

## Online High School World History: Does Interaction Make a Difference?

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### *Abstract*

*This study investigated the online interaction between students and teachers as well as student interaction preferences, student perceptions of learning and of online classes, and student performance. High school students, in an online world history course, participated in multiple activities that offered opportunities to interact with their teacher and classmates. Data was collected throughout the action research using student surveys, participant interviews, teacher records of daily interaction, pretests and posttests, and assignment grades. Students indicated that interaction with the teacher was very important, while interaction with their peers was less vital to learning. Interaction appeared to have little effect on student performance. Although this study took place over a three-week period rather than over an entire semester (e.g., Pelowski, Frissell, Cabral, & Yu, 2005; Picciano, 2002), results indicate that high school students may view online interaction differently than their counterparts in higher education (Northrup, 2002; Swan, 2002).*

### **Introduction**

In the past several years, online learning has become an increasingly popular alternative to traditional K-12 schools (Blobaum & Sullinger, 2007; Moser, 2006; Wood, 2005). As the online phenomenon has grown, concerns about appropriate and effective teaching practices in this environment have also increased accordingly. In this vein, many educators, parents, and

students have expressed apprehension about the nature and amount of interaction that students have with each other and with their instructors in a setting where they rarely, if ever, have face-to-face contact with other participants. As a high school social studies teacher in an online program for a large metro Atlanta school district, I share these concerns and worry about how online interaction may affect the students' learning experiences in my virtual classroom.

Research indicates that interaction does play a role in student perceptions of learning in the online environment. Swan (2002) and Pelowski, Frissell, Cabral, and Yu (2005) showed that interaction can promote positive student perceptions of online learning in post-secondary learning environments. Likewise, McDonald and Gibson (1998) concluded that students in an online environment seek to develop interpersonal relationships, much like those students in face to face classrooms. Additionally, Northrup (2002) showed that online Master's students believed that building a learning community with their peers is important. Further, O'Reilly and Newton (2002) found that students valued interaction with both their instructors and their peers. However, it should be noted that all of these studies took place in either undergraduate or graduate classes.

Theorists such as Berge (2002), Sherry (1996), and Moore (1989) also emphasized the importance of interaction between students and their peers and instructor in the online environment. Berge emphasized the importance of interaction because students expect it as part of the learning process, while Sherry asserted that teachers who foster interaction are key components of successful distance learning programs. Moore conceptualized a framework of interaction that included interaction between students and their peers and interaction between students and their instructors, a framework on which previous studies (e.g., Murphy & Coffin, 2003; Swan, 2002) and this action research rely.

However, despite this emphasis on online interaction, researchers have found that interaction plays a very small role, if any, in affecting student performance (Davies & Graff, 2005; Pelowski et al., 2005; Picciano, 2002). Davies and Graff examined interaction in relation to final course grades, Pelowski et al. investigated the relationship between interaction and grades on four separate multiple choice tests, and Picciano studied the relationship between interaction and a written assignment and a multiple choice test. None of these studies found a statistically significant relationship between interaction and various measures of student performance.

Though previous literature indicated a connection between student perceptions of learning and interaction with their peers and instructor, most of the research has focused on post-secondary education, rendering a study in a high school setting appropriate. The previous research also has drawn varying conclusions on the degree and nature of interaction's influence on actual student performance, inviting further investigation of the impact of interaction on student learning and perceptions.

Given the growing popularity of online learning and the previous research on interaction and online learning, I chose to study the implications of interaction on the preferences, perceptions of learning, and performance of students in an online high school world history course. In this study, I focused on interaction between learners and interaction between learner and instructor, as outlined by Moore (1989). This interaction included both asynchronous communication on the discussion boards and synchronous communication through the interactive chat room. Specifically, my research questions were as follows:

1. What types of interactions do high school students prefer in an online environment?
2. How do student-student and student-teacher interactions relate to student performance?
3. What is the relationship between student-student and student-teacher interactions and student perceptions of learning and of online classes?

This study took place in a district wide online program that had an enrollment of 674 students this semester. Of these students, 53% were White; 21% were African American; 14% were Asian; 9% were Hispanic, and 3% were multi-racial/other. Because this ongoing online program services the entire district, students' socio-economic levels can vary greatly. Students' achievement levels also tend to vary greatly. Most students in the program take online courses in addition to their regular course load in an effort to make up classes they have failed or make room in their schedules for electives.

## Methods

### *Participants*

This study took place in an online second semester world history course. Of the 15 students in the course, 13 agreed to participate in the study, although only 7 completed all of the data collection tools. Students participated in the study, based on their registration for the course and the return of both a student assent form and a parental consent form. All students in the course received the same instruction, regardless of their participation in the study. Of the 13 original participants in the study, 8 were in the tenth grade, and 5 were in the twelfth grade. The participants represented seven different high schools around the district. The participants consisted of 3 males and 10 females. In terms of ethnic composition, 7 were White; 2 were African American; 2 were Hispanic; 1 was Asian, and 1 was multi-racial. The participants varied in the amount of online course experience. While 3 had taken more than one online course, 6 had taken only one, and 4 had never taken an online course before. When asked their reasons for taking an online course, 2 responded that they wanted to get ahead in their studies and make room in their schedule for another class; 1 responded that she wanted to make room in her schedule for another course and that she preferred the online environment; 6 responded that they wanted to make room in their schedule for another course; 3 took the course for another unspecified reason, and 1 did not answer the question.

### *Intervention*

The intervention in this study lasted two and a half weeks and consisted of multiple assignments and opportunities designed to allow participants to interact with one another and with me as their instructor. Generally, students used email, asynchronous discussion boards, the interactive chat room, telephone, and face to face meetings to interact.

Specific interaction opportunities included a virtual office discussion board and a student lounge discussion board throughout the intervention period. The virtual office was designed to allow students to ask course-related questions, and students could post to this board at any time.

The student lounge provided a place for students to discuss topics unrelated to world history. As with the virtual office, students could post to the student lounge at any time. Students were not required to participate in either of these discussion boards.

In addition, students also had the opportunity to interact in the interactive chat room, a synchronous, interactive forum where students could meet with me and their classmates in real time. I held three weekly interactive sessions every Wednesday at 8:00 p.m. These sessions allowed students to ask questions regarding content or course issues. Students were required to attend only if their average dropped to a 74 or below in the course. However, no participants' averages fell to 74 or below during the intervention period; therefore, no participants were required to attend these sessions.

Beyond these optional opportunities, participants completed two required assignments designed to stimulate interaction. The first was a biography assignment that required students to post a short paragraph about themselves and then respond at least twice to their classmates. This assignment spanned three days. The purpose of this assignment was to allow students to practice participating in an online discussion with a familiar topic, while also becoming familiar with their classmates. The second required assignment was a project on absolute monarchs that lasted seven days. Working in pairs, students created PowerPoint presentations about specific European monarchs of the 17th and 18th centuries. Students were allowed to select their own partners, but I assigned partners to those who did not respond with their choice of partner by the deadline. They were also required to develop a discussion question on their monarch that would be posted to the discussion board for their classmates to answer. In addition, students acted as discussion moderators for the questions they created, while simultaneously participating in their classmates' discussions. Required interaction included multiple postings as moderators of their discussions and two postings on two of their classmates' discussions. Students were evaluated on this project based on their PowerPoint presentation, their moderation of the discussion on their monarch, and their participation in their classmates' discussions. I conducted the evaluations using a pre-constructed rubric. This assignment was designed to reinforce concepts and personalities associated with European absolutism, as outlined in the district's curriculum (Gwinnett County Public Schools, 1999).

### ***Instruments and Procedures***

At the beginning of the course, participants completed a 27-question survey that included Likert-type questions, ranking questions, and open-ended questions. The survey was designed to determine students' preferences of interaction in the online environment, as well as their perceptions of the effect of interaction on the degree and quality of their learning prior to their participation in the intervention. The response choices for the Likert questions were strongly disagree, disagree, agree, and strongly agree. For the ranking questions, participants were asked to rank the following forms of interaction in an online class, with 1 being the most favored to 5 being the least favored: email, telephone call, chat room, comments attached to dropbox submission, and discussion board. I emailed the survey to the participants and requested that they email me their completed survey within two days. Participants who had not returned the survey by the deadline received a reminder email. All participants returned this pre-intervention survey.

Prior to the beginning of the unit on absolute monarchs, participants completed a pretest to determine their prior knowledge of the unit content. I emailed the pretest to participants and requested that they email their completed pretest to me within six days. Those who had not

returned their completed pretest by the deadline received a reminder email, and those who did not respond to the reminder received another reminder email. All but two of the participants returned the completed pretest.

During the intervention, teacher fieldnotes and records comprised much of the data collection. As the teacher recorder/observer (Mills, 2007), I recorded the number of posts to the discussion boards for each student, as well as the amount of time each student spent in the interactive chat room. Based on my experiences and observations in the course, I also noted the nature and quality of interaction on a pre-constructed interaction tracking form. While I attempted to remain objective in these recordings, my role as the course instructor, as well as the fact that I developed all of the data collection instruments, could have resulted in some bias in my data collection. My concern over my relationships with the participants may have also led to some degree of bias. Finally, the fact that I am currently an online student myself may have colored my view of the data collection.

After the completion of the intervention, I emailed the participants a post-intervention survey that contained the 27 questions from the pre-intervention survey, as well as 10 additional Likert response questions and 3 additional open-ended questions. I also emailed the participants a post-test that was identical to the pretest. I requested that the participants return both documents within five days. After several reminder emails, 7 of the 13 participants returned the post-intervention survey, while 8 of the 13 participants returned the posttest. Additionally, I interviewed two participants by phone about their learning experiences. One of these participants volunteered to be interviewed, while the other agreed at my request. Although I asked a set of predetermined questions, I tried to allow the participants the flexibility to express their thoughts by altering and supplementing the questions as needed. In addition, student grades on the absolute monarchy project provided an additional measure of student learning.

## Results

As noted above, the data collected in this study resulted from several instruments, including a pre-intervention and post-intervention survey, participant interviews, teacher fieldnotes, observations and recordings, a pretest and posttest on course objectives, and grades on the intervention project.

### *Student Surveys*

All 13 participants returned the pre-intervention survey, though 1 participant responded only to the questions about how many online classes he had taken and why he was taking this online course. Only 7 participants responded to the post-intervention survey. For the 7 participants who responded to the post-intervention survey, 6 indicated that they had taken an online class prior to the current one, while 1 stated that she had not taken an online class previously. Of these 7 participants, 4 indicated that they were taking the course to make room in their schedule for another class; 2 stated that they were making room for another class and trying to get ahead in their studies, and 1 was taking the course for another unspecified reason. Of the 6 participants who did not return the post-intervention survey, 3 had never taken an online class before; 2 had taken a course before, and 1 had taken two previous online courses. Additionally, of the 6 participants who did not return the post-intervention survey, 2 stated on the pre-intervention survey that they were taking an online course to make room in their regular schedule

for another class; 1 stated that she was trying to get ahead in her studies and making room in her schedule for another course; 2 stated that they were taking the online course for an unspecified reason, and 1 did not answer the question. The Likert responses on the student surveys were scored from 1 to 4, with 1 representing a strongly disagree response, 2 representing disagree, 3 representing agree, and 4 representing strongly agree. The surveys also asked participants to rank their preferences for the type of interaction they prefer in online learning environments. Finally, participants were asked to provide comments to several open-ended questions.

Pre-intervention survey statements 1-11, 17, and 18, as well as post-intervention survey statements 26 and 28-30 addressed student preferences for interaction. The means and standard deviations of these statements for both pre- and post-intervention surveys are found in Table 1.

Table 1

*Mean Responses and Standard Deviations of Statements on Student Preferences for Interaction*

Question	Pre- Intervention (n = 13)		Pre- Intervention (n = 7)		Post- Intervention (n = 7)	
	Mean	SD	Mean	SD	Mean	SD
1. I prefer written communication over verbal communication when interacting with my teacher in an online class.	2.83	0.72	3.17	0.75	3.00	0.82
2. I prefer written communication over verbal communication when interacting with my classmates in an online class.	2.75	0.75	3.17	0.75	3.00	0.58
3. I am comfortable using email to communicate with my classmates about assignments in an online class.	3.17	0.58	3.50	0.55	3.86	0.38
4. I am comfortable communicating with my teacher about assignments in an online class.	3.33	0.65	3.50	0.55	3.86	0.38
5. I am comfortable contacting my teacher if I have a problem in an online class.	3.58	0.51	3.83	0.41	3.86	0.38
6. I like interacting with classmates during assignments on the discussion board.	3.00	0.74	3.33	0.52	3.29	0.49
7. I am comfortable using the Elluminate chat room for class activities.	3.00	0.85	3.17	0.75	3.43	0.53
8. When my teacher returns my graded assignments, I like receiving his or her comments in addition to the grade.	3.50	0.52	3.83	0.41	3.86	0.38

Table 1: continued

*Mean Responses and Standard Deviations of Statements on Student Preferences for Interaction*

Question	Pre- Intervention (n = 13)		Pre- Intervention (n = 7)		Post- Intervention (n = 7)	
	Mean	SD	Mean	SD	Mean	SD
9. I prefer assignments in which I can interact with my classmates.	2.75	0.87	2.67	0.82	2.57	0.98
10. I would like the opportunity to talk to my online classmates about something other than the course.	3.25	0.75	3.17	0.98	3.00	1.00
11. I wish I could communicate with my online teacher more often on a one-to-one basis.	2.58	0.67	2.83	0.75	2.57	0.53
17. I like the amount of interaction I have with my classmates in online classes.	2.91	0.54	3.00	0.71	3.14	0.38
18. I like the amount of interaction I have with my teacher in an online class.	3.00	0.43	3.00	0.63	3.43	0.53
26. I enjoyed working with my classmates on the interactive assignment on absolute monarchs.					3.29	0.76
28. I would have preferred that the teacher provide more feedback during the unit on absolute monarchs.					2.50	0.55
29. Overall, I like the amount of interaction that I have had with my classmates so far in this course.					3.50	0.55
30. Overall, I like the amount of interaction that I have had with my teacher so far in this course.					3.57	0.53

*Note:* The first set of data is for all 13 original participants. The second set is for only the 7 participants who completed both the pre- and post-intervention surveys.

Notice the 7 participants who completed both the pre-intervention and post-intervention surveys tended to show a stronger degree of opinion, either agreement or disagreement, than the other 6 participants. However, questions 9, 10, and 18 are exceptions to this trend. When only the 7 participants who completed both surveys are considered, the change in preferences between the pre-intervention survey and post-intervention survey appears smaller than when all 13 participants are included.

Survey questions asking students to rank the type of interaction they preferred provided additional information. For instance, prior to the intervention, participants were divided on what type of interaction they preferred with both their instructor and their classmates. Of the 13 original participants, 2 participants did not answer the ranking questions, while 2 did not respond correctly. Of the 9 respondents to the question regarding interaction with the instructor, 3 chose email as their first preference; 2 chose the telephone; 2 chose the interactive chat room, and 2 chose comments with submitted assignments as their first preference. However, it should be noted that 8 of the 9 selected email as either their first or second choice for interaction with their instructor. The participant who did not select email as her first or second choice had not taken an online course before. She selected the interactive chat room as her first choice and the discussion boards as her second. Likewise, first preferences for interaction with classmates on the pre-intervention surveys were divided. Of the 9 respondents, 3 chose the discussion board as their first choice; 2 selected email; 2 selected the telephone, and 2 selected the interactive chat room. Only 5 of the 9 selected email as their first or second preference for communicating with their classmates.

In the post-intervention survey, interaction through email was the first choice for most students when communicating with both their teacher and their classmates. Of participants who responded to the ranking questions on post-intervention surveys, 5 of 6 indicated that email was their first choice for communication with their instructor, while 4 of 5 indicated that email was their first choice when communicating with their classmates. One respondent did not answer the questions correctly, while 1 respondent did not answer the ranking question regarding interaction with classmates. All participants in the post-intervention survey listed email as their first or second preference when interacting with both their instructor and their classmates. Two participants changed their responses to email as their first preference for both interaction with their instructor and interaction with their classmates between the pre-intervention and post-intervention surveys. One of these participants had chosen the interactive chat room as her first option on the pre-intervention survey, and the other chose comments attached to assignments. Both of these participants had selected email as their second choice on the pre-intervention survey. They also had both taken an online class before and were taking this class to make room in their schedule for another course. Interestingly, the participant who marked the interactive chat room as her first choice on the pre-intervention survey did not attend any of the three chat sessions during the intervention, and she marked the interactive chat room as her fourth choice out of five options on the post-intervention survey. Additionally, all participants in the post-survey selected either a telephone call or the interactive chat room as their least preferred method of communication with their instructor.

Pre-intervention statements 12-16 and 19-22, as well as post-intervention statements 23, 24, 26, 27, 31, and 32, addressed student perceptions of learning and of online classes. The means and standard deviations of these statements for both pre-intervention and post-intervention surveys can be found in Table 2. The second set of pre-intervention data represents the responses of the 7 participants who also answered the post-intervention survey.

Table 2

*Mean Responses and Standard Deviations of Statements Addressing Student Perceptions of Learning and of Online Classes*

Question	Pre- Intervention (n = 13)		Pre- Intervention (n = 7)		Post- Intervention (n = 7)	
	Mean	SD	Mean	SD	Mean	SD
12. I learn more in online classes that require me to interact with my classmates.	2.58	0.67	2.83	0.75	2.43	1.13
13. I learn more in an online class when I communicate regularly with my teacher.	2.92	0.67	3.17	0.75	3.29	0.76
14. I learn more when my teacher offers regular feedback on my progress in the class.	3.33	0.49	3.50	0.55	3.86	0.38
15. I learn more when I work in a group.	2.58	0.51	2.67	0.52	2.43	0.79
16. I learn more from posting and reading responses to online discussions than from individual assignments.	2.75	0.75	2.83	0.75	2.86	0.90
19. The more interaction I have in an online class, the more I like the class.	2.92	0.67	3.17	0.75	2.86	0.69
20. The more interaction I have in an online class, the more I learn.	2.91	0.54	3.00	0.71	2.71	1.11
21. Interaction with my classmates is important in an online class.	2.83	0.72	3.00	0.63	3.00	1.15
22. Interaction with my teacher is important in an online class.	3.64	0.50	3.67	0.52	3.71	0.49
23. The biography discussion assignment was beneficial in getting to know my classmates.					3.29	0.49
24. The virtual office discussion board was helpful.					2.86	0.69
26. I enjoyed working with my classmates on the interactive assignment on absolute monarchs.					3.29	0.76

Table 2: continued

*Mean Responses and Standard Deviations of Statements Addressing Student Perceptions of Learning and of Online Classes*

Question	Pre-Intervention (n = 13)		Pre-Intervention (n = 7)		Post-Intervention (n = 7)	
	Mean	SD	Mean	SD	Mean	SD
27. I learned more by completing the interactive assignment on absolute monarchs than if we had covered the material with individual assignments.					3.17	0.75
31. I am more comfortable in this online course thanks to the interaction that I have had with my classmates.					3.29	0.49
32. I am more comfortable in this online course thanks to the interaction that I have had with my teacher.					3.43	0.53

All participants in both the pre-intervention survey and post-intervention survey agreed to some degree with several statements. For example, 7 participants strongly agreed while 5 agreed with the statement, "I am comfortable contacting my teacher if I have a problem in an online class." On the post-survey, 6 participants strongly agreed with this statement, while 1 agreed with the statement. One participant changed his response from the pre-survey to the post-survey. He did not answer the pre-survey question, but he strongly agreed with the statement on the post-survey. For the statement, "When my teacher returns my graded assignments, I like receiving his or her comments in addition to the grade," 6 participants on the pre-intervention survey agreed, while 6 strongly agreed. On the post-survey, 1 participant agreed while 6 strongly agreed. Of the 7 respondents in the post-survey, 3 changed their answer from the pre-survey. The respondent who did not answer the question on the pre-intervention survey strongly agreed; 1 participant who had marked strongly agree on the pre-intervention survey changed her response to agree, and 1 participant changed his response from strongly agree to agree. For the statement, "I learn more when my teacher offers regular feedback on my progress in the class," 8 participants on the pre-intervention survey agreed, and 4 strongly agreed. On the post-survey, 1 participant agreed while 6 strongly agreed. Of the 7 participants, 3 changed their response from the pre-intervention survey to the post-intervention survey. The participant who did not answer on the pre-survey strongly agreed with the statement; while 2 participants, including the participant who had never taken an online class, changed their answers from agree to strongly agree. Finally, 4 participants agreed and 7 strongly agreed with the statement, "Interaction with my teacher is important in an online class." In the post-intervention survey, 2 participants agreed and 5 strongly agreed. Of the 7 participants, 4 changed their responses to this question. Two changed their responses from agree to strongly agree; one changed her response from strongly agree to agree, and the

participant who did not answer the question on the pre-survey agreed with the statement on the post-survey. Further, all respondents to the post-intervention survey agreed to some degree on 11 other statements on the post-intervention survey including statements 3, 4, 6, 7, 17, 18, 23, 29, 30, 31, and 32.

Though most post-intervention participants responded positively to interaction, there were exceptions. For example, 5 of the 7 respondents disagreed with the statement, "I prefer assignments in which I can interact with my classmates," ( $M = 2.57, SD = .98$ ) on the post-intervention survey. Likewise, 5 of the 7 respondents disagreed with the statement, "I learn more when I work in a group," ( $M = 2.43, SD = .79$ ). These were the only two statements with which more respondents disagreed than agreed on the post-intervention survey.

The open-ended questions on the surveys provided a more qualitative look at student preferences and perceptions of learning and online classes. Participants' comments on the interventions were mixed. Some enjoyed the absolute monarchy assignment. Several students commented on how much they learned. One participant stated that she was surprised by how much she learned in the assignment and declared that interaction was "key in learning." Several cited the different points of view they encountered as one of the benefits of interaction with their classmates. These perceptions, however, were not universal. As one student stated, "I like being able to have a little bit of interaction with my classmates, but not too much." One participant disliked having to read other students' work. Another found it "really weird" that he was expected to interact with his online classmates outside of the course shell. Several different participants on the pre-intervention and post-intervention surveys indicated that they did not believe the interaction with classmates was as important as interaction with the teacher. For instance, one participant stated on the pre-intervention survey that she believed that having interaction with other students wasn't necessary for success. She did not complete the post-intervention survey. Another participant who did not complete the pre-intervention survey wrote on the post-survey that interaction with classmates had no impact on his learning in the course.

### *Interviews*

Participant interviews also provided more qualitative data to complement the numerical data being collected. Though 6 participants were contacted to be interviewed, only 2 agreed; one female volunteered, and one male agreed at my request. Both participants stated that they enjoyed the absolute monarchy project. The female called it "definitely a good experience." However, the male said he would have preferred a more traditional unit of study in terms of instructional strategies. Interestingly, the female said she and her project partner met in a face to face setting, while the male chatted online with his partner and then communicated through email. Both preferred email as the primary means of communication with their instructors, although the female actually ranked telephone call as her first choice on her survey; the female noted that she has email access on her cell phone and keeps it on at all times. She even assured me that if I emailed her at 2:00 a.m., she would respond almost immediately.

### *Observations and Fieldnotes*

In addition, teacher observations and fieldnotes addressed student preferences about online interaction and student perceptions of learning and of online classes. According to data collected, 5 of the 13 participants attended an interactive chat with the instructor and other

students during the intervention period. Students could attend chats to ask questions on content or assignment requirements. Of the 5 participants who attended the chats, they spent an average time of 10.6 minutes in interactive chat sessions. The average time spent in the chat sessions for the entire group was 4.1 minutes. The average number of postings to the discussion boards was 15 for all participants. The minimum number of required posts for the entire intervention period was 10 per student. Most extra postings occurred as part of the biography assignment.

Only one student posted a question to the virtual office. Students posted to the student lounge in an attempt to find a partner for the project, but the postings consisted mainly of general postings for the group. No one appeared to answer anyone directly, and I eventually had to match most of the participants who posted in search of a partner. These students appeared to have the most trouble expressing themselves on the discussion boards, and several did not post at all during the project. Only one other thread occurred in the students lounge. One student announced a “rave,” which did not relate to the course, and another student responded.

Teacher recordings of chat sessions and discussion postings revealed that students were courteous in their discussion board and chat room interactions with me and their classmates. Participants also seemed to give thought to their responses and attempt to address discussions to the best of their ability. However, few posted to the discussion boards when they were not required, and if they had already fulfilled their requirements for the number of posts, they often did not respond to follow-up questions that I or another classmate might ask. For example, the exchange below between a student and the student moderator of one of the absolute monarchy discussions illustrates this lack of response:

Student A: I think Maria Theresa's reign was very good for her country. Her father who was reigning before her seemed to be having some trouble. They had two wars that left them with little money and a small army. Maria was able to make a fresh start. In the beginning of her reign things did not go to well. Many wars occurred in Austria which made things a littler [sic] rocky. She soon made an alliance with France even though many of the other countries were enemies with France. She was able to make her government stronger.

Student B (Discussion Moderator): What were some of the ways that she improved the government?

Student A did not respond to Student B's question, although she posted another response, as required, in another place in the discussion. Both students had taken an online class previously and should have been familiar with the procedure for discussion boards.

Participants also used a much more informal tone in the biography discussion than in the other discussion areas, as evidenced by their use of emoticons and chat room slang. For example, 3 different participants used the emoticon smiley face in the biography discussion, while this convention was absent from the other discussion boards. Students also tended to use incomplete sentences and short informal phrases more readily in the biography discussion, such as one student's exclamation, “Oh my granny.” Complete sentences, such as “I don't believe that Catherine the Great would have had the same impact if she were a monarch of Germany rather than Russia,” were much more the norm in the discussion boards pertaining to course content.

### *Pretests and Posttests*

Student scores on the pretest and posttest measured student performance on course content objectives. Of the 13 original participants, 7 took both the pretest and the posttest. For these 7 students, the average score on the pretest was 64.29 ( $SD = 14.00$ ), while the average score on the posttest was 74.29 ( $SD = 18.58$ ) on a 100 point scale. The mean difference between the pretest and posttest scores for these 7 participants was 10.00. Finally, using an alpha level of .05, I conducted a  $t$  test on the pretest and posttest data to determine if the activities with increased interaction were effective in raising scores. There was no evidence that the change in test scores was due to increased interaction,  $t(6) = 1.91, p > .05$ .

In addition, I correlated the differences between individual pretest and posttest scores with each student's time in the interactive chat room in an effort to detect any relationship between the two variables. The  $r$  value for this linear correlation was  $-.81$ . I also correlated the differences between individual pretest and posttest scores with the number of posts each student made to the discussion boards to determine the degree of the relationship between these two variables. The  $r$  value for this linear correlation was  $.68$ .

### *Project Grades*

Students' grades on the absolute monarchy project provided another measure of student performance. These grades were evaluated based on a pre-constructed rubric to which the students had access before they began their projects. The mean score on the project was 82.08 ( $SD = 16.94$ ) on a 100 point scale for all 13 participants.

Individual grades were also correlated with the amount of time each student spent in the interactive chat room to determine any relationship that might exist between these two variables. The  $r$  value for this linear correlation was  $-.14$ . I further correlated the project grades with the number of each student's postings to the discussion boards to determine the relationship between these two variables. The  $r$  value for this linear correlation was  $.04$ .

## **Conclusions and Implications**

This research study addressed the implications of online interaction on student preferences for interaction, student performance, and student perceptions of learning and of online classes. Generally, interaction seemed to positively influence students' perceptions, but appeared to have little impact on actual performance.

The number of online courses may have played a small role in the results, as 3 of the 4 participants who had not taken an online course before did not return any of the post-intervention data. However, the 1 participant without online experience who did return the post-intervention data showed consistent results with her more experienced classmates. She agreed with at least half of her classmates on 24 of 32 Likert statements on the post-intervention survey and showed a 20-point increase in her posttest score from her pretest, an increase matched by 3 of the other 6 participants who completed both the pretest and posttest.

Likewise, participants' reasons for taking the course may provide insight into the research results. Of the 7 participants who returned all of the data, 4 indicated that they wanted to make room in their schedule for another class, and 2 others indicated this reason and a desire to get ahead in their studies. The other participant responded to the question by marking an

unspecified reason. This information indicated that these students were strong independent learners who were proactive in their education. Considering the nature of this type of student, it is no surprise that they tended to favor high interaction with their instructor, while they preferred to work independently rather than relying on interaction with their classmates when their grades were at stake. The participant who had an unspecified reason for taking the course did show less of a preference for interaction, particularly with his classmates, and he did not believe that greater interaction improved his learning.

### *Student Preferences*

The results of the study indicated that the involved students preferred frequent feedback from their instructors, as opposed to little interaction with the instructor. Furthermore, this preference, which students appear to have held prior to the intervention, appears to have strengthened after they completed the intervention. This affinity is evident in the increase in mean scores for statements concerning interaction with the instructor. These results seem to support Berge's (2002) assertion that regardless of the academic results, interaction is important in the online environment because students expect it.

Interaction with classmates did not appear as important to the participants as interaction with the teacher. For instance, the post-intervention survey mean for the statement, "Interaction with my classmates is important in an online class," was 3.00 ( $SD = 1.15$ ), while the post-intervention survey mean for the statement, "Interaction with my teacher is important in an online class," was 3.71 ( $SD = .49$ ), a rather telling difference. Furthermore, the only two statements with which more respondents disagreed than agreed on the post-intervention survey concerned interaction with classmates. This preference might be attributed to several factors. First, because of its nature, online education generally seems to attract more independent learners who prefer to work at their own pace. This type of learner may not be as comfortable in group learning situations. Secondly, expectations may again play a role. Just as Berge (2002) noted that students expect to interact with their teachers, the participants may not have expected to interact with one another in the online environment. One participant's comment that she was surprised by how much she learned, as well as the participant who found interaction with his classmates "really weird," seem to support the possibility that the participants entered the course not expecting to interact much with their classmates.

Finally, participants expressed a definite preference for email as their primary means of communication with both classmates and the teacher. They also indicated that they least preferred to interact with the teacher over the phone or in the interactive chat room, the only two devices that allow for synchronous real-time communication. Email has several advantages that could make it the preferred means of communication. First, it is familiar for most of today's students. Next, because email can be sent at any time from anywhere, as evidenced by the participant who had email access on her cell phone, it provides a convenient way to communicate. Finally, whereas interactive chat rooms and discussion boards are public forums, email allows students to ask questions without the fear of looking silly in front of their classmates. I found it particularly interesting that students least preferred phone calls and interactive chats. No student elaborated on this in their survey comments, and the two students I interviewed actually liked chat rooms or telephone calls. Perhaps further qualitative research that focused specifically on student preferences for types of interaction might be in order.

### *Student Perceptions of Learning and of Online Interaction*

The results of the study indicate that participants believed they learned more when their interaction with the teacher was high than when they had little interaction with the instructor. For instance, the statement, “I learn more when my teacher offers regular feedback on my progress in the class,” had a very high mean ( $M = 3.86$ ,  $SD = .38$ ), indicating that students generally strongly agreed with this statement. The mean response to the statement, “Interaction with my teacher is important in an online class,” ( $M = 3.71$ ,  $SD = .49$ ) also supports the student perception that student-teacher interaction has a strong impact on learning. Qualitative data also supports this conclusion, such as the statement by one student who called interaction “key in learning.” These conclusions support earlier research by Swan (2002) who concluded that interaction with the instructor leads to higher perceptions of learning.

In contrast, participants in this study provided conflicting results regarding online interaction with their classmates. According to the post-intervention survey, peer interaction did not necessarily equate with learning, as evidenced by the low mean response ( $M = 2.43$ ,  $SD = .79$ ) to the statement, “I learn more when I work in a group.” A similar mean response ( $M = 2.43$ ,  $SD = 1.13$ ) to the statement, “I learn more in online classes that require me to interact with my classmates,” further supported the idea that participants perceived that interaction with classmates does not necessarily support learning, a conclusion that conflicts with earlier work by Swan (2002) and Northrup (2002). This divergence might be attributed to the age and maturity of students, as these previous studies focused on post-secondary online students who were voluntarily pursuing their education and enjoying the online learning experience, as opposed to high school students who were taking a course that was required for graduation. However, in contrast to these more general perceptions, participants seemed to have a positive perception of specific interactions in the course in relation to learning. For example, participants in the post-intervention survey responded with a relatively high mean response ( $M = 3.17$ ,  $SD = .75$ ) to the statement, “I learned more by completing the interactive assignment on absolute monarchs than if we had covered the material with individual assignments.” Additionally, all participants in the post-intervention survey agreed with the statement, “I am more comfortable in this online course thanks to the interaction that I have had with my classmates,” ( $M = 3.29$ ,  $SD = .49$ ), indicating that the peer interaction helped shape a more favorable impression of the course. Certainly, learning and comfort are separate issues, and students perceived the latter without the former. This speaks against traditional teacher wisdom that students learn more when they are comfortable in an educational environment. Further study of the paradoxical statements of students regarding learning versus comfort in school could prove enlightening.

### *Student Performance*

The results of the study showed little connection between the amount of interaction and actual student performance. The  $r$  values indicated the almost complete absence of any statistical relationship between project grades and interactive chat time or number of discussion postings ( $n = 13$ ). The linear correlation between pretest-posttest differences and number of discussion postings ( $n = 7$ ) was moderate, with an  $r$  value of .68. The strongest linear correlation was between pretest-posttest differences and time in the interactive chat room ( $n = 7$ ), with an  $r$  value of -.81. This correlation was interesting because of its inverse nature, alerting us that more research needs to be done on interaction and student performance. In this case, the small sample

sizes of these correlations almost certainly skewed the results and therefore rendered any conclusions one might want to draw suspect.

Analysis of qualitative data indicated that the quality of interaction was more meaningful than the quantity when looking at student performance. The incident of finding a partner for the project demonstrated that some students had difficulty interacting online in even the most basic of tasks. Perhaps not coincidentally, those students for whom I had to match with a partner also had lower project scores. The tendency of students to ignore posted follow-up questions was also enlightening. Students appeared to approach the discussion boards as merely a course requirement to fulfill. They were usually required to post twice, which is what most participants did. After the second posting, they often did not appear to check the discussion again. The participants who did respond to direct questions posted on the board seemed to have a stronger grasp of the material than those who did not. This problem remains an area that I could improve in my online instruction.

### *Limitations*

Sample size was the most important limiting factor in this study. Results may be skewed due to the small size, and certainly no conclusions can be generalized. The initial small size of the class was exacerbated by the failure of almost half the participants to return the post-intervention data collection tools. Additionally, only 2 of the 6 participants asked agreed to be interviewed. Interestingly, this difficulty in collecting data speaks to the topic of interaction. Students received no benefit to their grade by completing the data collection tools. Similarly, I observed very little voluntary interaction on the discussion boards or in the interactive chat room, perhaps indicating that students only interact in a course when they are compelled to by a grading rubric.

An additional limitation was the inability to observe other types of interaction between students beyond discussion boards and the interactive chat room. As mentioned earlier, email was the preferred method of communication for most students, yet this could not be included in the study because of the difficulty in tracking private emails between students. More complete information about email, phone calls, and face-to-face meetings could perhaps provide a clearer picture of interaction in the online environment.

Despite these limitations, however, this action research study did provide the opportunity for me as the instructor to investigate the value of increased interaction in my online courses. With this in mind, I will use the results of this study to increase the quality and quantity of my interactions with students through the use of a virtual office discussion board, increased detailed feedback on assignments, and more opportunities for students to develop and moderate discussion questions based on content. I would also like to see an improvement in the quality of asynchronous discourse that takes place on the content-focused discussion boards.

### *Future Action Planning and Implications*

The more we, as educators, know about how students respond to interaction, the more capable we are to design instruction that takes advantage of these responses. The implications of this study may differ from course to course and discipline to discipline; therefore, sharing the results with the learning community provided an opportunity to discuss how our online program can address student needs. The other members of the online faculty in my district found my

results generally consistent with what they see in their courses and expressed interest in trying to increase interaction through virtual office discussion boards and student moderated discussion.

Our online program relies on students as clients. They are not required to take our courses but choose to take them as an alternative to their traditional school day. In such an environment, student perceptions are particularly important. If students and their parents believe they are learning and are having a positive experience in the online environment, they are more likely to choose to take another online course. By continuing to examine interaction, we can provide students with a richer online learning experience. Opportunities for further research in this area include a closer examination of the connection between motivation and interaction. It would be interesting to see the reasons that students choose to interact in the online environment. By paying attention to interaction, educators can shape online environments that better address student needs.

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