

Open Research Online

The Open University's repository of research publications and other research outputs

Students' perceptions of the factors leading to unsuccessful group collaboration

Conference or Workshop Item

How to cite:

Liu, Shuangyan; Joy, Mike and Griffiths, Nathan (2010). Students' perceptions of the factors leading to unsuccessful group collaboration. In: Proceedings, 10th IEEE International Conference on Advanced Learning Technologies (ICALT 2010), IEEE, pp. 565–569.

For guidance on citations see [FAQs](#).

© 2010 IEEE

Version: Version of Record

Link(s) to article on publisher's website:
<http://dx.doi.org/doi:10.1109/ICALT.2010.161>

Copyright and Moral Rights for the articles on this site are retained by the individual authors and/or other copyright owners. For more information on Open Research Online's data [policy](#) on reuse of materials please consult the policies page.

oro.open.ac.uk

Students' Perceptions of the Factors Leading to Unsuccessful Group Collaboration

Shuangyan Liu, Mike Joy and Nathan Griffiths

Department of Computer Science
University of Warwick
Coventry, United Kingdom

Shuangyan.Liu@warwick.ac.uk, M.S.Joy@warwick.ac.uk, Nathan.Griffiths@warwick.ac.uk

Abstract—A nationwide sample of university students completed a survey that asked questions about their perceptions of the factors that can cause problems which exist with online or general group work. Data were obtained from 173 students at more than 18 different universities in the United Kingdom. Three main problems that exist in group collaboration are identified through an extensive review of literature and addressed as problem scenarios in the survey. These include: poor motivation, lack of individual accountability and negative interdependence. Findings from the survey include that on average more than five factors are acknowledged by the students for each subcategory of problem, and for each scenario the factors that affect the group work are ranked by importance level. Furthermore, we find no statistically significant association between the students' backgrounds and their perceptions of the factors identified.

Keywords—students' perception; group collaboration; poor motivation; lack of individual accountability; negative interdependence; survey

I. INTRODUCTION

Collaborative learning is a learning process in which “two or more people learn or attempt to learn something together” [1]. This emphasises that the collaborative learning process is a social rather than an individual activity [2]. Numerous studies including [3] [4] have shown that learning through collaboration, as compared to individual learning, unusually results in better achievement. Although empirical studies demonstrate the benefits that collaboration can bring in online and traditional learning environments (e.g. better learning outcomes), there are still many problems existing in group collaboration, which eventually affects the success of collaborative learning. These problems have been addressed in several studies including [6-9].

Traditionally, technical limitations are the main reasons preventing online learners from communicating and learning together. However, with the development of information and communication technology, technical issues are no longer the main factors affecting learners' collaboration, and An, Kim and Kim's study [5] reveals that problems induced by the learners themselves are the main factors impeding successful online group work. However, current literature

fails to adequately address the factors, from the student perspective, that result in actual or potential problems affecting group collaboration.

The research reported in this paper is an investigation of student perceptions of the factors that lead to unsuccessful group collaboration. We attempt to address these issues by quantitatively examining the beliefs of current university students in the UK. Moreover, the findings from the research provide valuable information which will assist educators in formalising appropriate facilitating strategies for online collaborative learning. Additionally, researchers in the field of intelligent educational systems can incorporate the findings of this research into the design and development of their learning systems in order to enhance group collaboration.

Through the subsequent review of literature and a survey of university students, our research attempts to answer the following research questions:

RQ₁: *What potential group collaboration problems have been identified in empirical studies and what factors (from the student perspective) can cause these?*

RQ₂: *Is there any association between student background – age, gender, and whether the students are native English speakers or not – and their perceptions of the factors causing problems in group collaboration?*

The rest of the paper is structured as follows. Section II reviews the literature about group collaboration and identifies existing problems that students may have with group work. Section III describes the methodology adopted, the findings from the study are presented in Section IV, followed by conclusions in Section V.

II. LITERATURE SURVEY

Some problems relating to online group collaboration are caused by factors not directly related to the learners. These include challenges inherent in virtual communication relying solely on written language (i.e. the student is not able to access tones, facial expressions, and other non-verbal elements of communication that help convey emotion and meaning in face-to-face learning environments); technology problems; unclear instructional guidelines; and the challenges presented by working in different time zones.

An, Kim and Kim's study [5] reveals that the most serious problems that online students and instructors face are

induced by the learners themselves, and other research [6-9] suggests that the problems induced by learners must be taken into consideration in order for effective and successful group collaboration. The main problems induced by learners include poor motivation, lack of individual accountability, and negative interdependence among group members, and we address these in the following subsections.

A. *Poor Motivation*

In 2002 a national survey of educators in the US [10], ranked eighteen different factors by their level of impact on first-year students' academic performance, identifying "lack of (student) motivation" as the number one factor.

Hiltz and Turoff [11] suggest group learning activities that are well-suited for online learning environments include online seminars (individual groups lead a discussion on a topic), collaborative exams (students construct exam questions and answer each other's questions), group projects (collaborative composition of essays), case study discussions and debates.

Online discussions are a common and important component of effective online education, however Al-Shalchi [7] reported that students can behave problematically in such discussions, indicating that they possess poor motivation for the learning activities. Some students may not participate in a discussion at all and others may take part but give short and superficial responses rather than deep reflective ones. Hassanien [8] found that poor communication and poor attendance at group meetings are the main challenges that students face.

Black [12] proposed basic criteria to identify whether a student has poor motivation for online discussions, including quality of work (e.g. the post is irrelevant to the topic) and mechanics (e.g. the post contains several grammatical and/or spelling errors).

B. *Lack of Individual Accountability*

An, Kim and Kim conducted an empirical study [5] on a sample size of 24 students enrolled in an instructional technology course. The participants formed small groups and were required to complete a four-week online group project. They were asked to comment on the problems they had faced completing the group project, and the most common problem was "lack of individual accountability". Several subcategories of this problem were addressed by the participants, including not meeting the deadlines, not completing assigned work, and lack of participation (e.g. not engaging with the online discussions).

C. *Negative Interdependence*

Burdett conducted a survey to explore the perceptions of final year university business students of their formal group work experiences [13]. The key experiences examined included group processes, learning outcomes and competencies gained. The results of the survey revealed that 26% respondents perceived that they did most of the work in the group and that the workload was not shared fairly. This is consistent with the "free-rider" problem identified by Roberts and McInnerney [14] where one or more students in

the group do little or no work and consequently decrease the group's ability to reach its full potential.

This negative interdependence among group members typically results in oppositional interaction (individuals obstructing each other's efforts to achieve), whereas positive interdependence can encourage members' efforts to help the group reach its goals [9]. Johnson and Johnson further suggest that there are several ways that group members can promote each other's success, including giving and receiving feedback, challenging each other's reasoning, and exchanging resources and information.

III. METHODOLOGY

Our survey focused specifically on the factors that cause group collaboration problems from a student perspective. The survey was conducted using a web-based tool, the web-based approach being adopted since it can provide a greater response speed and the same or better quality data as compared to mail surveys.

The online survey was distributed via e-mail invitations to university students across the UK enrolled mainly on computing degree courses. The invitation e-mail contained the purpose of the study and the link to the URL where the survey was located. It is estimated that the United Kingdom has approximately 110 HE level computing institutions, and communication with students was facilitated by the UK Higher Education Academy Subject Centre for Information and Computer Sciences and its department representatives.

The survey was distributed late in 2009, and the responses to the survey were collected during a period of seven weeks. The survey consisted of nineteen questions. Survey questions one through seven gathered demographic information about the sample. This information included: age, gender, subject, education background, ethnic origin, whether the respondent is native English speaker or not, and the university they are studying at. The set of responses chosen for ethnic origin was that used by the authors' institution and by other UK universities.

Survey question eight sought to collect information on the types of asynchronous learning tools (e.g. forums, wikis, and blogs) that students had previously used when working on a group project. Questions nine through twelve gathered information about how the students' groups had been formed (however, analysis of those questions is out of the scope of this paper).

The final seven questions were in the form of small scenarios describing various situations of online or general group work in which the problems of poor motivation, lack of individual accountability, or negative interdependence exist. We list the possible factors that may cause the occurrence of such situations as the set of choices of responses. The respondents were required to select, from the set of choices of responses, the factors which in their opinion results in such a situation. It was also important to gather students' opinions on any additional factors leading to each scenario because of the wide possible variety, and a text box was provided under for each scenario for the respondents to offer alternative opinions.

A quantitative analysis of the survey responses was carried out. Descriptive statistics are presented on the demographic information on the sample and students' perceptions on the factors causing problems in group collaboration. Of interest to the researchers was whether there was a relationship between two variables – the students' background (i.e. age, gender, whether the student is native English speaker or not) and their perceptions on the factors resulting in one of the problem scenarios. Cross-tabulations were set up between the respondents' background and their perceptions on the factors causing problems in group collaboration, and chi-square tests were applied to the cross-tabulations.

IV. RESULTS

A. Participants' Demographic Information

A total of 173 students responded, most of whom (87% of the total) were students from 18 universities in the UK, (13% did not identify their university). Additionally, 87% of the respondents were studying computing related subjects and others were studying subjects including mathematics, information management, project management, mobile telecommunications management, digital film production, information and library studies, film and TV, and historical and archival studies. Apart from the 22 respondents who did not provide their university names and 4 who chose not to provide their ethnic origins, all the other demographic questions were answered by all participants, and these are summarised in Table I.

B. Research Question 1

RQ₁: *What potential group collaboration problems have been identified in empirical studies and what factors (from the student perspective) can cause these?*

TABLE I. DEMOGRAPHIC CHARACTERISTICS OF PARTICIPANTS (N=173)

Characteristics	Frequency	Percentage
<i>Age at time of survey (years)</i>		
18-20	63	36.4%
21-30	85	49.2%
31-40	17	9.8%
41-57	8	4.6%
<i>Gender</i>		
Male	125	72.3%
Female	48	27.7%
<i>Education</i>		
Undergraduate	130	75.1%
Masters Student	41	23.7%
Doctoral Student	1	0.6%
Non-degree Student	1	0.6%
<i>Ethnic Origin</i>		
White	108	62.4%
Indian	16	9.3%
Pakistani	10	5.8%
Black African	9	5.2%
Other Ethnic Background	26	15%
I'd rather not answer	4	2.3%
<i>English</i>		
Native English Speaker	125	72.3%
Non-Native English Speaker	48	27.7%

Three main problems were identified during the literature review – poor motivation, lack of individual accountability and negative interdependence. A total of seven problem scenarios were addressed in the survey, also derived from the findings of the literature review, and include subcategories of problems and criteria to assess whether a problem exists. Each of the problems is addressed by two or three scenarios, and the responses for the seven scenarios are summarised in Fig. 1.

The first (of two) scenarios which addressed poor motivation was 'post irrelevant to the learning topic scenario'. Although more than half of the respondents (52%, N=173) had not experienced scenario 1 (S1-D), the factor 'misunderstood the topic' (S1-A) gained the highest rate of responses, followed by 'used the forum to send personal messages to group members' (S1-C) and 'posted the message in the wrong place' (S1-B). One respondent suggested an additional factor – "may be for asking questions or spreading news" (S1-E).

The second scenario, 'post contains grammatical and/or spelling errors' had not been experienced by only 14.5% of the respondents (S2-F), and 'English was poor' (S2-A) gained the highest rate of responses, followed by 'he or she was careless' (S2-C) and 'used text speak' (S2-D). The factor 'did not have much time to finish the assignment' gained the lowest rate of responses (S2-E). Two respondents suggested dyslexia (S2-G).

The next three scenarios address 'lack of individual accountability'. Scenario 3, 'not contributing much in online discussions scenario' had not been experienced by 31.2% (S3-F). The factor 'did not have enough time' gained the highest rate of responses (S3-E), followed by 'too shy to be involved in the communication' (S3-A) and 'I have done my part of the work, no need to communicate with others' (S3-C). The factor 'disagreed with others on the discussion topic' gained the lowest rate of responses (S3-B). Additionally, several other factors were suggested (S3-G), including dislike of non face-to-face communication, "clunkiness" of the online discussion tool, and a perception that the student their comments are not needed.

Scenario 4, 'not meeting the deadlines', was not experienced by only 18.5% (S4-H). The most popular response was 'left the task until the last minute, when it was too late' (S4-E), followed by 'laziness' (S4-D) and 'did not wish to do the work' (S4-B). The factor 'forgot the deadline' (S4-A) gained the lowest rate of responses. Additionally, a few respondents suggested poor group management and lack of personal organizational skills (S4-I).

The next scenario, 'not completing the assigned work scenario', also was not experienced by only 18.5% (S5-H). It elicited 'left the task until the last minute, when it was too late' (S5-E) as the most popular response, followed by 'laziness' (S5-D) and 'did not understand what to do' (S5-C). The factor 'forgot the deadline' gained the lowest rate of responses (S5-A). Other suggestions (S5-I) by the respondents included ineffective progress tracking at meetings, attempting to "pawn the work on to other group mates", the difficulty of the tasks, and "had delusions of grandeur, could not actually finish anything".

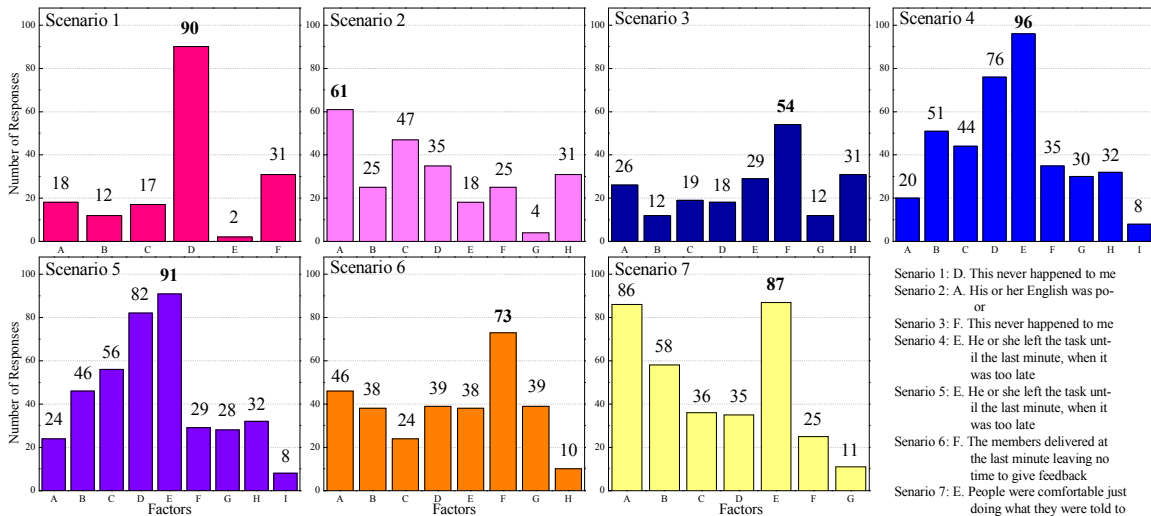


Figure 1. Scenarios and their associated responses. As the lengths of the actual descriptions for the each scenario and factors are large, we only present the id number of the scenarios and the most top rated factor of each scenario.

Finally, two scenarios addressed the negative interdependence problem. The first, ‘little feedback on each other’s task work’, which only 22.5% had not experienced (S6-G), the factor ‘The members delivered at the last minute leaving no time to give feedback’ gained the highest rate of responses (S6-F), followed by ‘they did not like to communicate with each other’ (S6-A) and ‘group members were too lazy’ (S6-D). The lowest rate of responses (S6-C) identified ‘differences in language made communication difficult’. Other suggestions (S6-H) included unwillingness to criticise, a tense social situation – “everyone walking on eggshells”, shyness, and unawareness of team working skills such as use of praise and encouragement.

Scenario 7, ‘single student dominating the group scenario’, which again was not experienced by a small minority of 14.5% (S7-F), the factor ‘people were comfortable just doing what they were told to’ was the most popular (S7-E), followed by ‘this person was the strongest academically’ (S7-A) and ‘other members of the group did not like to argue’ (S7-B). The factor ‘other members were too lazy to challenge that person’ (S7-D) has the lowest rate of responses. Other suggestions (S7-G) identified the student being selected as a group leader, naturally taking command “almost subconsciously”, being the best at organization / decision making, and having higher energy levels than the rest of the group.

In addition, a low proportion (17.9%) of the total respondents (N=173) have never used any asynchronous learning tools to complete group work (S1-F, S2-H and S3-H), so they did not provide responses to scenario 1 through scenario 3 which describe the problems in online group collaboration.

C. Research Question 2

RQ2: *Is there any association between student background – age, gender, and whether the students are native English speakers or not – and their perceptions on the factors causing problems in group collaboration?*

The students’ perceptions on the factors causing problems in group collaboration (i.e. responses to the scenario questions) are grouped by the scenarios since each scenario question represents a subcategory of the problems that are identified. In order to test whether the actual distribution of perceptions on each scenario differs significantly by student background, chi-square values (χ^2) and their significance levels (ρ) were computed. The chi-square test was adopted since the two variables being examined for each scenario are both categorical (not continuous).

Table II summarises the chi-square values (χ^2) and the significance levels (ρ) for various cases. The row heads represent the scenarios addressed, the column heads

TABLE II. ASSOCIATIONS BETWEEN STUDENTS’ CHARACTERISTICS AND THEIR PERCEPTIONS ON THE FACTORS

	Age		Gender		Native English speaker	
	χ^2	ρ	χ^2	ρ	χ^2	ρ
scenario 1	2.297	.971	2.664	.616	3.637	.457
scenario 2	5.213	.950	3.288	.772	6.890	.331
scenario 3	5.017	.957	26.102	.000*	8.494	.204
scenario 4	39.297	.001*	5.573	.695	6.039	.643
scenario 5	11.293	.791	16.034	.042*	11.632	.168
scenario 6	7.004	.935	11.515	.118	9.735	.204
scenario 7	4.684	.585	6.860	.077	.205	.977

* $\rho < 0.05$

represent the characteristics of age, gender and English capability.

Based on the results shown in Table II, no statistically significant association has been found between the student background and their perceptions on the factors causing the problems addressed in the seven scenarios ($\rho > 0.05$). There are three exceptions here. Student gender is associated with the perceptions of the students on the factors causing the problem addressed in scenario 3 ($\chi^2 = 26.102$, $\rho = 0.000 < 0.05$). Examining the pattern of data it is noted that more male students preferred factors 'this never happened to me' and 'other'. More female students tended to choose the factor 'I was too shy to be involved in the communication'. Student age is associated with the perceptions of the students on the factors causing the problem addressed in scenario 4 ($\chi^2 = 39.297$, $\rho = 0.001 < 0.05$). Examining the pattern of data it is noted that more younger students (age 18-20) preferred the factors 'he or she forgot the deadline' and 'he or she did not wish to do the work'. More older students (age 21-57) preferred the factors 'this never happened to me' and 'other'. There is also a statistically significant association found between gender of the students and the perceptions of the students on the factors causing the problem addressed in scenario 5 ($\chi^2 = 16.034$, $\rho = 0.042 < 0.05$). Examining the pattern of data it is noted that more male students preferred the factors including 'This never happened to me' and 'other' than the female students did.

V. CONCLUSIONS

Through an extensive literature review, three main problems existing in online or general group work have been identified, namely 'poor motivation', 'lack of individual accountability' and 'negative interdependence'. These problems are addressed as the problem scenarios in our survey. It is revealed from the survey that the majority of the respondents have experienced most of the problems addressed to them. This provides a level of confidence that the problems are significant and have been correctly identified.

There are various factors that can result in the problems identified. The results of the survey also support this point since the students responded differently to each problem scenario. In addition, both major and minor factors are both addressed by the survey.

Since the background of the participants involved in the survey varies largely, it would also be interesting to see whether there is an association between the participants' backgrounds and their perceptions on the factors resulting in the problems. We applied chi-square tests on the variables for checking whether there is an association between them. However, we found no statistically significant association between students' background and their perceptions on the factors resulting in the problems addressed.

This paper identifies the factors that may lead to unsuccessful group collaboration and what current university students in the UK perceive about the factors. It provides

valuable information for educators to formalise the facilitating strategies for group work. Additionally, the findings can support the design and development of educational systems that aim to enhance group collaboration.

ACKNOWLEDGMENT

The authors would like to thank the survey respondents, the HEA-ICS staff and university representatives for their kind support in delivering the survey.

REFERENCES

- [1] P. Dillenbourg, "Introduction: what do you mean by collaborative learning?," in *Collaborative Learning: Cognitive and Computational Approaches*, P. Dillenbourg, Eds. Oxford: Elsevier Science, 1999, pp. 1-19.
- [2] C. J. Bonk and D. J. Cunningham, "Searching for learner-centered, constructivist, and sociocultural components of collaborative educational learning tools," in *Electronic Collaborators: Learner-centered Technologies for Literacy, Apprenticeship, and Discourse*, C. J. Bonk and K. S. King, Eds. Mahwah, NJ: Lawrence Erlbaum, 1998, pp. 25-30.
- [3] S. L. Chang, "Using online concept mapping with peer learning to enhance concept application", *The Quarterly Review of Distance Education*, vol. 9, 2008, pp. 17-27.
- [4] K. W. Cheng, "The comparative effect on business creativity when web based collaborative learning vs. traditional lecturing instruction", *Research in Higher Education Journal*, vol. 2, 2009, retrieved from <http://www.aabri.com/manuscripts/08115.pdf>.
- [5] H. An, S. Kim and B. Kim, "Teacher perspectives on online collaborative learning: factors perceived as facilitating and impeding successful online group work", *Contemporary Issues in Technology and Teacher Education*, vol. 8, 2008, pp. 65-83, retrieved from <http://www.editlib.org/p/24290>.
- [6] K. Klein, "Promoting collaborative social learning communities with student response systems", *Journal of Online Learning and Teaching*, vol. 5, 2009, pp. 709-719, retrieved from http://jolt.merlot.org/vol5no4/klein_1209.pdf.
- [7] O. N. Al-Shalchi, "The effectiveness and development of online discussions", *Journal of Online Learning and Teaching*, vol. 5, 2009, pp. 104-108, retrieved from http://jolt.merlot.org/vol5no1/al-shalchi_0309.pdf.
- [8] A. Hassanien, "A qualitative student evaluation of group learning in higher education", *Higher Education in Europe*, vol. 32, 2007, pp. 135-150, doi:10.1080/03797720701840633.
- [9] D. W. Johnson and R. T. Johnson, "Cooperation and the use of technology," in *Handbook of Research on Educational Communications and Technology*, 2nd ed., D. H. Johanssen, Eds. Mahwah, NJ: Lawrence Erlbaum Associates, 2004, pp. 785-811.
- [10] B.O. Barefoot, "Second national survey of first-year academic practices", Brevard, NC: Gardner Institute, 2002, retrieved from <http://www.jngi.org/2002nationalsurvey>.
- [11] S. R. Hiltz and M. Turoff, "What makes learning networks effective?" *Communications of the ACM*, vol. 45, 2002, pp. 56-59, doi:10.1145/505248.505273.
- [12] A. Black, "The use of asynchronous discussion: creating a text of talk", *Contemporary Issues in Technology and Teacher Education*, vol. 5, 2005, pp. 5-24.
- [13] J. Burdett, "Making groups work: university students' perceptions", *International Education Journal*, vol. 4, 2003, pp. 177-191, retrieved from <http://ehlt.flinders.edu.au/education/iej/articles/v4n3/Burdett/paper.pdf>.
- [14] T. S. Roberts and J. M. McInerney, "Seven problems of online group learning (and their solutions)", *Educational Technology & Society*, vol. 10, 2007, pp. 257-268.