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Collaborative Learning in the Cloud: A Cross-Cultural Perspective of Collaboration

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Collaborative Learning in the Cloud– A cross-cultural perspective of collaboration

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ABSTRACT

This present study aims to investigate how students perceive collaboration and associated technologies used to collaborate. In particular we aim to address the following research questions: What are the factors that impact satisfaction with collaboration? How do these factors differ in different collaborative settings? Based on data from 75 students from Denmark and Germany, the article identifies factors that impact positively and negatively satisfaction with collaboration.

Categories and Subject Descriptors

K3.1 [Computers Uses in Education] Collaborative learning, H1.2 [User/Machine Systems]: Human factors, H4.3 [Communication Applications], H5.3 [Group and Organization Interfaces]: Collaborative computing, Computer-supported cooperative work

General Terms

Human Factors

Keywords

collaboration, group work, collaborative learning

1. INTRODUCTION

Collaborative learning is an important pedagogical tool used in modern higher education. "Collaborative learning describes a variety of educational practices in which interactions among peers constitute the most important factor in learning, although without excluding other factors such as the learning material and interactions with teachers." [1]

The "digital natives students" or "millennials" are multitasking, operating at "twitch speed" [2] in multiple modalities using mobile pervasive cloud technology and social media on regular basis. Social media is based on Internet and cloud computing technology that "allows users to easily create, edit, evaluate, and/or link to content or to other creators of content."[3].

Collaboration may be organized through both traditional face to face group work or through online learning using e-collaboration via various cloud services. Cloud services have a big potential for expanding collaborative learning through both real time collaboration and social interaction [4, 5]. A new set of collaborative tools available in the cloud are supporting different collaborative/cooperative or learning processes:

- multi-user collaborative writing like Wikis (e.g. Wikipedia, Wikiversity, Wikimedia,), GoogleDocs or editing simultaneous notes, lists and ideas using Pads (e.g. TitanPad, SimplePad)
- communicating, sharing and social interaction using social networking (e.g. Twitter, Facebook, Podio) or instant messaging (e.g. WhatsApp)
- file sharing or document sharing (e.g. Dropbox or GoogleDrive)
- brainstorming and structuring of ideas like Mindmaps (e.g. Mindmeister, Freemind)
- sharing links and bookmarks using Social Bookmarking (e.g. Delicious, Digg)
- media sharing including video streaming or presentations using content communities (e.g. Slideshare, YouTube)
- computer-intensive e-learning services (e.g. Massive Open Online Courses (MOOCS), virtual worlds, simulations)

Collaborative services are the most potential applications for achieving collaborative learning that can be used to assist students in accomplishing a collaborative or cooperative learning task [5]. The aim of this study is to investigate collaborative learning and technologies associated with learning in the cloud adopted by student to support collaboration. In particular, the following research questions are addressed: What are the factors that impact satisfaction with collaboration? How do these factors differ in different collaborative settings?

2. RELATED WORK

A variety of approaches and interpretations to collaborative learning exist [1] (e.g. online collaboration [6], cross-cultural virtual teams [7], case-based learning [8]). Despite these different approaches, these studies agree on the benefits of peer interaction that stimulates knowledge production and cognitive gains [1, 9, 10]. However group work has many dependent variables and factors that influence group performance [11, 12] and satisfaction [13]. In particular the quality of learning is highly dependent of characteristics of the group [11, 14]. The literature related to motivation and collaborative learning shows that students' performance and learning depends not only to interest in the subject but also to the relation to peers, individual differences, personality traits, cultural backgrounds, gender differences, classroom as a learning environment [7, 11, 12, 14].

Based on an extensive literature review, the main benefits and affordances of cloud computing for education have been

Conference'10, Month 1–2, 2010, City, State, Country.

identified and discussed [15]. The main listed benefits are: availability of online applications, flexibility to create learning environments, support for mobile learning, computing intensive support, scalability and cost savings in hardware and software.

3. RESEARCH METHOD AND DATA

Our study employs a survey research design. Based on the literature review, a questionnaire was developed in previous study [12, 13], that later was revised and extended. The questions focused on students' perception of collaboration and e-collaboration. The last version of the questionnaire consists of 22 questions covering areas like general collaboration within the group, the support of knowledge processes, the challenges of group work, as well as the role of e-collaboration via cloud services (e.g. social media). Most of the questions used a 5-point Likert scale ranging from 1 (strongly agree) to 5 (strongly disagree). In order to get additional insights and enable student to comment regarding the group work, some open questions were included in the survey.

The data was collected through an online survey, distributed at the end of the semester. Data was collected in two different courses, at bachelor level, one at Copenhagen Business School (CBS), one at Berlin School of Economics and Law (BSEL) in 2014 and 2015.

The course "Web Interaction Design" has run as an elective course at CBS in Spring and Fall 2014. The participating students were Danish bachelor students from different study programs as well as exchange students from all over the world. Students conducted research on a selected topic of interest, developed research ideas collaboratively and collected data in group. At the end of the course, student groups presented their results and received feedback on their work so far. The collaborative work was the starting point for their individual student projects.

Furthermore, data was collected from German Information Systems bachelor students of at BSEL in Spring 2015. The students were enrolled into a "cooperative" study program that means that they work all in parallel for a company and gain practical experience in addition to their theoretical knowledge. These students attended a mandatory course in "Management of complex software systems". They worked together in groups on a case study over the semester. Although the case study tasks were assigned, some degrees of freedom allowed integrating their own ideas. Similarly to the previous case, the results of group work were presented at the end of semester.

4. DATA ANALYSIS AND FINDINGS

Altogether, we have collected answers from 35 students at CBS (out of 92 participants) and 40 students (out of 50 participants) from BSEL. In total, our sample includes 75 valid responses, among which we have 42 male students (56%) and 33 female (44%). During the group work, students could freely select what collaborative tools they use. In the course at CBS, Podio, a social media-enhanced platform was used for providing course related materials, sharing information and interacting with the students. In the BSEL course, Moodle was used for similar purposes. Figure 1 shows the different usage of collaboration services. Facebook and Dropbox were the most preferred means of collaboration in both settings. Additionally to Skype, Prezi, GoogleDocs/Drive, and few students used WhatsApp and email.

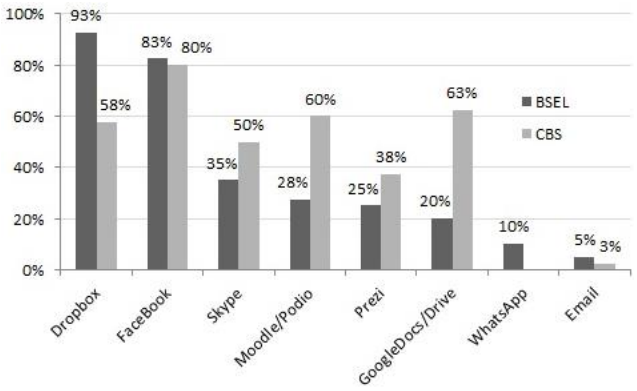

Figure 1.Usage of collaboration tools at BSEL and CBS

Furthermore, we have investigated the overall satisfaction of students in relation with their collaboration. As it can be seen in Figure 2, in the BSEL setting students were more satisfied (mean=1.68, SD=0.694) than in the CBS case (mean=2.31, SD=1.078). A T-Test showed a significant difference (sig. 0.003) between the two groups.

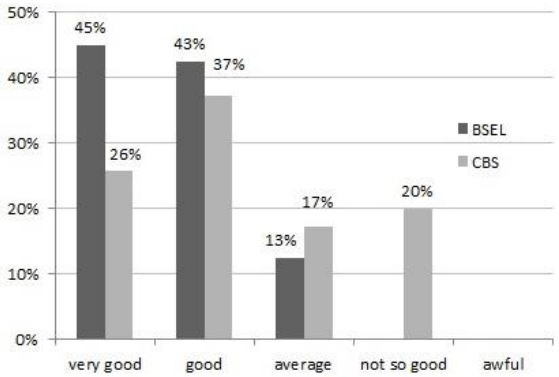

Figure 2.Overall satisfaction with collaboration

The "not so good" experience of some students at CBS may be explained due to the fact that some groups had experience conflict -"disagreements about approach to the subject" and therefore some groups split-up or some members left the group before finalizing the group work. Group work is not a mandatory task at CBS as students final grade depends only on their individual performance.

Table 1. Overview of collaboration factors (Likert Scale, 1= strongly agree, 5=strongly disagree)

Survey	Item	Mean	SD
General Collabo-ration	Enjoy collaboration with peers	1.91	0.918
	Collaboration effect on learning and inspiration	2.49	1.143
	Equal contribution of team members	2.31	1.208
	Help to enhance project ideas	2.01	0.979
Support of knowledge processes	Creating Presentations	2.09	1.042
	Learning new perspectives	2.48	1.005
	Inspiring new ideas	2.51	0.991
	Enhancing social interaction	2.53	1.155
	Helping individual project work	2.56	1.068

	Helping in data collection	2.44	1.265
Collaboration challenges	Social Loafing	3.68	1.210
	Lack of coordination	3.27	1.212
	Lack of trust	4.20	1.053
	Conflict	4.19	0.968
	Different backgrounds of team members	3.92	1.112
	Cultural differences in the team	3.61	1.218
General e-collaboration	E-Collaboration important for group work	1.64	0.880
	Prefer social interaction	4.04	1.202
	Easy to use	1.81	0.940
	Fun	2.32	0.872
	Benefits	1.61	0.804
	Need	1.93	1.095
	e-collaboration important for work	1.64	0.880
E-collaboration use	For coordination and meeting	1.88	1.013
	For exchanging ideas	2.35	1.157
	For assigning tasks	2.49	1.155
	For brainstorming	3.27	1.223
	For knowledge sharing	2.29	1.136
	For creating drafts and editing	1.51	0.876
	For sharing articles and ideas	2.36	1.147
	For virtual social interaction	2.80	1.252
Social media advantages	Save time	1.87	0.905
	Enhance group work	1.73	0.890
	Facilitate knowledge sharing and quality of end result	1.76	0.803
	Useful for completing group work	1.83	0.991
	Integrating different ideas and group creativity	2.14	0.944

Table 1 presents an overview of the different factors influencing collaboration that have been considered in the survey. These factors have been clustered into six different groups, namely "general collaboration", "support of knowledge processes", "collaboration challenges", "general e-collaboration", "e-collaboration use" and "social media advantages". All factors were ordinal, measured on a Likert scale from 1 to 5.

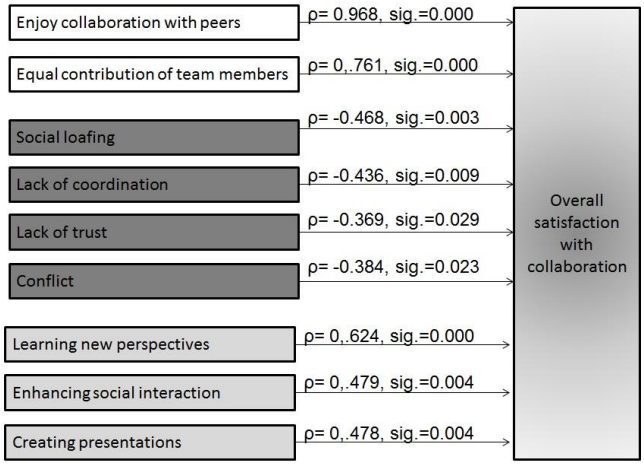

Figure 3. Influencing factors on satisfaction with collaboration in the CBS setting (n=35)

Spearman's Rho was used to analyze the influence of the 37 factors from table 1. As can be seen in Fig. 3, for the CBS case, eight factors from the clusters "general collaboration", "support of knowledge processes" and "collaboration challenges" influenced the overall satisfaction with collaboration. The factor with the highest impact in the CBS setting is "enjoy collaboration with peers" with Spearman Rho=0.968. Challenges like social loafing (Rho=-0.468) and lack of trust (Rho=-0.369) negatively influence the satisfaction with the group collaboration.

In the case of the BSEL setting, the factor "enjoy collaboration with peers" had also the highest impact on the overall satisfaction (Fig. 4). Nine factors from the clusters "general collaboration", "collaboration challenges" and "social media advantages" were significant factors. The challenge with the highest negative impact was the lack of trust.

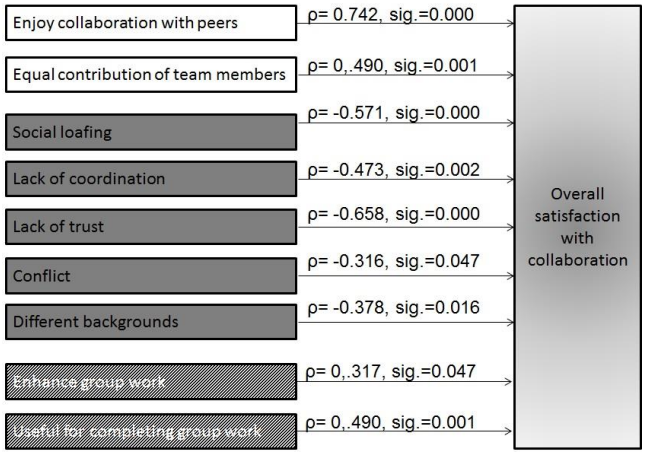

Figure 4. Influencing factors on satisfaction with collaboration in the BSEL setting (n=40)

5. DISCUSSION

Even though collaboration settings are different in terms of backgrounds (students, tasks, type of group projects) most of the influencing factors are common in both settings.

In both cases, variables from the clusters "General collaboration" and "Collaboration Challenges" were significant influencing factors on the overall satisfaction with the group collaboration. In both settings, "enjoy collaboration with peers" had the highest impact, although at CBS, the Rho value was higher (0.986) than at BSEL (0.742). In the cluster "Collaboration challenges", four factors were the same in both settings, although at BSEL, "lack of trust" played a bigger role than at CBS (despite the fact that students know each other since 3 years). Interestingly, the factor "different backgrounds" played only a significant role for the BSEL group, but not for CBS students. The might seems strange, because BSEL students have known each other since three years and they are more homogeneous, as they all belong to the same study program and CBS students are more heterogeneous - as they come from different study programs or countries. But, BSEL students had different practical knowledge and experience due to their practical work in different companies. Therefore, some of them had already some experiences with the topic covered in the case study for the group work.

For CBS students, factors from the cluster "support for knowledge processes" (including factors such as: learning new perspectives, enhancing social interaction, creating presentations) played a

significant role, while it was not the case for BSEL students. That might be due to the fact that the project task for in the CBS setting was more open and students had the opportunity to be more creative.

On the other hand, for the BSEL students, factors from the group "social media advantages" were significant, while this was not the case for the CBS students. In the BSEL setting, students had to do a case study with several tasks. According to their feedback, they separated the tasks among team members and later aggregated the results and define a red threat using social media tools. Students were not prescribed to use specific collaboration tools. Furthermore the student at CBS are not graded for their group presentation and class participation and therefore some students are not that motivated to participate in the group work and presentations. BSEL students are graded based on their students' presentations and group report.

In a previous study [13] that examined the students' satisfaction with group collaboration, based only on data from CBS student from 2011-2012-we found seven significant impact factors. The relationship to peers ("enjoy collaboration") was found to be the most significant fact that impact satisfaction as well as "equal contribution of team members". Among the challenges identified in a previous study were: social loafing, lack of coordination and lack of trust, which are the same as in this study. The present study identifies some additional factors (such as conflict) and how these factors are influenced by specific collaboration setting and context.

6. SUMMARY AND OUTLOOK

Cloud computing has the potential to expand collaborative learning and teaching. The article has investigated the most important factors that impact collaboration satisfaction with group work in two different classroom settings with students working on different collaborative tasks, in two different countries. The study has identified critical factors that impact students' satisfaction with collaboration. The study findings contribute to a better understanding of how to promote successful collaboration and of a better understanding of challenges that students encounter in their teamwork. Collaboration and group work skills are important for business school graduates as organizations demand employees to have strong interpersonal and group work skills. These skills are particularly important in an economic environment that is increasingly complex, rapidly changing and global.

7. REFERENCES

[1] Dillenbourg, P., What do you mean by collaborative learning?, in Collaborative-learning: Cognitive and Computational Approaches. 1999, Oxford, Elsevier. p. 1-19.

[2] Prensky, M., Digital natives, digital immigrants Part 1. On the Horizon, 2001. 9(5): p. 1-6.

[3] Kaplan, A.M. and M. Haenlein, Users of the world, unite! The challenges and opportunities of Social Media. Business Horizons, 2010. 53(1): p. 59-68.

[4] Calvo, R.A., et al., Collaborative Writing Support Tools on the Cloud. Learning Technologies, IEEE Transactions on, 2011. 4(1): p. 88-97.

[5] Huang, Y.-M., et al., Advancing collaborative learning with cloud service, in Information Technology Convergence. 2013, Springer. p. 717-722.

[6] Xu, J., J. Du, and X. Fan, Students' Groupwork Management in Online Collaborative Learning Environments. Journal of Educational Technology & Society, 2015. 18(2): p. 195-205.

[7] Paul, S., et al., Impact of Heterogeneity and collaborative conflict management style on the performance of synchronous global virtual teams. Information and Management, 2003. 41: p. 303-321.

[8] Mondahl, M. and L. Razmerita, Social Media, Collaboration and Social Learning-a study of Case-based Foreign Language Learning. The Electronic Journal of e-Learning (EJEL), 2014. 12(4): p. 339-352.

[9] Oliveira, I., L. Tinoca, and A. Pereira, Online group work patterns: How to promote a successful collaboration. Computers & Education, 2011. 57(1): p. 1348-1357.

[10] McConnell, D., E-learning groups and communities. 2006: McGraw-Hill International.

[11] Razmerita, L. and A. Brun, Collaborative Learning in Heterogeneous Classes: Towards a Group Formation Methodology. Proceedings of 3rd International Conference on Computer Supported Education (CSEDU 2011), 2011. 2: p. 189-194.

[12] Razmerita, L. and K. Kirchner. Collaboration and e-collaboration: A study of factors that influence perceived students' group performance. in HICSS 2015 2015. Kauai, USA: IEEE computer society.

[13] Razmerita, L. and K. Kirchner, Social media collaboration in the classroom: A study of group collaboration, in Collaboration and Technology (CRIWG 2014), G. Zurita, et al., Editors. 2014, Springer. p. 279-286.

[14] Ku, H.-Y., H.W. Tseng, and C. Akarasriworn, Collaboration factors, teamwork satisfaction, and student attitudes toward online collaborative learning. Computers in Human Behavior, 2013. 29(3): p. 922-929.

[15] González-Martínez, J.A., et al., Cloud computing and education: A state-of-the-art survey. Computers & Education, 2015. 80(0): p. 132-151.