six people. The students logged in to the Pyramid-App using one of the two available modes: anonymous or identified. In anonymous mode, members' names are not displayed at any time. Instead, generic identifiers are provided (e.g., user1, user2, etc.). All members logged in using the same mode as instructed by the teacher. During the four lectures, the students logged in twice in anonymous mode (for two of the activities) and twice in identified mode (for the remaining two activities).

The following instruments were used in the experiment: 1) System logs were used to check the amount and quality of participation; any blank messages sent to the chat, as well as messages that were not understandable, were deleted. 2) A post-activity questionnaire was given to the students after they had completed the four collaborative activities. The questions asked about students' preferences concerning their experiences and behaviours when in anonymous vs. identified mode. There were two groups of questions: cognitive and social-emotional (Barron, 2003). The cognitive-related questions asked if the students had posted more/equal/less a) ideas/proposals, b) feedback/answers, and c) questions/doubts. The questions about social-emotional interactions asked if they had posted more/equal/less d) humour/jokes, e) criticism/complaints, and f) spam messages in anonymous mode. *Spam* is a very context-dependent category (see Discussion), but we define it here as a purposefully off-topic comment.

After initial instructions on using the Pyramid-App for collaboration were given and a trial activity was done, each group of students completed four activities with four different teachers on four different days. The Pyramid pattern comprises various sequential phases that script collaboration through a combination of individual and collaborative participation (increasingly larger groups integrating previous subgroups) until consensus is reached in the final phase. The duration of each collaborative activity was defined by the teacher using the tool. In three of the activities, the two collaborative phases lasted five minutes each, while the remaining activity took 14 minutes (seven minutes each phase).

Analysis and results

We first analysed the answers to the post-activity questionnaire to gain a general understanding of the topic from the students' perspectives. The majority (59%) preferred to collaborate in anonymous mode. The most frequently given reason was a feeling of safety that made contributing easier, followed by having more fun. Some students referred to the safety of their behaviour not having 'consequences', while others referred to having the 'freedom' to express their opinions. Among students who preferred identified mode (18.8%), their main reason for the choice was a more productive and serious collaboration. One student reported that they wanted to know with whom they were talking. The group of students who did not have a preference of anonymous or identified mode (29.9%) stated they worked as much and behaved the same in either mode. Four students reflected on how the content of an activity may cause them to change their behaviour in one mode or the other. For example, one student reported that if they were addressing 'controversial' topics, anonymous mode might be more appropriate.

When asked if they shared more/equal/less a) ideas, b) feedback, c) questions, d) useless jokes, and e) complaints in anonymous mode, most students reported positive effects of anonymity in their collaboration (see Table 1). They said they shared more ideas (47%), gave more feedback (44%), asked more questions (36%), did not make more useless jokes (46%), and did not complain or criticise more than in identified mode (60%).

Table 1

The distribution of more/equal/less ideas, feedback, questions, jokes, wasted time, and complaints in anonymous mode (as reported by the students)

		more %	equal %	less %
Content/ cognitive	Ideas	47.6	46.1	6.3
	Feedback	44.4	49.2	6.4
	Questions	36.5	52.4	11.1
Social - emotional	Criticism/complaints	19.1	60.3	20.6
	Humour or jokes	46	46.1	7.9

We then analysed and compared the content of the logs of the students' actual conversations during collaboration with their reported behaviours. To begin, we compared the amount of participation between anonymous and identified chats, counting the number of messages in each. We filtered out the blank and meaningless messages. The data show that students did not participate more in anonymous mode. Indeed, there was no significant difference concerning the amount of participation: the two identified chats had 468 (see discussion for an explanation for this significantly higher number) and 234 messages, respectively, while the two anonymous chats had 245 and 289 messages.

To compare the actual behaviour during the chats with the behaviour reported in the questionnaire, we conducted a content analysis of all the messages. We clustered messages in the same categories used for the questions of the questionnaire, with the first category encompassing the content and the cognitive aspects of collaboration and the second category including the social-emotional aspects of collaboration. The first category contained the following sub-categories: a) ideas and/or proposals, b) questions and/or doubts, and c) feedback/opinions related to a or b. The second category contained the following sub-categories: d) support of the team, e) regulation of behaviour, f) humour and/or jokes, and g) wasting time (spam). The sub-category of 'criticism/complaints' that was present in the questionnaire did not produce any results, so we created a more general category about group regulation and warnings about behaviour.

The results of the analysis (see Table 2) show that, despite what the students reported, there were fewer ideas, less feedback, and fewer questions in anonymous mode. In addition, there were fewer messages supporting the team, fewer messages regulating behaviour, and less humour and fewer jokes. There was a significant increase in spam in the anonymous chats (after blank and meaningless messages were deleted). Therefore, we can conclude that the quality of collaboration was lower in anonymous mode.

Table 2
Results of content analysis of messages

		Identified chat 1	Identified chat 2	Anonymous chat 3	Anonymous chat 4
Content/ cognitive	Ideas	44	21	24	14
	Feedback	99	76	90	65
	Questions	17	7	4	5
Social- emotional	Team support	23	14	9	11
	Regulating behaviour	7	5	0	7
	Humour	34	18	20	1
	Spam	18	5	10	67

Students who reported negative experiences during collaboration were those who preferred to work in identified mode. Their main reason for preferring identified mode was that the others did not take it seriously, and their behaviour made these students put extra effort into completing the activity.

Discussion and future work

The majority of the students preferred to collaborate anonymously, and they justified their opinions with solid reasons. However, the overall behaviour of the group in anonymous mode was less productive in terms of the quality of participation. Concerning quantity, the students posted more messages in anonymous mode, but the majority of these were coded as *spam*. The first activity had an unusual amount of higher participation but the total number of coded messages is very similar to the rest; many messages were about welcoming each other and saying hello to each other (maybe because it was the first time those students used the Pyramid-app).

Another issue for discussion is the questions of the activities. As some students answered in the questionnaire, 'maybe the topic was not controversial enough'. Different topics of discussion may change the behaviour of many students. Since the Pyramid-App offers a shared text editor with which to compose answers collaboratively, the chat conversations were essentially feedback on and questions about individual answers, but students did not introduce ideas or proposals because we think these were made by editing the answers in the collaborative editor.

The clustering of the social-emotional messages was especially difficult because the distinctions between the sub-categories varied within the flow of the conversations. For example, sometimes we considered a message

to be a joke, but when it was repeated several times during the conversation, it became spam. At other times, messages were a mix of content and social-emotional messages, for example, mixing feedback with humour or a joke.

The Pyramid-App, like many previous research tools, provides only one mode of anonymity for all members of a group. What if students were logged in in identified mode by default but could choose to post specific, individual messages in anonymous mode? We hypothesise that this could be a good way to optimise the potential benefits of anonymous mode while maintaining the advantages of identified mode. Another way to fine-tune anonymity could be to provide some kind of mechanism to exclude spamming.

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