

INTERPERSONAL INTERACTION IN ONLINE LEARNING: EXPERIENCED ONLINE INSTRUCTORS' PERCEPTIONS OF INFLUENCING FACTORS

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ABSTRACT

A multitude of factors influence interpersonal interaction between students and instructors in an online course. This study examines perceptions of six experienced online instructors to determine factors they believe increase interaction among their students and between the students and instructor of online courses. The end result is an inventory of strategies that can be used by novice and experienced online instructors alike to impact interpersonal interaction in online courses. Factors include group work, course environment, model use, community, discussion question type and assessment, feedback type and medium, immediacy behaviors, discourse guidelines, and instructor participation.

KEYWORDS

online, interaction, interpersonal interaction, learning effectiveness

I. INTRODUCTION

This article explores factors that influence interpersonal interaction (learner-learner and learner-instructor) in online courses through a phenomenological study comprising interviews of six experienced online instructors. A comparison between interview findings and literature is also included. The end result is an inventory of strategies that can be used by novice and experienced online instructors alike to impact interpersonal interaction in online courses.

A. Background

Interaction is a critical factor that impacts student learning and motivation to learn in online courses [1-3]. The US Distance Learning Association refers specifically to "learning activities within a K-12, higher education, or professional continuing education environment where interaction is an integral component" (Holden & Westfall, cited in [4]). But what components influence interaction in online learning?

The question of interactions has a long history, demonstrating not only the importance of the topic but also the elusiveness of precise answers. For example, a panel was convened in 1989 by the Divisions of Independent Study and Educational Telecommunications of the National University Continuing Education Association at its annual meeting. The panel was titled "Interaction: That perplexing component of distance education" and debated such questions as: What level of interaction is essential for effective learning? What is good interaction? How can we achieve it? [5]. Today we ask these same questions as online learning continues to advance and proliferate.

Research has shown that online courses that lack substantive and meaningful interaction coupled with a

sense of presence (feeling of belonging) contribute to a sense of isolation, unsatisfying learning experiences, and high dropout rates [6-9]. Experienced online instructors believe there are certain components that increase interpersonal interaction in online courses. Some of these components can be influenced by the instructor through instructional strategies used to achieve them, and some have previously been reported in the literature [10-15]. Some components, such as a student's prior experience, can have an effect on interaction, but the instructor has little if any control over them.

If online instructors better understood the factors that influence interpersonal interaction, they would be able to better anticipate and prepare their online instructional approaches which could, in turn, lead to improved interaction in online courses. There are most certainly additional factors that influence interpersonal interaction in online courses that have not yet been identified or reported in the literature.

This paper seeks to answer the question, "What factors influence interpersonal interactions in online courses?" by presenting the perceptions of six experienced online instructors. By influencing interpersonal interaction within an online course, instructors can affect student attitudes and performance [10, 13, 16].

1. Interaction in Online Learning

Instructional interaction is meaningful communication that challenges learners' thinking, shapes the acquisition of knowledge in meaningful ways, and changes learners, moving them toward achieving their goals. Effective interaction is not necessarily more interaction; rather, it is interaction resulting in learners thinking in new and more profound ways. While literature and research confirm the importance of interaction in the learning process [17-20], instructors need to be encouraged to support interpersonal interaction in their online courses [11, 12, 21, 22].

There are several interaction typologies discussed in the literature. Perhaps the most common is Moore's [5] "Three Types of Interactions" which includes learner-learner, learner-instructor, and learner-content interactions and stems from the field of communications [13]. A recent meta-analysis [23] supports the importance of the three types of interactions and that the strength of the interactions is found to be associated with increasing achievement outcomes [23]. This typology has since been expanded to include learner-interface [24] and learner-self [16]. There are also typologies that stem from a particular participant perspective such as the instructor [25], the learning environment [13], and tools [26]. Similarly, much work has been done with the Community of Inquiry framework (CoI) that examines interaction from a different lens, a more holistic approach that represents a process of creating a deep and meaningful (collaborative-constructivist) learning experience [27]. The focus of this paper is on the two interpersonal types of interaction that are most commonly discussed across the typologies: learner-learner and learner-instructor.

2. Interpersonal Interaction in Online Learning

Interpersonal interaction (learner-learner and learner-instructor) refers to the learners' and instructor's engagement (reciprocal relationships) in the learning and teaching process. It also refers to dialogue between and/or among different participants in online learning environments [28, 29]. Interpersonal interactions are considered essential components by many educators and learners [27, 28]. These types of interaction can help ensure learners and instructors develop a feeling of community and connectedness to the course [8, 27, 30, 31].

Much research has been conducted in the past 20 years on the importance of interactions, specifically those that involve the "person" or "human" as learner-learner and learner-instructor interactions do. These two realms of interaction research are directly related to the research in the area of social presence. Social presence is defined as "the degree to which participants in online courses feel affectively connected to one another" [32] and has been shown to be a factor in students' success and satisfaction with the learning experience [32, 33, 34, 35]. Some have even purported that social presence is the most important factor in improving instructional effectiveness [15]. Others, such as those using the Community of Inquiry (CoI) Framework as their lens for teaching and research, believe that social presence is one of the three essential

constructs or presences, the other two being teaching and cognitive presence [8, 27, 32, 36, 37, 38 39]. However, in both literature bases few research studies specifically discuss factors [15, 40, 41, 42] that influence or impact interaction online, while others only suggest instructional strategies [2, 30, 43, 44] that can influence interaction. This paper will focus on factors with which the instructor has some control.

II. METHODS

A qualitative phenomenological research design, utilizing semi-structured interviews [45] of experienced online instructors was used. Phenomenology originated as a method of philosophy based on the investigation of phenomena in the 20th century by the German philosopher Edmund Husserl [46]. Husserl believed researchers could examine essential components of human experiences in order to understand and describe the structure of the phenomena under study. The following research question was the focus of this study, “What factors influence interpersonal interaction in an online course?”

A. Participants and Sampling Method

A purposeful sampling technique was used to create a list of potential participants who had at least five years of experience teaching online, were currently active in the field of online learning, and were considered experienced online instructors by their peers. The literature on online learning was examined in order to generate a list of “practitioner researchers” that were prevalent in the literature on online learning and teaching. The concept of purposeful sampling means that “the inquirer selects individuals and sites for study because they can purposefully inform an understanding of the research problem and central phenomenon in the study” [47, p. 125]. After creating the list of potential participants, persons who met the inclusion criteria were emailed requesting participation (n=16). Once participation was accepted, a demographic survey was emailed to participants. Six practitioners responded as willing to participate: Zane Berge, Curt Bonk, Phil Ice, Rena Palloff, Anthony Picciano, and Karen Swan (see Table 1). There were four male participants and two female participants with an average of twelve years experience with online teaching. All six participants were currently working in higher education and two of the six additionally led consulting groups. Permission was requested and granted to use participants’ names in scholarly works in order to lend weight to the results.

Participant	Years of Experience Teaching Online	Highest Degree	Instructional Delivery Formats Used
Berge	13	Ph.D.	Face-to-Face, Online, Blended
Bonk	10+	Ph.D.	Face-to-Face, Online, Blended Computer-based, Self-instructional Videoconferencing, Television
Ice	5	Ed.D.	Face-to-Face, Online, Blended
Palloff	16	Ph.D.	Face-to-Face, Online, Blended Computer-based, Self-instructional
Picciano	12	Ph.D.	Face-to-Face, Online, Blended
Swan	12	Ed.D.	Face-to-Face, Online, Blended Computer-based, Self-instructional

Table 1. Participant Demographics

B. Data Collection

Interviews were conducted over a three-week period. Interviews took place via telephone conferences, at a time convenient to participants. An email was sent to participants to prepare them for the interview:

During our conversation, I'd like you to tell me a story about an online course you created and/or

instructed in which you intentionally attempted to increase interaction (learner-learner or learner-instructor). If you don't have a story, we can just talk about interaction in online learning in general. The ultimate goal is to identify some of the strategies you use in your online practice to intentionally increase interaction.

A semi-structured interview protocol was created and followed. Information was obtained from each participant in the form of personal accounts about online courses he/she had taught. Interviews were used to elicit factors that influence interaction in online courses using participants' own words. Data were collected via interview questions such as: What strategies do you use in your online courses to increase interpersonal interaction? What advice would you give to the instructor of an online course who wants to increase interpersonal interaction? What is your greatest challenge when trying to influence interaction in an online course? What factors do you believe increase interaction in online learning? This provided a conversational approach to the interview allowing the participants to be comfortable when talking. Each interview lasted between 30 and 60 minutes.

C. Data Analysis

Data were analyzed using Colaizzi's [48] and Moustakas's [49] seven steps. Audiotapes were transcribed by two researchers, including one of the authors, in 2007. Thus, audiotapes were listened to and the transcripts read a number of times (first in 2007 and again through the writing of this article) in order to obtain an overall feeling for the interviews. Significant statements related to factors that influence interpersonal interaction in online courses were identified in the transcripts. These were highlighted and extracted. An overarching "factor influencing interaction" was assigned each statement. The researchers then compared the factors elicited from the participants with those found in the literature. From the practitioner interviews and the literature review, the factors that influence interaction in online courses were combined into three tables (see Appendix) comprising the three categories: course structure, feedback, and discourse techniques and facilitation. Practitioner interview references are bolded in the table. During this process, the transcripts were re-read in order to clarify some factors listed in the tables. Modifications were then made to increase the accuracy of the tables. Member checking was also used for clarification and validation purposes. The findings were presented to all six participating practitioners in order to verify results.

III. INTERVIEW FINDINGS

Three themes emerged from the interviews relating to the impact of interpersonal interaction: course structure factors, feedback factors, and facilitating discourse factors. These themes captured the essence of interpersonal interaction in online courses as perceived by the six individuals interviewed. Within these three themes are multiple factors participants believed influenced interaction online. The interview findings for each theme are then discussed within the context of the literature.

A. Course Structure Factors

Factors that relate to course structure that might influence interaction that emerged from the interviews included: teamwork/group work, environment, models/guidelines, activities, and community. Teamwork/group work strategies included both required and optional work depending on the participant being interviewed. For example, Ice requires his students to do group work and provides them their own discussion board only they can see, whereas Berge and Picciano both make group work optional in their online courses.

The environments discussed by different participants were both constructivist and project/problem-based. In addition, Palloff said she does not name course elements in a conventional manner. Instead she said, "I try to come up with some interesting names for some of the discussion forums with some context for them." Swan stated that the online interface should have transparent navigation. As an example, she discussed a time when her students didn't know how to expand a discussion thread and thus could not interact in the discussion.

Models/guidelines include providing students with prior student examples and testimonials as well as with instructor expectations. Bonk discussed how he posts students' prior work examples and picks the best in order to raise the bar each semester. If he doesn't have prior examples to post, he will have students provide peer feedback on drafts in order to improve the project. Palloff said she sends out an initial welcome letter to her online students that details her expectations of students for interaction, as well as other expectations for the course.

Activities should be both high in number and provide variety. Swan has her students doing three to four things a week, and Bonk likes to consider different aspects when he determines activities such as: what can we do to involve international colleagues, how will this be better than face-to-face, and trying to foster interaction in relation to how much more time it is going to take.

Creating a sense of community online includes icebreakers, introductions/biographies, a social space, and having a safe environment. Swan sees herself as a coach on the discussion board and tries to comment in encouraging ways. Ice tries to share personal stories with his students and develop personal relationships with them. Bonk asks his students, at the beginning of a course, to post what they believe they are going to get out of that course, as well as eight nouns that describe them. He said that doing this allows other students to relate to them and shows what traits students have in common. Finally, Palloff explains her technique for creating community via a social space:

I always, always, always include a social space in the course. And I've named that Rena's Road House and I have a whole description about what the Road House is, and how the entire community gathers there to drink coffee and swap lies, and I invite them in to have a cup of coffee with me and who knows, there may be some weekly specials that show up in the Road House.

The literature has discussed course structure as a factor that can influence interpersonal interaction [42, 50]. Course structure can be considered as the different components the instructor has created and implemented into the course. For example, structure can consist of the type of discussion question, required assignments, variety of assignments, the value or grade placed on various components such as the discussions, as well as planned interaction such as assigning group work and roles and having peer reviews. In their study on teaching presence related to students' sense of a learning community, Shea et al. [50] determined that students feel more connected when the instructor shows an active teaching presence in the course. This can be in the form of actively guiding the discussions, providing good instructional design for the course, and being well organized.

In a theoretical framework for designing interaction in online courses provided by Northrup [51], course structure appeared as a factor that influences interaction. Northrup discussed activity components of course structure that can influence interaction such as demonstrations, debates, role playing, and discussions, group size, and group roles. She also discussed the facilitation of group discussions and the utilization of peer, as well as instructor, feedback as factors that can influence interaction. Similarly, in Vrasidas and McIsaac's [42] study, as part of its structure, the course they examined had required activities such as peer editing of papers, online discussions, and learner-instructor discussions of paper outlines; all of which led to interaction among participants.

In an examination of an online course discussion between ten adult students, Smith and Winking-Diaz [41] determined that incorporating relevant and challenging assignments and instructional strategies that support learner interaction lead to increased interaction. For example, instructors must provide sufficient time for students to reflect on and post responses to readings and assignments. Instructors also need to prompt students with challenging questions and present assignments that force students to reach higher levels of thinking (analysis, synthesis, evaluation).

From our interviews and the literature we can conclude that that course structure, whether pre-planned for courses or implemented along the way, is a factor that can impact interpersonal interaction in an online course.

B. Feedback Factors

Factors related to feedback that emerged from the interviews included variety of feedback and assessing discussion questions. Variety of feedback could include instructor, peer, and practitioner feedback as well as the medium used to provide that feedback (e.g., audio, written). Swan discussed weekly journaling she participates in with her students. This involves students conducting a private conversation with her each week in which they discussed what was happening with them in the course. This allows for personal reflection as well as providing some emotional presence in the online course.

Assessing discussion questions could include providing a rubric that details how participation will be assessed, providing no rubric, allowing students to self-assess based on a rubric, and the importance of the value placed on the discussion postings. Participants disagreed on the use of a rubric for assessing discussions. Ice felt he would rather send the non-participating student an email reiterating his expectations than give a letter grade for discussion participation. Palloff does use a participation rubric and at times allows students to look at the rubric and self assess, and then she send an email explaining where she feels they are falling on the discussion rubric. Swan discussed the importance of the value placed on the discussion postings. Swan stated, "We found that the greater percentage of grade that was given to discussion, the more satisfied the students were and the more they felt they were learning." Swan also discussed how students' personal characteristics affected how much they participated in discussions and whether they valued the postings of other students. Some students appreciated that they could articulate their point-of-view but did not think other students' points-of-view were helpful at all.

The literature in this area is consistent with our experienced online instructors; timely, relevant, and adequate feedback can influence a learner's perception of interaction [10, 16, 40-42]. Feedback was suggested by Hirumi [16] and Smith and Winking-Diaz [41] as part of a framework posited for increasing interaction. Feedback was also suggested by Muirhead [40] in an examination of the attitudes of 93 graduate students enrolled in online courses. Muirhead's students expressed the need for timely and relevant feedback on their discussions, as well as a need for both instructors and students to participate in online discussions. This indicates that feedback is another factor that leads to interaction in an online course.

Dennen et al. [10] conducted a study of 19 instructor actions in terms of perceived importance to both instructors and students. Thirty-two instructors and 170 students from two universities rated the importance of the actions. While the instructors perceived actions related to course content and providing information to learners about their performance (associated with feedback) as most important to student satisfaction, students indicated that communication needs and being treated as individuals (both associated with interpersonal interactions) are most important to their satisfaction.

The type of media used by the instructor and/or students when providing feedback can also influence interpersonal interaction [30, 52, 53]. Using a case study approach, Ice et al. [30] examined the use of asynchronous audio instructor feedback instead of text-based feedback in an asynchronous online course. Using data from surveys, interviews, and unsolicited feedback from one online course consisting of 34 students, the authors found that students preferred the audio feedback because it allowed them to understand nuance in the feedback and decreased perceived distance between instructor and student. However, Oomen-Early et al. [53] found that 85% of their student participants in online courses preferred a combination of both audio and written feedback. Either way, alone or in combination with textual feedback, it can be inferred that the feedback medium utilized is another factor that can influence interpersonal interaction in online courses. Morgan and Toledo [52] examined student perceptions related to handwritten versus typewritten feedback. They determined students felt more connected to instructors when the instructor used handwritten feedback. In addition, the instructor also felt more connected to the students when she used handwritten feedback versus typed feedback.

C. Discourse Techniques and Facilitation Factors

Factors related to facilitating discourse that emerged from the interviews included: immediacy behaviors,

discourse guidelines, discussion questions, and instructor participation. Immediacy behaviors included whether to accept postings such as “I agree” for points, self-disclosure, anecdotes, conversational style, using first names, and timing. Berge stated that he counts “I agree” posts toward participation. As Berge stated:

I used to write and tell them that's not very useful, but it actually can be. It tends to build some camaraderie; I mean it makes them feel they are more in a class when they do that because you look around and you see somebody shaking their head or something like that, body language. It's a similar thing. So I don't tell them not to do that anymore.

Palloff stated that “I agree” posts do not count. As Palloff says,

I tell them what I mean by a substantive post. So, the “good job” and “I agree” posts don't count. I tell them a substantive post has to either start a new topic, ask a question, take the conversation in a different direction, or support the on-going discussion with some additional information. I expect them to give me some evidence of the use of critical thinking skills and evidence they've been reading and doing the work they are supposed to be doing.

The timing the instructor uses to respond or interact in an online course is also important in facilitating discourse. For example, Palloff doesn't respond to every discussion posting, but if she expects students to post two to three times a week, she does the same. Most of the participants stated that they respond to email inquiries within 12 to 48 hours.

Participants had different expectations for discussion participation, but all informed their students what those expectations were. Swan required students to change the subject line for each post. Changing the subject line allowed for summarization of the post, and increased interest for other students to read the post.

Most participants stated that they used open-ended discussion questions. Swan said that using somewhat controversial topics will also increase interaction between students. In addition, having a question/answer section of the discussion board for off-topic questions allows for both the instructor and other students to respond with answers.

Participants felt that the instructor should model the behavior they expect on the discussion board. Some participants stated that they respond to every student introduction in the first week, but then post less frequently as the weeks go on. Interestingly, Ice stated the instructor posts should equal 10-15% of all posts on the discussion board.

There appears to be consistency between the interview data and the literature that discourse is a factor that influences interpersonal interaction in an online course. The manner in which learners and instructors communicate in an online course can affect interpersonal interaction [54]. In a study on instructor discourse techniques in a computerized supplement to a face-to-face course, Ahern, Peck, and Laycock [55] randomly assigned 80 students to one of three conditions: questioning only, statement only, and conversational condition. Results, determined through content analysis of the discussions, stated the conversational condition resulted in the most complex interactions between and among students and the instructor. Thus, one can assume that the type of discourse the instructor utilizes is a factor that can affect interpersonal interaction in an online course.

The conversational style of discourse has additionally been shown in more recent studies as being a factor that influences interaction. For example, when looking at social presence and the building of communities in asynchronous online courses, Swan [14] utilized data from two studies (one contained survey data from 1406 students, the other contained data from 39 discussion threads from a graduate online course, *Computing in Education*). She found that among online participants, affective verbal immediacy behaviors influenced interaction. Affective verbal immediacy is the use of paralanguage such as emoticons, exaggerated spellings, and the use of capitalization for talking loud, in order to project personalization into online discourse through text. Swan also found that self-disclosure “seemed to evoke the greatest number and depth of response from other participants” [14, p. 16]. Thus, it was suggested that instructors reduce the gap between students and themselves with the use of personal stories or personal

information (self-disclosure).

Examining 51 student perceptions of social presence in an online course, Tu and McIsaac [15] utilized surveys, interviews, observations, and document analysis to determine that the following factors contributed positively to interaction: (a) timely response, (b) casual communication style, and (c) informal discussion board. All three of these factors can be considered components of the overarching factor: discourse. In another, albeit older, study on online learning, Gunawardena's [56] study of 160 graduate students' perceptions can still be applied today. One suggestion was to utilize discussion board etiquette protocols to enhance communication. Although not specifically defined in her study, etiquette protocols could include modifying the subject line, using first names, and including affective verbal immediacy behaviors [K. Swan, interview, 2007]. These, one can assume, would make discussions more conversational in style and, in turn, increase interpersonal interaction.

From these four studies, we can infer that the manner in which a participant "talks" on the discussion board can affect interaction. If they are combative in nature towards other participants, it can affect the overall discussion and some participants might be afraid to post anything. Thus, affective verbal immediacy behaviors and self-disclosure lead to a more conversational style of discourse and that factor, in turn, leads to increased interpersonal interaction in an online course.

Discussion facilitation, or mediation, can be a role played by the instructor or assigned to students. The facilitator helps to move the discussion along without taking sides by posing open-ended questions, asking for clarification, and encouraging participation [54]. Berge [43] stated that the role included guiding, coaching, and modeling appropriate behaviors as well as ensuring accuracy of content and understanding. When one considers that it includes questioning and encouraging participation, it is easy to see how it can be a factor that influences interpersonal interaction. Maor [57], in an attempt to create a community of learners in an asynchronous discussion board in an online class, promoted interpersonal interactions through her facilitation of the discussion board. She assigned discussion leaders each week so each of the 12 students played a role. From her evaluation of the course and the interpersonal interactions, she determined it was necessary for the instructor to scaffold student collaborative learning to teach students how to communicate online in a scholarly manner. From this, it can be suggested that scaffolding communication, as a component of discussion facilitation, is another factor that can influence interaction online.

IV. DISCUSSION

As shown in Tables A-1, A-2, and A-3 (see Appendix), most factors discussed in the interviews appeared in the literature. However, there were a few factors that emerged from interviews that were not discussed to a great extent in the literature. For example, the type of learning environment within course structure was discussed by three practitioners as an influencing factor. Bonk discussed using project- and/or problem-based learning environments as a way of increasing interaction, whereas Berge and Picciano discussed using a constructivist learning environment. In addition, using a high number of required activities, providing student testimonials and prior project examples, and having students self-assess discussions were also discussed by practitioners but were not found in the literature. Journaling with students, using bi/tri-level discussion questions, requiring discussion post subject lines, and not using a rubric for discussion questions were also factors discussed by participations that were not found in the literature.

Bonk described how he makes students feel more comfortable in his online courses by providing testimonials and project examples from prior students. Ice described how he uses bi/tri-level discussion questions. As he explained, in order to get students to reach the top three levels of Bloom's Taxonomy (analysis, synthesis, and evaluation) he required more elaborate responses. The idea came from a National Council of Teachers of English (NCTE) critical thinking book, where a level one question would be one in which the answer is "right there" in the materials. In a level two question, students must relate the materials with a personally relevant answer. With level three, students connect to a broader historical/cultural/social context. This would mean that students have to read and comprehend a

considerable amount of material before answering the discussion questions. Thus, it allows for a connection between the discussion question and the resource materials. This type of bi/tri-level discussion question provided Ice with better student responses.

Swan described how in threaded discussions, changing the subject line for every new post increased interaction in her courses. She attributed this to the fact that students are more apt to read a posting with a new subject line, than one that simply repeats the prior heading with "re:" in front of it. In addition, she felt that subject lines forced the students to think about what their posting was about and summarize it in a few words. Swan also discussed the required weekly journaling with students. This entails the student reflecting on what he/she has done or learned that week through private correspondence with the instructor. She believes this increases learner-instructor interaction, forces the students to reflect on their learning, and increases teaching presence. She briefly mentioned journaling in a few published articles [32, 58], but research on online learner-instructor journaling, specifically, was not found.

An additional element that was not discussed within the interviews is that of class size; however in many cases instructors have little say on the number of students allowed within a class. Yet, given that the number of students in an online class can impact interpersonal interaction [42, 59, 60] we have decided to also touch upon this. As Paloff and Pratt explained, class or group size "relates to the ability of the instructor to maintain some modicum of control over the process without subjecting participants to information overload" [59, p. 81]. While the number of students or ideal class size varies from instructor to instructor, it is generally the number of students the instructor can manage for the type of class he/she is teaching and the associated activities. Too many students and instructors may find they cannot keep up with the asynchronous discussions (information overload); too few students and the discussion may lag.

Vrasidas and McIsaac found this discussion lag in the small online class they analyzed. They noted that the small class size (9) negatively influenced interaction in the online discussions. The instructor of the course commented that, "community was never built because it was too small" [42, p. 30]. Hewitt and Brett [60] looked at class size and student discussion posts in 28 online courses to determine if there was a relationship. They found that as the class size increased, students wrote shorter discussion posts yet they wrote more posts. As class size increased, students also opened fewer posts, from which one can assume they read fewer.

Correspondingly, a study by Oestmann and Oestmann [61] determined that larger online class sizes (>20 students) were more optimal as compared with smaller online class sizes (<10 students) based on significant increases in direct and indirect learning outcome measures (e.g., final grade percentages and classroom discussion interactivity/number of discussion posts). Their study examined 5 "small" and 5 "large" sections of an identical master's level healthcare management course taught between 2004 and 2005. The average size of the large classes was 21.6 students compared with the small classes of 7.6 students. The average number of substantive discussion posts in the large classes was 76.3 which was significantly different from the average number of substantive discussion posts in the small classes at 49.9; students were required a minimum of 48 to earn maximum discussion points. Similarly, the average final grade percentage in the large class cohort was 91.1% and significantly higher than the average final grade percentage in the small class cohort of 84.9%.

From these studies we can only infer that class size is a factor that has an effect on interpersonal interaction, yet what that perfect number of students should be cannot be determined outside of course context and instructor comfort level. However, when considering small or large class sizes instructors should be aware and prepared to deal with class size issues related to group dynamics and unequal participation [50]. Sometimes instructors do not have the flexibility to determine the maximum number of students that are allowed to enroll in their course and thus cannot control class size.

V. CONCLUSIONS AND FUTURE RESEARCH

This paper includes just the first phase of a research study on interaction in online courses. A number of factors were found to influence interaction in online courses, such as group work, course environment,

model use, community, discussion question type and assessment, feedback type and medium, immediacy behaviors, discourse guidelines, and instructor participation. Unfortunately, from the data collected for this study, it cannot be determined which of the above factors are most important for interaction or how context of courses plays a role in fostering interaction. Providing novice online instructors with a long list of factors could be overwhelming, especially without any means for prioritizing those factors.

The results of this study suggest there are factors instructors can employ in order to increase learner-learner and learner-instructor interaction in their online courses. A limitation to these results that should be considered is that the interviews took place in 2007 and with time new strategies are often put into place.

This next phase will consist of a Delphi study, including a survey of experienced online instructors' perceptions regarding the above compiled list of factors that influence interpersonal interaction online. This would supply us with a verification of the list, which could then be possibly categorized, rank-ordered, or scaled such as by a Likert scale, by the participants. The Delphi Technique could be used as a method for eliciting additional experts' feedback on the factors compiled as well as providing additional strategies. This would be similar to Soo and Bonk's [62] study to determine the *types* of interaction deemed most important. However, instead of types of interaction, we would be looking for the factors used to increase interaction deemed most important. This could lead to a framework for increasing interaction as instructors become more familiar with teaching online. There are numerous factors that influence interaction and a framework might help a novice online instructor prioritize which factors to consider. The framework should then be examined for its impact on student learning.

VI. ABOUT THE AUTHORS

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VII. REFERENCES

1. **Anderson, T.**, Interaction in Learning and Teaching on the Educational Semantic Web. In: Juwah, C. (Ed.), *Interactions in online education*, 141-155, New York: Routledge, 2006.
2. **Arbaugh, J.B.** How Classroom Environment and Student Engagement Affect Learning in Internet-Based MBA Courses. *Business Communication Quarterly* 63(4): 9-26 (2000).
3. **Garrison, D.R., and Cleveland-Innes, M.** Facilitating Cognitive Presence in Online Learning: Interaction is Not Enough. *American Journal of Distance Education* 19(3): 133-148 (2005).
4. **Bernard, R., Abrami, P., Borokhovski, E., Wade, C., and Ta, R.** A Meta-Analysis of Three Types of Interaction Treatments in Distance Education. *Review of Educational Research (RER)* 79(3): 1243-1289 (2009).
5. **Moore, M.** Three Types of Interaction. *The American Journal of Distance Education* 3(2) (1989). http://www.ajde.com/Contents/vol3_2.htm#editorial.

6. **Aragon, S.R.**, Creating Social Presence in Online Environments. In: Aragon, S.R. (Ed.), *Facilitating learning in online environments*, 57-68, San Francisco: Jossey-Bass, 2003.
7. **Moore, M., and Kearsley, G.**, *Distance Education: A Systems View*, Belmont, CA: Wadsworth Publishing Company, 2004.
8. **Swan, K., Richardson, J.C., Ice, P., Garrison, D.R., Cleveland-Innes, M., and Arbaugh, J.B.** Validating a Measurement Tool of Presence in Online Communities of Inquiry. *E-mentor* 2(24) (2008). http://www.e-mentor.edu.pl/e_index.php?numer=24&all=1.
9. **Akyol, Z., and Garrison, D.R.**, Community of Inquiry in Adult Online Learning: Collaborative-Constructivist Approaches. In: Kidd, T.T. (Ed.), *Adult learning in the digital age: Perspectives on online technologies and outcomes* (Ch.VI), Hershey, PA: IGI Global, 2009.
10. **Dennen, V., Darabi, A., and Smith, L.** Instructor-Learner Interaction in Online Courses: The Relative Perceived Importance of Particular Instructor Actions on Performance and Satisfaction. *Distance Education* 28(1): 65-79 (2007).
11. **Richardson, J.C., Arbaugh, J.C. Cleveland-Innes, M., Ice, P., Swan, K. and Garrison, D.R.** *Using the Community of Inquiry Framework to Inform Effective Instructional Design*. Paper presented at the 2010 AECT Research Symposium: Bloomington, IN, 2010.
12. **Bonk, C.J., and Dennen, V.**, Frameworks for Research, Design, Benchmarks, Training, and Pedagogy in Web-Based Distance Education. In: Moore, M.G., and Anderson, W.G. (Eds.), *Handbook of Distance Education*, 331-348, Mahwah, NJ: Lawrence Erlbaum, 2003.
13. **Hirumi, A.**, Analysing and Designing E-Learning Interactions. In: Juwah, C. (Ed.), *Interactions in online education*, 46-71, New York: Routledge, 2006.
14. **Swan, K.** Building Communities in Online Courses: The Importance of Interaction. *Education, Communication and Information* 2(1): 23-49 (2002).
15. **Tu, C-H., and McIsaac, M.** The Relationship of Social Presence and Interaction in Online Classes. *The American Journal of Distance Education* 16(3): 131-150 (2002).
16. **Hirumi, A.** A Framework for Analyzing, Designing, and Sequencing Planned Elearning Interactions. *The Quarterly Review of Distance Education (QRDE)* 3(2): 141-160 (2002).
17. **Boston, W., Diaz, S., Gibson, A., Ice, P., Richardson, J., and Swan, K.** An Exploration of the Relationship Between Indicators of The Community of Inquiry Framework and Retention in Online Programs. *Journal of Asynchronous Learning Networks* 13(3): 67-83 (2009).
18. **Mays, T.**, Theoretical Perspectives on Interactivity in E-Learning. In: Juwah, C. (Ed.), *Interactions in online education*, 9-26, New York: Routledge, 2006.
19. **Muirhead, B.** Interactivity Research Studies. *Educational Technology & Society* 4(3): 108-112 (2001). http://ifets.ieee.org/periodical/vol_3_2001/muirhead.html.
20. **Wallace, R.M.** Online Learning in Higher Education: A Review of Research on Interactions Among Teachers and Students. *Education, Communication and Information* 3(2): 241-280 (2003).
21. **Anderson, T.**, Modes of Interaction in Distance Education: Recent Developments and Research Questions. In: Moore, M.G., and Anderson, W.G. (Eds.), *Handbook of Distance Education*, 129-144, Mahwah, NJ: Lawrence Erlbaum, 2003.
22. **Marks, R.B., Sibley, S.D., and Arbaugh, J.B.** A Structural Equation Model of Predictors for Effective Online Learning. *Journal of Management Education* 29(4): 531-563 (2005).
23. **Bernard, R.M., Abrami, P.C., Borokhovski, E., Wade, C.A., Tamim, R., Surkes, M.A., and Bethel, E.C.** A Meta-Analysis of Three Types of Interaction Treatments in Distance Education. *Review of Educational Research (RER)* 79(3): 1243-1289 (2009).
24. **Hillman, D.C., Willis, D.J., and Gunawardena, C.N.** Learner-Interface Interaction in Distance Education: An Extension of Contemporary Models And Strategies For Practitioners. *The American Journal of Distance Education* 8(2): 30-42 (1994).
25. **Mortera-Gutierrez, F., and Murphy, K.** *Instructor Interactions in Distance Education Environments: A Case Study*. Paper presented at the Annual Distance Education Conference, Austin, TX (January 2000). (ERIC Document Reproduction Service No. ED439292.)
26. **Bonk, C., and King, K.** (Eds.), *Electronic Collaborators*, Mahwah, NJ: Lawrence Erlbaum, 1998.

28. **Swan, K., Garrison, D.R., & Richardson, J.**, A Constructivist Approach to Online Learning: The Community of Inquiry Framework. In: Payne, C.R. (Ed.), *Information technology and constructivism in higher education: Progressive learning frameworks*, 43-57, Hershey, PA: IGI Global, 2009.
29. **Berge, Z.L.** Facilitating Computer Conferencing: Recommendations from the Field. *Educational Technology* 35(1): 22-30 (1995).
30. **Wagner, E.D.** In Support of a Functional Definition of Interaction. *The American Journal of Distance Education* 8(2): 6-29 (1994).
31. **Ice, P., Curtis, R., Phillips, P., and Wells, J.** Using Asynchronous Audio Feedback to Enhance Teaching Presence and Students' Sense of Community. *Journal of Asynchronous Learning Networks (JALN)* 11(2): 3-25 (2007).
32. **Lavooy, M.J., and Newlin, M.H.** Computer Mediated Communication: Online Instruction and Interactivity. *Journal of Interactive Learning Research* 14(2): 157-165 (2003).
33. **Swan, K., and Shih, L.F.** On the Nature and Development of Social Presence in Online Course Discussions. *Journal of Asynchronous Learning Networks (JALN)* 9(3): 115-136 (2005).
34. **Gunawardena, C.N., and Zittle, F.J.** Social Presence as a Predictor of Satisfaction Within a Computer-Mediated Conferencing Environment. *The American Journal of Distance Education* 11(3): 8-26 (1997).
35. **Richardson, J.C., and Swan, K.** Examining Social Presence in Online Courses in Relation to Students' Perceived Learning and Satisfaction. *Journal of Asynchronous Learning Networks (JALN)* 7(1): 68-88 (2003).
36. **Picciano, A.G.** Beyond Student Perceptions: Issues of Interaction, Presence and Performance in an Online Course. *Journal of Asynchronous Learning Networks (JALN)* 6(1): 21-40 (2002). http://www.aln.org/publications/jaln/v6n1/pdf/v6n1_picciano.pdf.
37. **Ke, F.** Examining Online Teaching, Cognitive, and Social Presence for Adult Students, *Computers & Education* 55(2): 808-820 (2010).
38. **Garrison, D.R., Cleveland-Innes, M., and Fung, T.** Exploring Causal Relationships Among Cognitive, Social and Teaching Presence: Student Perceptions of The Community of Inquiry Framework. *The Internet and Higher Education* 13(1-2): 31-36 (2010).
39. **Akyol, Z., and Garrison, D.R.** The Development of a Community of Inquiry over Time in an Online Course: Understanding the Progression and Integration of Social, Cognitive and Teaching Presence. *Journal of Asynchronous Learning Network (JALN)* 12(2-3): 3-22 (2008).
40. **Garrison, D.R., Anderson, T., and Archer, W.** Critical Inquiry in a Text-Based Environment: Computer Conferencing in Higher Education. *The Internet and Higher Education* 2(2-3): 87-105 (2000).
41. **Muirhead, B.**, *Attitudes Toward Interactivity in a Graduate Distance Education Program: A Qualitative Analysis*, Parkland, FL: Dissertation.com, 1999.
42. **Smith, M.C., and Winking-Diaz, A.** Increasing Students' Interactivity in an Online Course. *The Journal of Interactive Online Learning* 2(3): 1-25 (2004).
43. **Vrasidas, C., and McIsaac, M.S.** Factors Influencing Interaction in an Online Course. *American Journal of Distance Education* 13(3): 22-36 (1999).
44. **Berge, Z.L.** Active, Interactive, and Reflective Elearning. *The Quarterly Review of Distance Education (QRDE)* 3(2): 181-190 (2002).
45. **Richardson, J.C., and Ice, P.** Students' Level of Critical Thinking in Relation to Preferred Instructional Strategy in Online Discussions. *The Internet and Higher Education* 13: 52-59 (2010). <http://dx.doi.org/10.1016/j.iheduc.2009.10.009>.
46. **Patton, M.Q.**, *Qualitative Research and Evaluation Methods*, Thousand Oaks, CA: Sage, 2002.
47. **Smith, D.W.**, Phenomenology. In: Zalta, E.N. (Ed.), *The Stanford Encyclopedia of Philosophy (Winter 2005 Edition)*, 2005. <http://plato.stanford.edu/archives/win2005/entries/phenomenology/>.
48. **Creswell, J.W.**, *Qualitative Inquiry and Research Design: Choosing Among Five Approaches (2nd ed.)*, Thousand Oaks, CA: Sage, 2007.

49. **Colaizzi, P.F.**, Psychological Research as the Phenomenologist Views It. In: Valle, R., & King, M. (Eds.), *Existential phenomenological alternatives in psychology*, 48-71, New York: Oxford University Press, 1978.
50. **Moustakas, C.**, *Phenomenological Research Methods*, Thousand Oaks, CA: Sage, 2005.
51. **Shea, P., Swan, K., Li, C.S., and Pickett, A.** Developing Learning Community in Online Asynchronous College Courses: The Role Of Teaching Presence. *Journal of Asynchronous Learning Networks (JALN)* 9(4): 59-82 (1994).
52. **Northrup, P.** A Framework for Designing Interactivity into Web-Based Instruction. In: Rossett, A. (Ed.), *The ASTD e-learning handbook: Best practices, strategies, and case studies for an emerging field*, 127-138, New York: McGraw-Hill, 2002.
53. **Morgan, V.L., and Toledo, C.A.** Online Feedback and Student Perceptions. *Journal of Interactive Online Learning* 5(3): 333-340 (2006).
54. **Oomen-Early, J., Bold, M., Wiginton, K.L., Gallien, T.L., and Anderson, N.** Using Asynchronous Audio Communication (AAC) in the Online Classroom: A Comparative Study. *Journal of Online Learning and Teaching (JOLT)* 4: 267-276 (2008).
55. **Sargeant, J., Curran, V., Allen, M., Jarvis-Selinger, S., and Ho, K.** Facilitating Interpersonal Interaction and Learning Online: Linking Theory and Practice. *Health Professions* 26(2): 128-136 (2006).
56. **Ahern, T.C., Peck, K., and Laycock, M.** The Effects of Teacher Discourse in Computer-Mediated Discussion. *Journal of Educational Computing Research (JECR)* 8(3): 291-309 (1992).
57. **Gunawardena, C.N.** Social Presence Theory and Implications for Interaction and Collaborative Learning in Computer Conferences. *International Journal of Educational Telecommunications*, 1(2/3): 147-166 (1995).
58. **Maor, D.** The Teacher's Role in Developing Interaction and Reflection in an Online Learning Community. *Education Media International* 40(1/2): 127-137 (2003).
59. **Swan, K.**, Learning Effectiveness: What the Research Tells Us. In: Bourne, J., & Moore, J.C. (Eds.) *Elements of quality online education: Practice and direction*, 13-45, Needham, MA: Sloan-C., 2003.
60. **Palloff, R.M., and Pratt, K.**, *Building Online Learning Communities: Effective Strategies for the Virtual Classroom*, Hoboken, NJ: Wiley, 2007.
61. **Hewitt, J., and Brett, C.** The Relationship Between Class Size and Online Activity Patterns in Asynchronous Computer Conferencing Environments. *Computers & Education* 49: 1258-1271 (2007).
62. **Oestmann, E., and Oestmann, J.** Significant Difference in Learning Outcomes and Online Class Size. *Journal of Online Educators* 2(1): 1-8 (2006).
63. **Soo, K-S., and Bonk, C.J.** *Interaction: What Does it Mean in Online Distance Education?* Paper presented at the ED-MEDIA/ED-TELECOM 1998 World Conference on Educational Multimedia and Hypermedia & World Conference on Educational Telecommunications, Freiburg, Germany (June 1998). (ERIC Document Reproduction Service No. ED428724.)
64. **Carabajal, K., LaPointe, D., and Gunawardena, C.N.**, Group Development in Online Distance Learning Groups. In: Moore, M.G. (Ed.), *Handbook of Distance Education*, 137-148, Mahwah, NJ: Lawrence Erlbaum, 2007.
65. **Dennen, V., and Bonk, C.J.**, We'll Leave a Light On for You: Keeping Learners Motivated in Online Courses. In: Khan, B.H. (Ed.), *Flexible learning in an information society*, 64-76, Hershey, PA: The Idea Group, Inc, 2007.
66. **Gunawardena, C.N., Ortegano-Layne, L., Carabajal, K., Frechette, C., Lindemann, K., and Jennings, B.** New Model, New Strategies: Instructional Design for Building Online Wisdom Communities. *Distance Education* 27(2): 217-232 (2006).
67. **Juwah, C.**, Interactions in Online Peer Learning. In: Juwah, C. (Ed.), *Interactions in online education*, 171-190, New York: Routledge, 2006.

68. **Rovai, A.** Building Sense of Community At a Distance. *International Review of Research in Open and Distance Learning* 3(1): 1–16 (2002).
69. **Conaway, R.N., Easton, S.S., and Schmidt, W.V.** Strategies for Enhancing Student Interaction and Immediacy in Online Courses. *Business Communication Quarterly* 68(1): 23-35 (2005).
70. **Parker, A.** Interaction in Distance Education: The Critical Conversation. *Educational Technology Review* 12: 13–17 (Autumn-Winter1999).
71. **Vrasidas, C.A** Working Typology of Intentions Driving Face-To-Face and Online Interaction in a Graduate Teacher Education Course. *Journal of Technology and Teacher Education* 10(2): 273-296 (2002).
72. **Mishra, S., and Juwah, C.,** Interactions in Online Discussions: A Pedagogical Perspective. In: Juwah, C. (Ed.), *Interactions in online education*, 156-170, New York: Routledge, 2006.
73. **Rourke, L., Anderson, T., Garrison, D.R., and Archer, W.** Assessing Social Presence in Asynchronous Text-Based Computer Conferencing. *Journal of Distance Education* 14(2): 50-71, (1999).
74. **Shearer, R.,** Instructional Design in Distance Education: An Overview. In: Moore, M., and Anderson, B. (Eds.), *Handbook of Distance Education*, 275-286, Mahwah, NJ: Lawrence Erlbaum, 2003.
75. **Curran, V.R., Lockyer, J., Kirby, F., Sargeant, J., Fleet, L., and Wright, D.** The Nature of the Interaction between Participants and Facilitators in Online Asynchronous Continuing Medical Education Learning Environments. *Teaching and Learning in Medicine* 17(3): 240-246 (2005).

VIII. APPENDIX

Category	Factor	Sub-Factor	Supporting Sources
Course Structure	Teamwork/Group work		[2, 12, 15, 16, 30, 57, 63, 64, 65, 66, 67] Ice (interview, 2007)
		Optional group work	Berge (interview, 2007); Picciano (interview, 2007)
		Group role definition	[12, 57, 64, 68]
	Environment/Structure	Interface has transparent navigation	Swan (interview, 2007)
		Constructivist	Berge (interview, 2007); Picciano (interview, 2007)
		Project/Problem-based	Bonk (interview, 2007)
		Don't name things conventionally	Palloff (interview, 2007)
	Models/Guidelines	Former student prior work examples, testimonials	Bonk (interview, 2007)
		Provide students with instructor expectations	Berge (interview, 2007); Palloff (interview, 2007); Picciano (interview, 2007)
	Activities	Provide variety	[12, 64, 69] Bonk (interview, 2007); Picciano (interview, 2007)
		High number	Swan (interview, 2007)
		Create community	Bonk (interview, 2007)
	Create community	Icebreaking first week	Bonk (interview, 2007)
		Post introductions/biographies	Ice (interview, 2007); Palloff (interview, 2007); Picciano (interview, 2007)
		Safe (encouragement, reduce tension/anxiety)	[15, 65] Bonk (interview, 2007); Swan (interview, 2007)
Include a social space		Palloff (interview, 2007)	

Table A-1. Course Structure Factors that Influence Interaction

Category	Factor	Sub-Factor	Supporting Sources
Feedback Techniques	Variety of feedback	Peer, instructor, practitioner feedback	[12, 14, 16, 42, 43, 51, 57, 64, 65, 69, 71] Bonk (interview, 2007)
		Instructor feedback -Audio	[30] Ice (interview, 2007)
		Instructor journaling with students	Swan (interview, 2007)
	Assessing discussion questions	Value placed on discussion postings	[14, 16, 67, 68, 70, 71] Swan (interview, 2007)
		Provide participation rubric	Palloff (interview, 2007)
		No rubric for discussion questions	Ice (interview, 2007)
		Self-assess discussions based on rubric	Palloff (interview, 2007)

Table A-2. Feedback Factors that Influence Interaction

Category	Factor	Sub-Factor	Supporting Sources
Facilitating Discourse	Immediacy behaviors	“I agree” posts count towards participation – increases camaraderie	[14, 72] Berge (interview, 2007)
		“Good job, I agree” do not count	Palloff (interview, 2007)
		Paralanguage / emoticons	[14, 15, 42]
		Self-disclosure and personal anecdotes/humor	[14, 15, 30, 41, 64, 69] Bonk (interview, 2007); Ice (interview, 2007); Picciano (interview, 2007); Swan (interview, 2007)
		Conversational style	[2, 12, 15, 55, 68, 73] Bonk (interview, 2007); Picciano (interview, 2007); Swan (interview, 2007)
		Use first names	[68] Ice (interview, 2007); Swan (interview, 2007)
		Timing	[15, 73, 74] Palloff (interview, 2007); Picciano (interview, 2007); Swan (interview, 2007)
	Guidelines	Provide guidelines on how to interact	Bonk (interview, 2007); Palloff (interview, 2007)
		Require new subject lines for each post	Swan (interview, 2007)
		Students should post 2-3 times a week, not on same day.	Palloff (interview, 2007); Picciano (interview, 2007)
		Students should on a weekly basis, respond to 2 peers.	Palloff (interview, 2007)
	Discussion Questions	Open-ended discussion questions	[2, 69, 71] Ice (interview, 2007); Palloff (interview, 2007); Picciano (interview, 2007); Swan (interview, 2007)
		Bi/Tri-level questions (Blooms top 3 levels)	Ice (interview, 2007)
		Somewhat controversial topics	Swan (interview, 2007)
		Include a questions area on discussion board	Palloff (interview, 2007); Picciano (interview, 2007)
	Instructor	Instructor participation in	Berge (interview, 2007)

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Discussion Participation	discussions	
	Instructor involved early in discussions	[15, 68, 74]
	Instructor responds to every student introduction in first week	Palloff (interview, 2007); Swan (interview, 2007)
	Instructor models discussion behavior	[43, 64, 68] Palloff (interview, 2007); Swan (interview, 2007)
	Instructor should not respond to every post.	Palloff (interview, 2007); Swan (interview, 2007)
Instructor posts should equal 10-15% of all posts.	Ice (interview, 2007)	

Table A-3. Discourse Factors that Influence Interaction