Table 7

*Archival Analysis of Interaction within Three Instructional Technology Courses*

|  | Course 1  CBI | | | Course 2  Evaluation | | | | Course 3  HPI | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Academic | Social | Technical | | Academic | Social | Technical | | Academic | Social | Technical |
| **Directly Observable Instructor-Learner Interaction** |  |  |  | |  |  |  | |  |  |  |
| Checks student comprehension | 8 |  | 15 | | 19 | 2 | 18 | | 19 |  | 6 |
| Knows and uses student names | 9 |  | 14 | | 29 |  | 20 | | 16 |  | 38 |
| Responds to students as individuals |  |  | 8 | | 11 | 2 | 7 | | 15 |  | 19 |
| Praises students for contributions that deserve commendation | 8 | 1 | 4 | | 24 |  |  | | 24 |  | 1 |
| Criticizes student ignorance or misunderstanding |  |  |  | |  |  |  | |  |  |  |
| Encourages questions, involvement, debate, and/or feedback | 2 |  |  | | 12 |  | 2 | | 9 |  |  |
| Encourages students to answer questions by providing cues and encouragement |  |  |  | | 4 |  |  | | 13 |  | 1 |
| Other Directly Observable I-L Interactions (Description or explanation with approximate time codes) |  |  |  | |  |  |  | |  |  |  |
| **Directly Observable Learner-Instructor Interaction** |  |  |  | |  |  |  | |  |  |  |
| Students ask questions of the instructor | 1 | 1 | 4 | | 5 |  | 4 | | 6 | 1 | 9 |
| Students volunteer information |  |  |  | | 1 |  |  | | 4 |  |  |
| Students present information | 12 |  | 1 | | 17 |  |  | |  |  |  |
| Student feedback is on topic | 3 | 1 |  | | 18 |  | 6 | | 63 |  | 5 |
| Other Directly Observable L-I Interactions |  |  |  | |  |  |  | |  |  |  |
| **Directly Observable Learner-Content Interaction** |  |  |  | |  |  |  | |  |  |  |
| Reading |  |  |  | | 4 |  |  | |  |  |  |
| Writing (i.e., on whiteboard, in chat, etc.) |  |  |  | |  |  |  | |  |  |  |
| Presentation (i.e., verbal, graphical, etc.) |  |  |  | | 18 |  |  | |  |  |  |
| Discussion |  |  |  | |  |  |  | |  |  |  |
| Responds |  |  |  | |  |  |  | |  |  |  |
| Participates in Poll |  |  |  | |  |  |  | |  |  |  |
| Other Directly Observable L-C Interactions |  |  |  | |  |  |  | |  |  |  |
| **Directly Observable Learner-Learner Interaction** |  |  |  | |  |  |  | |  |  |  |
| Students discuss the content of the session with each other (on-task academic conversation) | 13 | 13 |  | | 3 | 8 | 4 | | 36 |  |  |
| Students engage in conversation that is not related to the subject of the session but is related to the course or other courses (off-task academic conversation) | 2 |  |  | |  |  |  | | 10 |  | 4 |
| Students engage in conversation that is not related to the course (social conversation) |  |  | 3 | |  |  |  | | 10 |  |  |
| Students encourage other students’ questions, involvement, debate, and/or feedback | 5 |  | 3 | |  |  |  | |  |  |  |
| Students criticize other students’ ignorance or misunderstanding |  |  |  | |  |  |  | |  |  |  |
| Students use each other’s names |  |  |  | |  |  |  | | 2 | 2 |  |
| Other Directly Observable L-L Interactions |  |  |  | |  |  |  | |  |  |  |
| **Directly Observable Learner-Interface Interaction** |  |  |  | |  |  |  | |  |  |  |
| Work on eboard |  |  |  | |  |  |  | |  |  |  |
| Use microphone | 26 | 2 | 2 | | 19 |  | 5 | | 39 |  | 13 |
| Exchange messages in text chat | 36 | 23 | 38 | | 24 | 4 | 20 | | 152 | 82 | 52 |
| Raises hand | 2 | 1 | 2 | | 1 |  |  | | 8 |  |  |
| Completes a poll |  |  |  | | 1 |  |  | |  |  |  |
| Uses emoticons |  |  |  | |  |  |  | |  |  |  |
| Troubles connecting |  |  |  | |  |  |  | |  |  |  |
| Unable to use tools (specify) |  |  |  | |  |  | Mic\* | |  |  |  |
| Use video |  |  |  | |  |  |  | | 28 |  |  |
| Uses App Sharing | 8 |  |  | |  |  |  | |  |  |  |
| Joins Breakout rooms | 6 |  |  | |  |  |  | |  |  |  |
| Uses Step Away Feature |  |  |  | |  |  |  | |  |  |  |
| Sharing weblinks |  |  |  | |  |  |  | |  |  |  |
| Uses the phone to join the room |  |  |  | |  |  |  | |  |  |  |
| Other Directly Observable L-Interface Interactions |  |  |  | |  |  |  | |  |  |  |
| **Directly Observable Instructor-Interface Interaction** |  |  |  | |  |  |  | |  |  |  |
| Work on eboard |  |  |  | |  |  |  | |  |  |  |
| Use microphone |  |  |  | |  |  |  | |  |  | 3 |
| Exchange messages in chat | 1 |  | 3 | |  |  | 2 | |  |  | 14 |
| Ask students to raise their hands | 2 |  | 2 | | 1 |  |  | | 1 |  |  |
| Ask students to respond to polling |  |  |  | | 2 |  |  | |  |  |  |
| Troubles connecting |  |  |  | |  |  |  | |  |  |  |
| Use video |  |  |  | |  |  |  | |  |  |  |
| Uses App Sharing |  |  |  | | 1 |  |  | |  |  |  |
| Creates Breakout rooms |  |  |  | |  |  |  | |  |  |  |
| Uses Step Away Feature |  |  |  | |  |  |  | |  |  |  |
| Sharing weblinks | 2 |  |  | |  |  |  | |  |  |  |
| Archives |  |  |  | |  |  |  | |  |  |  |
| Sets up guest access |  |  |  | |  |  |  | |  |  |  |
| Unable to use tools (specify) |  |  |  | |  |  |  | |  |  |  |
| Other Directly Observable Instructor-Interface Interactions |  |  |  | |  |  |  | |  |  |  |
| Total Interactions | 146 | 42 | 99 | | 214 | 16 | 88 | |  |  |  |

Mic\* - Refers to the Microphone in the Virtual Classroom

**Appendix**

Details of eight current studies on interaction and synchronous systems

| **Reference** | **Research purpose** | **Context** | **Data collection method & Sample** | **Outcome** |
| --- | --- | --- | --- | --- |
| McBrien, J. L., & Jones, P. (2009). Virtual spaces: Employing a synchronous online classroom to facilitate student engagement in online learning. *International Review of Research in Open and Distance Learning*, *10*(3). | To analyze distance by exploring the different elements of Moore’s (1993) transactional distance theory, specifically dialogue, structure, and learner autonomy, through student responses to a survey about their experience with the synchronous online learning platform, Elluminate Live! (E!). | Three undergraduate and three graduate courses in the College of Education at a regional campus of the University of South Florida  Technology: Elluminate Live | Short open-ended survey to collect reflections  35 graduate and 55 undergraduate students | Particular themes emerged related to dialogue, structure, and learner autonomy. In addition, students rated convenience, technical issues, and pedagogical preferences as important elements in their learning experiences. |
| LaPointe, D. K., & Gunawardena, C. N. (2004). Developing, testing and refining of a model to understand the relationship between peer interaction and learning outcomes in computer-mediated conferencing. *Distance Education*, *25*(1), 83–106. | To develop and test a model of the influences impacting peer interaction in an online course and determine the relationship, if any, between peer interaction and learning outcomes | Data collection was from 6 colleges and Universities in the US and 1 in Canada.  Technology: Computer-Mediated Conferencing | Two online questionnaires  228 Community College and University students enrolled in 30 online courses | The results showed that perceived teaching style had a small direct effect (0.23) and prior CMC experience had a moderate direct effect (0.31) on self-reported peer interaction; self-reported peer interaction had a strong direct effect (0.66) on self-reported learning outcomes peer interaction. |
| Shi, S. (2010). Teacher moderating and student engagement in synchronous computer conferences. *Journal of Online Learning and Teaching*, *6*(2). | To investigate the relationship between and among teacher moderating variables and student engagement variables. Student engagement consists of three different aspects: behavioral engagement, social-emotional engagement, and intellectual engagement. | The study was conducted in an online, three-credit university level undergraduate course that was delivered in real time in a fall semester that consisted of eleven consecutive three-hour weekly sessions.  Technology: Learning by Doing | Rubrics  32 undergraduates | Statistical results showed that the number of teacher postings had a significant effect on student behavioral engagement while the quality of teacher moderating levels did not. Student participation had a significant effect on student intellectual engagement, but student attending or student social-emotional engagement did not. Finally, analyses showed that both the number of teacher postings and the quality of teacher moderating levels had a significant effect on student intellectual engagement. |
| Aydin, B. (2008). An e-class application in a Distance English Language Teacher Training program (DELTT): Turkish learners' perceptions. *Interactive Learning Environments*, *16*(2), 157–168. | To investigate perceptions of the students participating in the electronic reading class and explore whether or not the e-class application had any impact on the academic success of learners. | At Anadolu University, Eskisehir, Turkey in the 2000–2001 academic year  E-class applications were used to meet the increasing demand for English language teachers in the country.  Technology: Not specified | Document analysis  1 group of 26 groups composed of undergraduates were randomly selected to participate. 1 group was exposed to e-class while other students had traditional instruction. | Turkish adult learners mainly have positive attitudes towards e-class application. This positive attitude might be perceived as their willingness and readiness for the inclusion of technology into language education. The participants also appreciated the idea of group work on the computer. An e-class project might therefore be suggested as a way of increasing interaction among students, because such an application motivates learners and encourages them to develop positive attitudes towards the course. Students participating in this study also reported that the e-class application helped them prepare for the later online part of their education. |
| Wang, Y. (2004). Supporting synchronous distance language learning with desktop videoconferencing. *Language Learning & Technology*, *8*(3), 90–121. | To examine the potential of Internet-based desktop videoconferencing in facilitating oral and visual interaction in DLE through a formative evaluation of one specific videoconferencing tool, NetMeeting | 5 video conferencing sessions with each student. The students had to complete various tasks during each session and were located throughout Australia.  Technology: NetMeeting | Observations, transcipt analysis, survey, or student perceptions  4 partcipants | Data strongly supporting the use of videoconferencing in DLE for the provision of oral-visual interaction. The ease of installation and use makes NetMeeting a user-friendly videoconferencing tool. While acknowledging three major constraints (Internet bandwidth, latency, and the computing power of the individual PC) on the quality of a videoconference, this research has successfully confirmed the capability of NetMeeting in providing reliable and acceptable audio and video quality. |
| Hrastinski, S. (2006). Introducing an informal synchronous medium in a distance learning course: How is participation affected? *The Internet and Higher Education*, *9*(2), 117–131. | To evaluate the introduction of an IM system and its effect on participation in the course. Moreover, students in the course that adopted the IM system were compared with students in the other course. | Business English Online course. The course involves group discussions, and continuous assessment of individual and group  work.  Technology: Not specified | Two questionnaires and 1:1 interviews with students  28 students | The results of this comparison indicate that the degree of participation was higher in the class that did not use IM. However, then the degree of participation by students in the second offering that adopted the IM system was compared with the degree for those that did not adopt the system. The results of this comparison indicate that the degree of participation was higher for those that adopted the IM system. |
| Abdous, M., & Yen, C. (2010). A predictive study of learner satisfaction and outcomes in face-to-face, satellite broadcast, and live video-streaming learning environments. *Internet and Higher Education*, *13*(4), 248–257. | To explore the relationship between self-perceived learner-to-teacher interaction and learning outcomes and satisfaction across various delivery modes (face-to-face, satellite broadcasting, or live video-streaming). | Participants were recruited from a public four-year research university in the mid-Atlantic region of the United States.  Technology: Not specified. | Online Survey  496 students enrolled in a variety of courses | Delivery mode was not a useful predictor for self-perceived learner-to-teacher interaction. Self-perceived learner-to-teacher interaction could serve as a predictor for student satisfaction in courses similar. Overall, computer skill could serve as a predictor for student satisfaction, but those two variables were negatively related to each other. Therefore, the increase in the self-perceived learner-to-teacher interaction score would be accompanied by the increased probabilities of obtaining a better course final grade. |
| Goussal, D. M., & Udrízar Lezcano, M. S. (2003). Synchronous distance learning and virtual classrooms: A case study on student expectations and conditioning factors. *Australian Journal of Educational Technology, 19*(3), 388–404. | To identify students’ perceptions about hypothetical implementations of DL systems, in particular the use of synchronous two-way transmission and virtual classrooms in new locations. | 3 regional campuses of el Universidad Nacional del Nordeste, Argentina  Technology: Not specified. Hypothetical situations | Survey  2629 undergraduates | Asked students about their foreseeable motivation and concentration to take classes via distance learning, on account that DL, in the lack of teachers' physical, face-to-face contact and its associated interaction level, requires more in both. Almost 60% considered it as “Normal,” another 14% as “High,” 14.7% as “Fair,” and 3.7% as “Low.” The great majority preferred a “50-50” share, with class time loads up to 10 hours a week for each delivery form (50.2% for live classes and 53.9% for virtual, synchronous 2-way full duplex DL classes). |