

CROSS-CULTURAL DIFFERENCES IN UNDERGRADUATE STUDENTS' PERCEPTIONS OF ONLINE BARRIERS

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ABSTRACT

The intent of this study was to learn about students' perceived barriers and the impact of those barriers on the quality of online discussions between two distinct cultural groups in Eastern and Northern Siberia (Russia). A mixed-methods approach utilizing surveys and interviews was used to investigate (1) the types of barriers the students perceived participating in an asynchronous online course across the two cultural groups, and (2) the impact of those barriers on the quality of students' postings. Findings indicate that cultural influences can add potential barriers to online learning aside from those widely reported in the literature. The study has implications for instructors and designers in creating online learning environments, especially as it relates to asynchronous communication across multiple locations and cultural backgrounds.

KEYWORDS

Online discussion, cultural differences, cultural impact, globalization of online learning

I. INTRODUCTION

Asynchronous communication is one of the most frequently used features in computer-mediated learning environments [1, 2]. Many communication tools can support asynchronous discussions and can be incorporated into learning environments. For example, electronic mail, listservs, newsgroup, bulletin boards, and threaded discussion systems are common asynchronous forms of communication. Asynchronous communication tools support messaging between individuals and facilitate participants to read and respond to messages or add new messages which others can respond to at times of their own choosing or convenience [3]. Discussions can take place among individuals in widely dispersed

geographic locations or among persons unable to participate in a discussion at a specific time [3, 4, 5]. Many researchers have discussed the impact of computer-mediated communication (CMC) on students' learning, perspective-taking and awareness [1, 2, 5, 6] and argued that it has benefits as a teaching tool that provides flexibility, convenience, greater student independence, and the potential to develop higher-order skills [7, 8].

II. BACKGROUND

A. Online barriers

While asynchronous communication can provide increased student interaction and accessibility there are also limitations to using asynchronous CMC. A number of studies have examined barriers that learners and instructors face in online learning [9, 10, 11, 12, 13, 14, 15, 16, 17]. These studies generally provide the information from the instructors' point of view rather than from that of the students'. For example, researchers have identified general barriers to distance education related to faculty, organization, and course structure [13, 18]. More specifically, they have reported on the nature of barriers in relation to e-learning [14] and barriers to completing distance education programs [11, 12, 17]. Barriers that exist in online communication include difficulties related to the physical distance between members, the difficulties of dealing with new media, having time constraints and restrictions, lack of background knowledge or experiences with distance education, a lack of technology skills, and the sometimes low interactivity level of the communication process [20, 21]. In addition, cultural differences can create barriers in the use of online communication capabilities. For example, individualistic tendencies (i.e., USA, Germany) can reduce students' interaction and collaboration [22]. On the other hand, collectivist tendencies (i.e., Asia) with a focus on more intimate relationship can also create barriers to the effective use of online communication [22]. These barriers can make it difficult to establish the online communication process effectively and may decrease the communication between and among members. The degree of these barriers differs from one institution to another, from one program to another, and even from one user delivery system to another [20].

B. Cross-cultural research

In addition to the aforementioned barriers, several research findings have indicated that cultural differences should be taken into account when dealing with multicultural learners in an online learning environment. For example, Kim and Bonk [23] examined cross-cultural differences among students from Finland, the United States, and Korea in web-based conferences. They found that U.S. students were more action-oriented and pragmatic in completing a task; Finnish students were more theory-driven, group focused and more reflective; and Korean students were more socially interactive, sharing personal feelings and concerns. Several studies [24, 25] examined cross-cultural differences between learners in China and Russia when employees shared knowledge through online communities of practice. They found that Chinese learners were shy about contributing to online discussions and asking questions in a "public" manner; they were concerned about "losing face" (i.e., the so-called Asian modesty attribute [24]). Similarly, Yang, Olesova and Richardson [26] found that Asian-based students were more conservative and less self-expressive when addressing discussion topics and responding to their peers' posting than their European-based counterparts, even though both groups were from Siberia [26]. Russian learners, however, did not perceive concerns or barriers to knowledge sharing or asking questions in public.

Moreover, Kim and Bonk's [23] study supported previous research findings [27, 28] that low language proficiency can affect the level of participation in online discussions, especially when participants have different first languages. For example, several studies examining the participation of Siberian students in online cross-cultural collaborations with U.S. and Canadian students [29, 30] found evidence that language proficiency was the greatest factor affecting students' participation. Another study [24], however, found that the English language was not a major barrier for Russian participants with non-

Siberian Russians being less concerned about language fluency even if they possessed low English proficiency levels. These findings suggest that cultural differences are not necessarily associated with a society, but rather may relate to certain group activities [24, 26]. This consideration is salient for our study, as Russia is the country with the largest territory in the world and a country of different regions, religions, cultures, and languages [25].

Based on previous studies and research findings, the increased use of asynchronous discussions in online learning requires further research particularly as it applies to cultural differences. This can help designers and instructors better understand how asynchronous technologies can assist learning in online environment, helping make online learning more effective and successful. While student barriers have been demonstrated to affect online learning, limited research has been conducted that examines the factors contributing to those barriers and how those factors may differ across cultures. In addition, no research has been conducted that investigates how culture affects online learning if the learners have the same primary language background but have different cultural backgrounds. The purpose of this study was to fill this gap by examining the student perceptions about online barriers and the impact of those barriers on the quality of asynchronous online discussions between two different cultural groups in Eastern and Northern Siberia (Russia). The research questions were:

RQ1: What types of barriers do students perceive when participating in an asynchronous online course across two cultural groups?

RQ2: What is the impact of these barriers on the quality of students' postings in an online environment through asynchronous discussions across the two cultural groups?

III. THEORETICAL FRAMEWORK

To examine cross-cultural differences in undergraduate students' perceptions of online barriers in Eastern and Northern Siberia (Russia), this study employed the Technology Mediated Learning (TML) model developed by Hornik and Tupchiy [22]. The TML model [22] indicates the effects of cultural dimensions on the use of online communication. Specifically, the model proposes that individualistic-collectivistic cultural dimensions impact the processes and outcomes of the use of the Web-based communication technology, the perception of social presence (the feeling of closeness with other learners), sense of community, and learning outcomes (learner satisfaction, perceived learning performance, and actual learning performance) [33]. It also predicts the types of barriers that occur among individualistic and collectivist dimensions [33]. For this particular study, the TML model helped us examine the types of barriers across the two cultural groups when students participated in asynchronous online discussions.

C. Individualism and Collectivism

Individualism and collectivism are the major cultural variations used to analyze social behavior and cultural patterns of attitudes, norms, and values [34]. Hofstede [31] and Triandis [32] define individualistic cultures as the tendency of people to pursue their own goals ahead of the goals of a social group (i.e., the United States); people in individualistic cultures see themselves as independent of others. People within collectivist cultures give priority to the goals of the larger group, and they see themselves as interdependent with members of one or more groups (i.e., Mexico, Brazil, Russia) [31, 34]. In addition, cultures differ in how information is processed. Individualistic cultures are considered to be low-context communication cultures, as they focus on each piece of information as being independent of its context; they are more concerned with rationality and they are more likely to accept information [22]. Contrary to low-context communication, collectivist cultures are considered to be high-context cultures and they tend to look for contextual cues in information; they are more sensitive to context-specific information and may disregard information [24]. According to the TML model [22], both cultural dimensions can create barriers, or possibly be used to predict barriers to the effective use of online communication.

D. Horizontal and Vertical Dimensions

In addition to individualism and collectivism cultural variations, Triandis [32] identifies four cultural patterns: vertical collectivism (VC), horizontal collectivism (HC), vertical individualism (VI), and horizontal individualism (HI) that are parallel to high and low power distance cultures described by Hofstede [31]. According to Triandis [32], horizontal cultures emphasize low power distance where people are equal or similar, whereas vertical cultures tend not to accept equality and see differences among people. Bhagat, Kedia, Harveston and Triandis [34] argued that people in horizontal collectivism see themselves as a merged part of a group (e.g., the Israeli kibbutz), whereas people in vertical collectivist cultures think of themselves as different from others in a group (e.g., China, Korea, Singapore, and India). Bhagat and colleagues also argue that people from horizontal individualist cultures tend not to compare themselves with others (e.g., Australia, Denmark, and Sweden) whereas vertical individualistic cultures believe in inequality in status and are concerned with comparing themselves with others in order to compete and win (e.g., France, Germany, the United Kingdom, and the United States) [34]. Hornik and Kupchiy [22] stated that the four cultural patterns (HI, VI, HC, and VC) can affect TML in different ways. For example, researchers found that HI, the only cultural dimension with self-directed learning, was not suitable for online collaboration and that VI, with the attributes of power and achievement, lead to negative view of collaboration. One of the most valuable findings of the research for building effective online outcomes was that both collectivist cultures (VC and HC) had an impact on sense of community and the use of communication tools. Interestingly, some researchers recommended the direct increase of the effectiveness of TML by encouraging the characteristics associated with HC and HI and discouraging those associated with VI [22].

Using this framework, our study examined cross-cultural differences between the two distinctly different cultural groups in Eastern and Northern Siberia (Russia) to determine the types of online barriers across the groups. Further, the framework allowed us to examine how these barriers impacted the quality of online communication in an asynchronous environment.

IV. METHODS

A mixed methods design was selected for this study. The design was guided by a pragmatic worldview in order to understand the complex phenomenon of students' perceived barriers in cross-cultural online environment and to change the ways of teaching/learning online [35, 36, 37]. The study, which occurred in fall of 2007, used quantitative and qualitative data. The intent of this mixed methods approach was to learn about students' perceived barriers and the impact of those barriers on the quality of online discussions between two different cultural groups in Northern and Eastern Siberia (Russia). In this approach, quantitative and qualitative items in the pre-survey data were used to gather background information about the participants prior to the start of their online course. The quantitative and qualitative items in the post survey data were used to examine what types of barriers impacted the effectiveness of online learning. Post-survey data were collected at the end of the course. Concurrent with this data collection, qualitative interviews were conducted. The reason for collecting both quantitative and qualitative data is to bring together the strength of both forms of research to compare results [38]. In addition, data were collected from students' weekly discussion postings. Using both descriptive and evaluative approaches, the discussion postings were examined in relation to the barriers to determine if students' perceived barriers had an impact on their online postings and discussion posting scores as a means to shed additional light on the perceived barriers and potential impact of those barriers on postings and scores.

A. Context and Participants

The participants (n=34) for this study were undergraduate students at *Y University* (n=20) and *K University* (n=14) who were enrolled in an online course, Introduction into Cross-Cultural Management as part of their International Economics Programs. All participants were non-native speakers of English. *Y*

University is located in Republic Sakha (Yakutia) in Northern Siberia while *K University* is located in the Eastern Siberian part of Russia. *Y University* is located in an area with Asian-oriented cultural traditions and religious beliefs in shamanism; this group is referred to as Asian-based for the purpose of this study. This geographic area has two native languages, Russian and Yakut (Sakha). *K University* is located in an area with traditional Siberian Russian culture and Orthodox Christianity as the dominant local religious belief; this group is referred to as European-based for the purpose of this study. People in Eastern Siberia typically only speak Russian. Demographic data were collected online from all participating students. Of the 34 students, 26 were female and all were between the ages of 22-24 years. Only six students had previous experience with online learning, and nine students had previous experiences participating in discussion boards.

The students were divided into eight teams for easier monitoring of their progress and to help them work with their peers more effectively. All eight teams were formed based on their university affiliation with four teams from each university, but all participants worked across teams (and cultures) during the course. The teams participated in asynchronous communication, specifically discussion boards in WebCT, for two months (October – November, 2007). They discussed different articles that covered a variety of business problems. The undergraduate level course was taught by an advanced graduate student in a doctoral program at a large Midwestern University who also serves as faculty at *Y University*. While the instructor is a native Russian and Yakut speaking instructor, the online course was conducted in English. The instructor posted a discussion question on Thursday of each week to give students an opportunity to respond during the next week. Each team posted reflective responses to the discussion questions. Responses that added identified important relationships, offered a fresh perspectives or critique of a point, and offered supporting evidence were considered as significant contributions to the discussions. Each week several teams were assigned a specific role (i.e., starter, wrapper and gadfly) with the teams rotating the roles.

B. Data Collection and Analysis

1. Pre and Post Surveys

Quantitative data were collected from pre and post surveys and the weekly discussion postings. The online pre-survey was conducted in October 2007 while the post-survey was completed at the close of the course (December 2007). Twelve (63 percent) of the Asian-based students and ten (71 percent) of the European-based students responded to the pre-survey. Twelve (63 percent) of the Asian-based students and five (35 percent) of the European-based students responded to the post-survey. The pre-survey included demographic information of the respondents and difficulties which they encountered during the online course as they initially began participating. Additionally, the pre-survey was used to gather background information including previous online learning experience, previous teamwork experience, the level of students' computer skills, and Internet access for the course. The post-survey's questions related to communication with peers and instructors, value of teamwork for communication, and barriers students encountered during the course.

2. Online Discussions

Quantitative data were collected from students' weekly discussion postings and responses (n=272). Students' weekly discussion postings and responses were defined as: 1) a numerical score (from 0-2) based on Bloom's taxonomy and 2) descriptive comments supporting the assigned score and relating to the quality of the post. The scoring rubric was adapted from Ertmer, Richardson, Belland, Camin, Connolly, and Coulthard [39]. Postings demonstrating analysis, synthesis, or evaluation received two points; postings at the knowledge, comprehension, and application levels received one point; non substantive comments received zero points [39]. To determine the impact of barriers on the quality of students' postings, the average scores obtained on postings for the first four weeks were compared to those obtained during the latter four weeks using a paired sample t-test.

3. Open-Ended Questions in Pre and Post Surveys and Semi-Structured Interviews

Qualitative data were collected from open-ended questions in the pre and post surveys and semi-structured interviews. As indicated previously, twelve (63 percent) of the Asian-based students and five (35 percent) of the European-based students responded to the post-survey. Sample open-ended questions included:

What is your general perception of the online course?

Were you able to learn effectively?

Were you able to learn as effectively as in a traditional course?

Was it a positive experience overall?

When was it difficult to you to participate in online communication? Try to be as specific as possible (e.g. language, time, access, and topic)?

Why do you think these activities were difficult? Please try to be as specific as possible.

Was the course structure easy to navigate, easy to access, easy to follow instructions? Please describe.

Overall, what was the value of the online course to you? Please, be as specific as possible.

In addition, seventeen (89 percent) Asian-based students and eleven (78 percent) European-based students volunteered for the semi-structured interviews. The interviews were administered by the two on-site instructors, from *Y University* and *K University*. The interviews lasted approximately thirty minutes and were conducted at the close of the course (December 2007), interviews were recorded on video. The interviews allowed for more detailed explanations of individual experiences with perceived barriers in order to compare and triangulate with the quantitative responses. In general, the interviews were used to determine the degree of barriers occurrence, when they occurred, and how they occurred. The questions ranged from general students' perception of the value the course (What is your impression of the online course? What do you like? What not? Why do you like it? Why not? Please explain. What is the value of the course for you?) to more specific (What did you perceive as useful when you participated in discussions? Did you like to lead the weekly discussion? Why? Did you find any difficulties in your participation in the course? Were you comfortable working in teams with your peers?).

The interviews were transcribed and coded by two researchers to find agreement across coding categories. Two coders agreed to each transcribe and initially code the interviews. After reviewing the codes and looking for common codes or codes that could be collapsed, they generated a list of general categories and used them to re-code the interviews. Based on general categories, the two coders organized the codes to support the two research questions. In the end, they re-coded the data based on research questions and this allowed them to look both within and across interviews. Inter-rater reliability of 98% was reached. The following general categories were generated: technical barriers and deadlines, understanding postings, second language, and working in teams.

V. RESULTS AND DISCUSSIONS

A. Types of Barriers by Cultural Groups

The first research question for this study was designed to examine the types of barriers that might have influenced the quality of the students' postings in asynchronous discussions across the two cultural groups from Northern and Eastern Siberia. The pre-survey was conducted at the beginning of the online course to determine participants' general impressions of their previous online learning in both cultural groups. All students indicated positive impressions, but an Asian-based student (n=1) indicated a lack of time to reply and to submit responses as a major barrier in previous online courses. Pre-survey data revealed that almost all students had previous experience using computers, the Internet, and email. Less than half of the students in both cultural groups indicated previous experience in online courses; however,

more than half of them reported experience with different online activities (i.e. email exchange or public forums). All students in both cultural groups had experience working in traditional teams prior to the online course.

Both cultural groups reported facing significant barriers during the first two weeks compared to later parts of the course when they were better adapted to the online environment; the barriers were primarily related to technical issues. Differences between the two cultural groups were found in their perceptions of the factors that caused the barriers.

4. Technical Barriers and Deadlines

The multiple choice items in the post-survey showed that the Asian-based students had serious technical problems which were supported by their responses on the open-ended questions in the post-survey and during the semi-structured interviews. One of the Asian students explained that they didn't have technical support, and they experienced Internet access issues due to slow connections on campus. Time management also revealed problems with how the course assignments were scheduled, with some students in the Asian-based group (n=4) indicating what they perceived to be overloading of course assignments (e.g., they spent more time on this course assignments in comparison with traditional courses). Similarly, the European-based group faced difficulties with assignment deadlines. They indicated difficulties in meeting deadlines for the course assignments, especially when they had to work on Sundays because the course required posting of initial responses by Monday of a given week. Several European-based students (n=5) explained these types of barriers by saying that "one of the difficulties was ... deadlines because I am working and studying and ... I haven't got enough time ... to read the text" and "assignments were difficult to understand."

Given the technological environments participants were exposed to it was expected that results would identify the barriers related to limited capability of the technology to meet all students' needs. Similarly, it was expected that a number of technical problems in the first two weeks of operation would be higher than in the following weeks as they would relate to issues with WebCT registration and the navigation tools within the system. None of the participants indicated that they found the discussion threads complicated, problematic, or frustrating, but a few students in the Asian-based group (n=2) found that it took too much time to type and complete a discussion and to follow long threads. In accordance with the TML model [22], European-based students in our study perceived barriers similar to individualistic cultures, namely they were more task-oriented (meeting deadlines for the course assignments). The Asian-based students perceived barriers similar to collectivist cultures, such as time management when working on the course; this supports previous findings that Asian participants spend more time completing assignments [25] in order to "save face". Furthermore, while describing the European-based group of students in this study as belonging to an individualistic culture may contradict with general views of Russian culture as collectivist [22], this finding supports the previous study [27] that European-based Russians are mainly oriented towards their own goals and tasks without considering the group as a whole.

5. Understanding Postings

Additionally, responses to the open-ended questions in the post-survey and interviews revealed that European-based students experienced problems understanding postings from other students' groups. A European-based student stated that "sometimes it was difficult to understand what in particular people meant." This finding supports the TML model [22] which would identify European-based students as representatives of an individualistic or low-context communication culture, one that processes information from written words as independent of their context. Our finding also supports that the European-based students in this study behaved in accordance with individualistic dimensions, as they relied more on words to interpret meaning. According to Hornik and Tupchiy [22], low-context communication with its focus on words rather than context may factor positively into forming the needed interactions in online communication.

6. Second Language

Several of the Asian-based students (n=2) who were interviewed were concerned with the use of English, the participants' second language. It caused some problems for participants as they interacted online, even though no one from the European-based group indicated a similar problem during the interviews. However, 20% of the European-based group indicated the language barrier as an issue in the post-survey while 16% of the Asian-based group indicated the same issue. This finding is in contrast to what Ardichvili, Maurer, Li, Wentling, and Stuedemann [24] found in their research when they examined Chinese and Russian learners' online communications. They found that Chinese participants were more concerned about English accuracy and spent more time to improve language, whereas Russian employees were less concerned about the language issue. In our case, both groups of students behaved in accordance with the collectivist culture; both groups indicated they spent time working to improve their English language posts which support the general view of Russian culture as collectivist [27].

7. Working in Teams

Muilenburg and Berge [13] found that a lack of social interaction was the most severe barrier perceived by students in their study about student barriers in online learning. They found that social interaction is strongly related to online learning enjoyment and effectiveness of learning online. The researchers suggested improving social interaction in online learning to promote human relationships, develop groups' cohesiveness and maintain groups as a unit. In this study, the students from each university worked in virtual teams. Our findings showed that cultural differences impacted students' participation in online collaboration. First, the Asian-based students (n=3) perceived working in teams as a barrier to control equal workload distribution when they worked collaboratively on course assignments together. As one Asian-based student explained, "sometimes it was difficult ... when someone did nothing ... [and] someone worked... [it] was hard to control." But at the same time sixteen Asian-based students (94 percent) indicated they preferred working in teams as an effective online learning strategy. Teamwork was perceived as a value while taking the online course. For example, another of the Asian-based students said, "I like dynamics how we [the students] worked as a team ... we improved our relations ... in the end we began to think like one man, one human." Meanwhile, a number of the European-based students (n=5) indicated they preferred working individually; they perceived that online collaboration decreased the quality of their postings and their independence to compose their individual postings. Interestingly enough, however, the interviews revealed that the European-based students (n=9) identified teamwork as one of the ways that helped them overcome online barriers and comprehend course materials even though they preferred individual work. For example, a European-based student explained, "Sometimes it was difficult to understand something [on] your own. You can discuss something with your group mates and then together we could understand what the real problem is."

This study supports previous studies [23] that different cultures prefer and demonstrate different levels of collaborative interaction. In our case the level of interaction among European-based students was similar to Hornik and Tupchiy's findings [22], which specified that horizontal individualistic cultures' tend to favor self-sufficiency and autonomy, such as preferences working individually, which could explain the reduced European-based students' preference and ability to work effective in teams. At the same time, the horizontal individualistic cultures' tendency to favor personal goals impact how the European-based students perceived their effective learning outcomes in the online course, for example, they found that teamwork helped them to better comprehend course materials. Meanwhile, the Asian-based students demonstrated a more collectivist approach even as feelings of equality such as workload distribution within teams caused problems as they tried to collaborate effectively. However, the collectivist tendency to perceive the importance of teamwork over individual work impacted how the Asian-based students perceived the effectiveness of their online learning. The importance of this finding for the Asian-based students supports Hornik and Tupchiy's [22] recommendations to use characteristics of the collectivist

dimension, such as the importance of group identity over individual identity, to increase the effectiveness of online collaboration and interaction.

B. Impact of Barriers

The research also investigated the impact of students' perceived barriers on the quality of students' postings in the online course discussions. More specifically, it investigated the impact of perceived barriers on the quality of students' postings across the two cultural groups. Table 1 presents data from students' scores from weekly discussion postings across the two cultural groups.

Table 1
Students' Weekly Discussion Postings

Weeks	University	N	Mean	SD
1	Y University	20	2.2	0.44
	K University	14	2.2	0.86
2	Y University	20	2.2	0.44
	K University	14	3.6	0.49
3	Y University	20	3.2	0.44
	K University	14	2.9	0.71
4	Y University	20	3.5	1.12
	K University	14	3.6	0.82
5	Y University	20	3.2	0.83
	K University	14	3.3	1.22
6	Y University	20	3.2	0.44
	K University	14	4.1	0.70
7	Y University	20	4.2	0.44
	K University	14	4.0	0.00
8	Y University	20	5.0	0.00
	K University	14	4.3	0.45

According to the average weekly student's score in conjunction with the barriers noted previously during the first four weeks of the course, when students from both cultural groups faced considerable barriers and got accustomed to online discussions, it was not surprising to find that students' later online postings achieved higher levels of quality according to the Bloom's taxonomy-based scoring rubric. Table 2 shows the results of students' online postings for the first and last four weeks of the course for two cultural groups.

A paired t-test for the European-based group and for the Asian-based group indicated that the students in both groups scored significantly higher ($p=.000$, $df=19$; $p=.000$, $df=13$) in weeks 5-8 than they did in weeks 1-4.

Table 2

University	Weeks	N	Mean	SD
Y University	Weeks 1-4	20	2.78	0.675
	Weeks 5-8	20	3.94	0.852
K University	Weeks 1-4	14	3.08	0.670
	Weeks 5-8	14	3.92	0.432

Students' First and Last Four Weeks Discussions by University

According to the post surveys and interviews, barriers encountered in the first two weeks indicated that the obstacles were extrinsic to course participants. Also, time management and support are considered factors that impact students' participation at the beginning of the course [13]. Taking into consideration that the quality of students' postings improved after the first two weeks, they appear to have plateaued during the following six weeks.

The data show that of the barriers students reported and encountered, the organizational barriers (i.e., deadlines and working in teams) and communication barriers (i.e., understanding postings) played the largest role on the impact on the quality of students' postings. For example, the analysis of the post-survey and the students' discussion postings shows that the quality of students' postings decreased under the influence of the types of weekly activities, slow interactions with peers, keeping deadlines for assignments, and working in teams.

In addition, instructor's feedback and reading other teams' postings helped them comprehend the course assignments and the content for weekly readings more clearly. Moreover, the post-survey questions and the interview data related to the effectiveness of the course structure and instructions indicated that the students found the course design effective to follow online instructions. As one student explained, "I found the course structure well-organized and easy to work with. The readings were distributed in definite topics that made work easier. The course structure was quite easy to navigate and to follow instructions. For me, it was very comfortable and understandable."

VI. CONCLUSIONS

While using asynchronous discussions provides interaction flexibility, convenience of time and speed, independent study, and the development of higher-order skills [7, 8], it also presents a range of limitations or barriers when students from distinct cultures negotiate their way through such a learning environment. This study revealed the types of barriers students encountered, including technical and communication barriers and, perhaps most markedly, barriers related to working in teams and/or collaboratively with different cultures. Additionally, this study found that these barriers did have an impact on the quality of students' online discussions when they worked in virtual teams, and demonstrated how cross-cultural differences can influence overall students' perceptions of online learning.

The revealed differences based on the two distinct cultures can be explained in large part by the TML model developed by Hornik and Tupchiy [22] where a collectivist Asian culture and an individualistic European cultural approach can perceive different types of online barriers. In this study, European-based students from Eastern Siberia perceived barriers common to the low-context or horizontal individualistic culture, such as negative attitude to collaboration in order to pursue personal goals or relying on words to interpret meaning of communication. On the contrary, Asian-based students in Northern Siberia tend to be closer to characteristics of high-context or horizontal collectivist cultures including perceived importance of group interactions, pursuing group goals to complete learning task, and language accuracy. These cultural dimensions explain why European-based students preferred individual participation to collaboration while Asian-based students valued equal workload distribution during teamwork. In addition, these cultural differences impact on perceived communication barriers between European-based students and Asian-based students [23] when they worked on their weekly assignments. For example, European-based students tried to understand the meaning of the messages out of their context similar to low-context communication cultures [23]. However, as evidenced by our findings on issues of second language and accuracy, both groups of students behaved in accordance with the collectivist culture. In other words, both groups indicated they spent time working to improve their English language posts which support the general view of Russian culture as collectivist [27]. This may be a commonality across second language learners to some degree, or a finding particular to this group who do share a larger

(Russian) cultural background. Further research is required on this matter to help clarify the cultural issues across the various levels.

Finally, this study supports and extends previous studies findings [22] that different cultures perceive different types of online barriers and those barriers have an impact on the quality of online learning. As explained by Lee, Magjuka, Liu, and Bonk's [40] recommendations, instructors need to learn and understand the cultural differentiation of their students as it can impact the effectiveness of virtual collaborative activities.

VII. LIMITATIONS AND FUTURE RESEARCH

A small sample of participants is considered as one of the major limitations in this study. Interviews conducted in English also caused some limitations as English was the participants' second (or third) language, and they may not have been able to express their views precisely. Lower than anticipated return rates from both surveys was also a limitation of this study. Further research is needed, including research that looks at larger groups of participants to validate accuracy in the statistical analysis. For example, we plan to conduct an explanatory mixed methods study to understand how online barriers affect virtual teamwork. It is also important to involve participants from more different cultural groups; adding diverse cultural groups may reveal additional barriers, particularly as students work in virtual groups.

VIII. ABOUT THE AUTHORS

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