Student-to-Student Interaction in Distance Education Classes: What Do Graduate Students Want?

Gary E. Moore[1], Wendy J. Warner[2] and David W. W. Jones[3]

Abstract

This research sought to determine if graduate students taking distance education classes desire student-to-student interaction. Over 200 graduate students who completed one or more distance education graduate classes in agricultural and extension education from North Carolina State University during the past three years were surveyed. While some students desired student-to-student interaction, the majority of the respondents do not particularly like or want student-to-student interaction. When various sub-groups of the population (disaggregated by gender, personality type, age, work status, and student status) were examined, the results were the same. None of the sub-groups embraced student-to-student interaction in distance education classes.

Keywords: distance education, student-to-student interaction

Introduction/Conceptual Framework

It is widely believed that student-to-student interaction is important in distance learning. This belief was reinforced by Dixson (2010) in the statement, "one of the recurrent themes in the literature is the effectiveness of using collaborative activities, group discussions, and other forms of student-student interaction" (p. 2). In a typical journal article about distance education, one often finds statements such as "the importance of interaction in education is practically a 'given'" (Hillman, Willis, & Gunawardena, 1994, p. 31) and "interaction [is] an essential element to student learning and to the overall success and effectiveness of distance education" (Sher, 2009, p. 103).

What is the basis for the recommendation that student-to-student interaction is important in distance education classes? Many journal articles looking at interaction in distance education reference the work of Chickering and Gamson (1987) or Chickering and Ehrmann (1996). In 1987, Chickering and Gamson identified seven principles of effective teaching practice for undergraduate education. Their seminal efforts were supported by the Johnson Foundation and the American Association for Higher Education. The seven principles grew out of 50 years of higher education research and have been promoted and adopted at many universities. The seven principles included frequent and open communication between faculty members and students, promotion of collaborative student efforts, incorporation of active learning, prompt feedback, efficient use of time, establishing high expectations, and celebrating differences in student learning.

As technology became more commonplace on university campuses, Chickering and Ehrmann (1996) tweaked the seven principles to show how technology could be used to support and enhance these teaching principles. Chickering and Ehrmann (1996) noted technology could

---

[1] Gary E. Moore is a Professor in the Department of Agricultural and Extension Education at North Carolina State University, Campus Box 7607, Raleigh, NC, 27695, gmoore@ncsu.edu.

[2] Wendy J. Warner is an Assistant Professor in the Department of Agricultural and Extension Education at North Carolina State University, Campus Box 7607, Raleigh, NC, 27695, wjwarner@ncsu.edu.

[3] David W. W. Jones is an Associate Professor in the Department of Agricultural and Extension Education at North Carolina State University, Campus Box 7607, Raleigh, NC, 27695, dwjones@ncsu.edu.

strengthen the communication between faculty and students, support and sustain student collaboration, and increase opportunities for active learning.

Along with the work of Chickering and colleagues, Moore (1989, 1993, 2013) is widely cited in distance education literature. He identified three types of interaction believed to be important in distance education courses. These are student-to-content interaction, student-to-instructor interaction, and student-to-student interaction.

A question could be raised about the empirical evidence to support the claim that student-to-student interaction is essential in distance education. The seven principles were developed from research on face-to-face undergraduate classes taught during the 1960s, 70s, and 80s. The students of that era could be different from the students of today. Also, undergraduates are different from graduate students and distance education classes are different than face-to-face classes. Even though the seven principles were tweaked in 1996 to account for technology, the technology of the 1990s is nothing like the technology of today.

A number of educators have suggested empirical research is needed in regards to the efficacy of student-to-student interaction in distance education classes. Liu (2008) asserts "few studies have focused on the student interaction issues in distance education" (para. 3). Grandzol and Grandzol (2010) state there are "conflicting findings and unanswered questions…" (para. 2). Hutchins (2003) found Chickering and Gamson's seminal work was given attention in educational journals and practitioner literature but was "lacking in instructional research" (para. 2). Arbarugh and Hornick (2006) question the applicability of the seven principles to graduate education.

In the research studies examining interaction in distance education classes, student-to-student interaction is typically not isolated from overall interaction. All three of the interactions described by Moore (1993) are collapsed into one variable. Therefore, the results and conclusions might be skewed. The research tends to show interaction is important but which type of interaction? When one collapses student-to-student interaction into an overall interaction score, this detail is lost.

Of the limited number of research studies focusing specifically on student-to-student interaction in distance education classes, the findings are mixed. Bernard et al. (2009) conducted a meta-analysis of previous research and found 10 studies where student-to-student interaction had a large effect size on student learning. However, there were 44 studies that found large effect size for student-teacher interaction and 20 that found the same for student-content interaction. However, Grandzol and Grandzol (2010) found a significant, negative relationship between student-student interaction and course completion rates in six mid-Western community colleges. Kuo, Walker, Belland, and Schroder (2013) found student-teacher interaction and student-content interaction were good predictors of student satisfaction with online courses; however, student-student interaction did not contribute to student satisfaction. Arbaugh and Rau (2007) found learner-learner interaction was negatively correlated with course satisfaction among MBA students. Liu's (2008) qualitative study of distance education students found students liked the convenience of taking distance education courses but did not want to put more time and effort into interacting with other students.

In 2003, Zirkle completed a synthesis of the research on distance education in Career and Technical Education. Zirkle (2003) found a wide variety of distance education topics were examined in the 71 studies, but only two specifically looked at interaction among students (Flowers, 1991; Zirkle, 2002). Flowers (1991) surveyed technology educators and learned, "more respondents preferred learning on their own than preferred learning by interacting with other students" (p. 24). Zirkle (2002) surveyed Trade and Industrial majors and found they rated the statement "isolation from other learners/lack of opportunity for interaction with other students" as a possible barrier for participating in distance education.

A later study in agricultural education examined interaction in distance education classes. Kelsey and D'souza (2004) conducted a case study of graduate students who had completed distance education coursework over a two-year period. The participants recognized their interaction with course instructors to be most beneficial and felt student-to-student interaction was minimally important. Chapman and Henderson (2010) surveyed 64 business educators who taught via distance education and found the respondents to believe "interaction" was important and should be a benchmark for distance education classes but the meaning of "interaction" was not defined.

Numerous distance education research studies have been conducted in career and technical education since Zirkle's work, but none other than the Kelsey and D'souza (2004) paper focused on student-to-student interaction. The scant research on student-to-student interaction in career and technical education has yielded mixed findings.

In addition to looking specifically at expectations regarding student-to-student interaction, it might be prudent to gather more information about characteristics of students enrolled in distance education classes. Different personality types tend to prefer different modes of instruction (Lawrence, 2009). Extroverts enjoy engaging with others, so in the classroom they appreciate social interaction provided by collaborative projects and active learning techniques. In contrast, introverts are more introspective and favor opportunities for internal processing (Felder, Felder, & Dietz, 2002).

Generational differences among learners have been well documented in the literature. Millennials tend to prefer a more team-based and collaborative approach to learning (Oblinger, 2003; Raines, 2002), whereas baby boomers have been accustomed to a more passive approach to learning and rely on instructors to provide information through the use of lecture (Mangold, 2007). The fact that distance learners may be older adults who work full-time and are often part-time students could influence their learning preferences (Huang, 2002; Moore & Wilson, 2005).

Why is it important to examine the delivery of distance education courses? An increasing number of college courses are being delivered via distance. The Sloan Consortium has been tracking online enrollments for the past 10 years (Allen & Seaman, 2013). Between Fall 2002 and Fall 2011, the percent of online enrollment as a percent of total enrollment in colleges and universities had risen from less than 10% to more than 30%. In the last two years college enrollments have remained flat (and actually declined in 2011), but enrollment in distance education classes has continued to climb at a 9-10% annual growth rate. Over 90% of public universities offer online courses and programs. It is clear online learning is growing and is here to stay.

The increasing popularity and enrollment in distance education courses is expected to continue. With the continuing growth in distance education offerings, it is important to critically examine the pedagogical strategies most appropriate in distance education courses.

Theoretical Framework

The theoretical framework for this study is drawn primarily from Vroom's (1964) Expectancy Theory. Basically Vroom suggests people are motivated to act in a certain way based on what they expect the results to be. If students enroll in distance education classes expecting substantial amounts of student-to-student interaction and do not have that experience, they will be less motivated to perform well in class and could drop out of the class (and program). However, if their expectations are met, they will perform at a higher level. Expectations influence satisfaction and performance. Therefore, it is important in distance education classes to ascertain student expectations regarding student-to-student interaction; especially since there are conflicting findings and beliefs.

Instructors of online courses have to consider how their students may be different from the students they teach on campus. Wang and Newlin (2000) assert faculty need to know more about the characteristics of students who enroll in distance education classes. Because little is known about these students, Smith (1997) questions whether instructors can effectively design distance education courses for them. Accordingly, Prosser's 14th Theorem also contributed to the theoretical framework of this research. This theorem states:

> Vocational education will be socially efficient in proportion as in its methods of instruction and its personal relations with learners it takes into consideration the particular characteristics of any particular group which it serves (Prosser & Allen, 1925, p. 207).

Prosser's admonition about knowing the characteristics of the students being taught influenced the inclusion of demographic questions in the instrument.

Purpose and Research Questions

With the increase in distance education, many faculty members in agricultural education can anticipate teaching at least one online course. Because of this, it is important to conduct research on best practices in distance education. Specifically, this study sought to examine graduate students' expectations regarding student-to-student interaction in distance education courses. The study focused on two research questions:

Research Question 1 - What are the expectations of distance education students regarding student-to-student interaction in distance education classes?

Research Question 2 - Is there a difference in the expectations of distance education graduate students regarding student-to-student interaction in distance education classes according to the following dependent variables – Gender, Personality Type, Work Status, Student Status, Generational Classification, and Number of Distant Education Courses Taken?

Methods and Procedures

This research was a descriptive study. Information was gathered from distance education students regarding their expectations in regards to student-to-student interaction.

The population was all students who had taken one of more courses by distance education from the Department of Agricultural and Extension Education at North Carolina State University during a three year period -- the Fall of 2010 through the Summer of 2013. There were a total of 273 unique students enrolled in distance education classes. However, the accessible population was 220 students because valid e-mail addresses were not available for 53 students. These students were typically "visiting" students from other universities who were assigned a temporary university e-mail address so they could access the course materials. After the course was over, the visiting students' university e-mail account was closed. The university did not have a record of the permanent e-mail address for these students because they were not officially North Carolina State University students.

The instrument was developed by the researchers after reviewing the literature for pedagogical practices designed to foster student-to-student interaction in distance education courses. While it would have been preferable to use an existing instrument, none were found that focused specifically on student-to-student interaction in distance education classes. Over 50 statements were generated independently by the researchers after a thorough review of the distance education literature. These statements were then evaluated, combined, and refined by the researchers to develop an instrument with 20 Likert-type statements. The instrument was then

reviewed by five individuals in the university (outside of the department) who had experience in teaching distance education classes and expertise in instrument construction. Two of the expert panelists were specialists in distance education pedagogy who work for the university's distance education division in evaluation. They deemed the instrument to possess content validity.

The instrument was created electronically and was field tested with students who had been enrolled in three distance education classes (animal science, technology education, and family development) during the spring of 2013. As a result of the field test, two items were dropped from the final instrument. To assess the internal consistency of the instrument, Cronbach's alpha was calculated on the field test results. The resulting coefficient was .95, indicating a high degree of internal consistency. The final instrument had 12 positive statements and six negative statements in addition to six demographic questions. The six demographics items asked the student to self-report information such as the year in which they were born, the number of courses they had completed and so forth. The one item in which a judgment was made was personality type. The definitions of the three personality types were given and the students selected the definition that described them the best. Since all of the items on the instrument were specifically designed to look at the construct of student-to-student interaction, a summated mean score was calculated in addition to individual item mean scores.

The instrument was distributed to the accessible population electronically. First a pre-notice was sent, and then the instrument was sent 24 hours later. A 35% response rate was achieved within two days. A reminder was sent ten days later, which boosted the response rate to 46%. One of the problems encountered was the fact that students who graduate can retain their university e-mail address but may never check or use the account. The researchers then searched for alternative e-mail addresses for the non-respondents. A third e-mail was sent to the alternative e-mail address. This effort resulted in a final response rate of 62% for the accessible population.

To ascertain the possibility of non-response error, the 15 first responders were compared with the last 15 responders from the initial two solicitations. Additionally, 15 of the responders from the alternative e-mail solicitation were compared with these two groups. The comparison of early and late responders is advocated by Miller and Smith (1983). The three groups were compared on their mean opinion scores and three demographic variables. No significant differences were found. This signifies the likelihood that non-response error is low.

Results/Findings

Research Question 1 – What are the expectations of distance education students towards student-to-student interaction in distance education classes?

In general, the respondents did not value student-to-student interaction in distance education classes. The mean score for the 18 statements on the instrument was a 2.66, which falls between the *disagree* and *neither agree nor disagree* scales on the instruments. Of the 18 statements on the instrument only five received a rating above 3.0, which is the mid-point, but the ratings were barely above a 3.0. When one realizes it was possible for an item to get a mean score of 5.0 for a strongly agree rating, these ratings were not very positive. The three highest rated statements were "I feel I learn more in a course when I have the opportunity to engage with my peers", "I care about other students in my DE courses", and "Interaction with other students enhances my learning of the content."

There were three items that had ratings near 2.0, which was a *disagree* on the rating scale. It should be noted the two italicized items were negative statements and were reverse coded. The lowest rated items were "I would prefer not having "group work" in distance education classes,"

"The relationships I have established with other distance education students have continued after the class is over", and "I prefer to work alone on assignments."

The responses to each statement are found in Table 1. It should be noted the items were ordered for presentation in this table starting with the items with the highest mean to items with the lowest means. On the instrument the items were in a random order.

Table 1

Expectations of Distance Education Students Regarding Student-to-Student Interaction in Distance Education Classes[1]

Statement	SD	D	Neither A or D	A	SA	M (SD)
1. I feel I learn more in a course when I have the opportunity to engage with my peers.	5	32	37	50	11	3.22 (1.02)
2. I care about other students in my DE courses.	6	17	59	52	1	3.19 (0.83)
3. Interaction with other students enhances my learning of the content.	10	26	44	45	9	3.13 (1.04)
4. I like the chance to read and comment on my classmates' discussion board posts.	10	36	32	49	7	3.05 (1.07)
5. I have better things to do with my time than spending it interacting with other students in the class.	7	41	39	42	6	3.01 (1.00)
6. I think student-to-student interaction should be a high priority for a distance education class.	6	45	39	38	7	2.96 (1.00)
7. I gain a lot from interacting with my classmates.	10	36	44	40	5	2.96 (1.01)
8. I think the value of cooperative learning (students in small groups learning from each other) is overblown in distance education classes.	2	33	30	52	9	2.76 (0.95)
9. It is important for me to feel as if I belong to my classroom community.	0	42	44	31	3	2.74 (1.00)
10. It is important for me to know about the other students in the class.	11	41	30	25	0	2.67 (0.96)

Table 1 (continued)

Expectations of Distance Education Students Regarding Student-to-Student Interaction in Distance Education Classes[1]

Statement	SD	D	Neither A or D	A	SA	M (SD)
11. I enjoy participating in on-line forums, bulletin boards, Google hangouts, Skype and other such approaches that promote student-to-student interaction.	23	42	31	36	2	2.64 (1.10)
12. It is important for me to feel connected to others in my DE courses.	12	41	37	17	1	2.58 (0.89)
13. I only participate in discussion board exchanges if they are a graded component of the course.	0	21	21	66	27	2.27 (0.96)
14. I desire a substantial amount of student-to-student interaction in my DE courses.	19	58	23	8	0	2.22 (0.87)
15. I am more concerned about the course content than participating in a classroom community.	1	19	22	57	36	2.20 (1.01)
16. I prefer to work alone on assignments.	0	14	21	65	35	2.10 (0.91)
17. The relationships I have established with other distance education students have continued after the class is over.	41	62	16	14	2	2.07 (0.99)
18. I would prefer <u>not having</u> "group work" in distance education classes.	2	16	20	46	51	2.05 (1.07)
Grand Mean						**2.66 (0.70)**

[1]*Note*: The questions in italics were negative statements; therefore in calculating the mean score, these items were reverse coded. The higher the mean, the more positive the student is toward student-to-student interaction in distance education classes. SA is *Strongly Agree* and is coded a 5, A is *Agree* and is coded a 4, Neither A nor D is *Neither Agree Nor Disagree* and is coded a 3, D is *Disagree* and is coded a 2 and SD is *Strongly Disagree* and is coded as a 1.

Research Question 2 - Is there a difference in the expectations of distance education graduate students regarding student-to-student interaction in distance education classes according to the following dependent variables – Gender, Personality Type, Work Status, Student Status, Generational Classification, and Number of Distant Education Courses Taken?

The researchers planned on performing multiple regression analysis to determine which demographic factors played a role in influencing the students' views regarding student-to-student interaction. However, when the mean perception scores for each demographic variable sub-category were examined, there were no mean scores that were positive (see Table 2). All scores were in the 2.49 to 2.84 range (a mean score of 3.0 would be neutral). Since the scores were on the negative side of the scale, conducting the multiple regression analysis would be more confusing than helpful. To state that students with characteristics A & B were more positive toward student-to-student interaction when in fact their mean scores were not on the positive side of the scale might lead to unfounded conclusions. Hamlin (1966) warned the profession to not get carried away with statistical analysis that tends to obscure and not to illuminate. The researchers heeded Hamlin's advice.

Table 2

Expectations of Distance Education Students Regarding Student-to-Student Interaction in Distance Education Classes Grouped According to Demographic Variables

Demographic Variable	Mean Expectation Score	SD
Generations		
Millennials (N=82)	2.55	0.67
Gen X (N=34)	2.84	0.71
Boomers (N=9)	2.75	0.73
Gender		
Females (N=89)	2.66	0.65
Males (N=41)	2.64	0.79
Personality Type		
Extroverts (N=37)	2.78	0.63
Introverts (N=44)	2.55	0.72
Ambiverts (N=50)	2.67	0.70
Work Status		
Full-time (N=108)	2.65	0.69
Part-time (N=19)	2.68	0.77
Do not work (N=4)	2.78	0.84
Student Status		
Part-time (N=85)	2.69	0.66
Full-time (N=34)	2.49	0.76
Number of Distance Education Classes Completed		
1-2 Classes (N=14)	2.80	0.73
3-4 Classes (N=31)	2.66	0.66
5 or More Classes (N=86)	2.63	0.62

Respondents were given the opportunity to provide feedback on an open-ended question about student-to-student interaction. The statement was "If you have any comments you want to share with us about distance education classes or specifically about student-to-student interaction in distance education classes we would welcome them." Sixty respondents provided comments.

While most respondents did not value student-to-student interaction in distance education courses, a few respondents felt having the opportunity to engage with others made learning more enjoyable and effective. As one student noted, "I found the student-to-student interaction to be a very valuable part of the course. I took two DE courses at another institution in which NO student-to-student interaction was required and I never really felt like I was part of the class. In my opinion, multiple avenues of engagement greatly enhance the learning environment and overall satisfaction with the course." Another student stated, "I most enjoy learning about the background of my classmates and reading their comments and opinions. Interaction within a class is important to my learning, in my opinion." But there were more statements questioning the value of student-to-student interaction.

Respondents identified several challenges to student-to-student interaction in the online environment. These challenges centered around other demands on time, such as full-time jobs and family responsibilities. Several respondents noted they had elected to take online courses since they "work full-time and I'm busy with my family most of the time I'm not working." Another mentioned, "I don't feel the need to make friends with people that I will never meet and who also have their own very busy lives." These various demands contributed to several students' preference of the "self-paced dynamic." One respondent actually recognized a benefit to the absence of student-to-student interaction and thought "it freed up my time and allowed me to focus on the assignments and learning objectives instead of going crazy getting group work done and contributing to discussion groups."

Multiple students questioned the value of discussion forums. As explained by one respondent, "During my time in distance education, I craved interaction with people and classroom camaraderie but I DID NOT feel that I received this from interaction on message boards/discussion forums." Respondents also voiced dissatisfaction towards using discussion forums as a graded component of courses. One respondent thought requirements mandating a specific number of responses to other postings was a "huge waste (consumption) of valuable time." Someone else felt "the forced interaction of posting mandatory postings in discussion boards leads people to post the required number and that is it."

From the comments of respondents, it was clear students did not like the use of collaborative projects in distance education courses. Many comments reflected a concern about the time commitment and individual efforts towards the finished product. One student found "group projects in DE courses much more difficult than in traditional, on-campus courses...all meetings must occur over the phone, via email or possibly Skype, which does not create the same group dynamics that are created in a face-to-face meeting." Another considered group work to be "too much of a hassle" and "non-enjoyable" when assigned in a distance education course.

Conclusions and Discussion

In general, graduate students in agricultural and extension education classes taught at a distance do not desire student-to-student interaction in their classes. Even though there were some students who tended to be positive about having student-to-student interaction, there were more who didn't. When one disaggregates the data and looks at mean scores for various sub-groups, the same conclusion is reached. Contrary to what the research (Oblinger, 2003; Raines, 2002) says about millennials they did not embrace student-to-student interaction, nor did the extroverts

(Lawrence, 2009; Felder, Felder, & Dietz, 2002). Both males and females had the same less-than-positive views. When the other demographic variables were examined, part-time and full-time students, those who were employed full-time and part-time, and those who had taken more courses, the results were the same – none of the sub-groups had positive perceptions of student-to-student interaction in distance education classes.

In examining the findings in light of the theoretical framework for this study, Vroom's Expectancy Theory, it does not appear student-to-student interaction is a major expectation of the students. Students are satisfied with distance education classes in the absence of student-to-student interaction and seem to prefer it that way. Those educators who cling to the nearly two decades old thoughts of Chickering and Ehrmann (1996) about the need for student-to-student interaction might want to rethink and re-examine their beliefs. The research of Flowers (2001), Kelsey and D'souza (2004), Grandzol and Grandzol (2010), Kuo et al. (2013), Arbaugh and Rau (2007) and Liu (2008) would support the findings of this research.

Prosser's 14th theorem (Prosser & Allen, 1925) about understanding the characteristics of the students appears to be valid. Adult students taking distance education classes are not the same as undergraduate students in face-to-face classes from 50 years ago (the basis for Chickering and colleague's seven principles). Adult distance education students have different wants and needs. This conclusion agrees with the research of Grandzol and Grandzol (2010), Kuo et al. (2013), Arbaugh and Rau (2007), Wang and Newlin (2000), and Liu (2008).

It appears the typical student in a distance education class is an adult with a full-time job and is taking courses part-time. They have family and work responsibilities and see student-to-student interaction as a major time commitment. Their rating of the instrument items and their comments on the open-ended question lead to this conclusion. They do not believe the advantage of having student-to-student interaction outweighs the time commitment.

Overwhelmingly students are more concerned with the course content then they are with building or participating in a classroom community. Students take distance education courses for a variety of reasons. Given that many students work full-time and attend college part-time via distance education, they may prefer independent work and do not want to rely on someone else. If a grade is based on interaction with other students using discussion threads or online group work, then the stress of relying on others increases. With the realization that different students have different needs, learning styles and available time, trying to coordinate meaningful student-to-student interaction may only be increasing the stress on students in the course and not enhancing the learning.

Based upon the findings, one could conclude having extensive student-to-student interaction in a graduate distance education class does not need to be a high priority for the instructor. It is recommended that if a teacher chooses to incorporate student-to-student activities into a class, that it be voluntary. There are some students who do desire and benefit from student-to-student interaction; so they should have the opportunity to engage in those activities. However, for the majority of the students who do not want student-to-student interaction, they should not be forced to engage in those activities.

This study examined one component of the interaction variable, specifically student-to-student interaction. Additional research is warranted to examine students' perceptions regarding the importance of student-to-content interaction and student-to-instructor interaction in distance education courses.

This study did not look at student achievement. While students may prefer a more individualized approach to online courses, it may not always translate into the most robust learning environment. Additional research should examine student performance and comprehension in

courses with a great deal of student-to-student interaction as compared to courses with minimal or no student-to-student interaction.

<div align="center">

References
</div>

Allen, I. E., & Seaman, J. (2013). *Changing course: Ten years of tracking online education in the United States*. Needham, MA: The Sloan Consortium. Retrieved from http://www.onlinelearningsurvey.com/reports/changingcourse.pdf

Arbaugh, J., & Hornik, S. (2006). Do Chickering and Gamson's seven principles also apply to online MBAs? *The Journal of Educators Online, 3*(2), 1-18. Retrieved from http://www.thejeo.com/Volume3Number2/ArbaughFinal.pdf.

Arbaugh, J. B., & Rau, B. L. (2007). A study of disciplinary, structural, and behavioral outcomes in online MBS courses. *Decision Sciences Journal of Innovative Education. 5(*1), 65-95. doi: 10.1111/j.1540-4609.2007.00128.x

Benson, A. D., Johnson, S. D., Taylor, G. D., Treat, T., Shinkareva, O. N., & Duncan, J. (2004). *Distance learning in postsecondary career and technical education: A comparison of achievement in online vs. on-campus CTE courses*. National Research Center for Career and Technical Education. http://eric.ed.gov/?id=ED493603.

Bernard, R. M., Abrami, P. C., Borokhovski, E., Wade, A., Tamim, R., Surkes, M. A., & Bethel, E.C. (2009). A meta-analysis of three interaction treatments in distance education. *Review of Educational Research*, 79(3), 1243–1289. doi:10.3102/0034654309333844

Chapman, B. F., & Henderson, R.G. (2010). E-learning quality assurance: A perspective of business teacher educators and distance learning coordinators. *Delta Pi Epsilon Journal*. 52(1), 16-31.

Chickering, A. W., & Ehrmann, S. C. (1996). Implementing the seven principles: Technology as lever. *AAHE Bulletin*, *49*(2), 3-6. Retrieved from http://www.aahea.org/aahea/articles/sevenprinciples.htm

Chickering, A. W., & Gamson, Z. F. (1987). Seven principles for good practice. *AAHE Bulletin*, *39*(7), 3-7. Retrieved from http://www.aahea.org/aahea/articles/sevenprinciples1987.htm

Dixson, M. D. (2010). Creating effective student engagement in online courses: What do students find engaging? *Journal of the Scholarship of Teaching and Learning*. *10*(2), 1-13. Retrieved from http://josotl.indiana.edu/article/view/1744/1742

Felder, R. M., Felder, G. N., & Dietz, E. J. (2002). The effects of personality type on engineering student performance and attitudes. *Journal of Engineering Education, 91*(1), 3-17. doi:10.1002/j.2168-9830.2002.tb00667.x

Flowers, J. (2001). Online learning needs in technology education. *Journal of Technology Education*, 13 (1), 17-30.

Grandzol, C. J., & Grandzol, J. R. (2010). Interaction in online courses: More is NOT always better. *Online Journal of Distance Learning Administrators*. *13*(2). Retrieved from http://www.westga.edu/~distance/ojdla/summer132/Grandzol_Grandzol132.html

Hamlin, H. M. (1966, September). What is research? *American Vocational Journal. 41*(6), 14-16.

Hillman, D., Willis, D., & Gunawardena, C. (1994). Learner-interface interaction in distance education: an extension of contemporary models and strategies for practitioners. *American Journal of Distance Education*, *8*(2), 30-42, doi:10.1080/08923649409526853

Huang, H. (2002). Toward Constructivism for adult learners in online learning environments. *British Journal of Educational Technology. 33*(1), 27-37. doi:10.1111/1467-8535.00236

Hutchins, H. M. (2003). Instructional immediacy and the seven principles: Strategies for facilitating online courses. *Online Journal of Distance Learning Administrators. 6*(3). Retrieved from http://www.westga.edu/~distance/ojdla/fall63/hutchins63.html

Kelsey, K. D., & D'souza, A. (2004). Student motivation for learning at a distance: Does interaction matter? *Online Journal of Distance Learning Administrators. 7*(2). Retrieved from http://www.westga.edu/~distance/ojdla/summer72/kelsey72.html

Kuo, Y., Walker, A., Belland, B., & Schroder, K. A predictive study of student satisfaction in online education programs. *International Review of Research in Open and Distance Learning. 14*(1), 16-39. Retrieved from http://www.irrodl.org/index.php/irrodl/article/view/1338/2416

Lawrence, G. D. (2009). *People types & tiger stripes (4th ed.)*. Gainesville, FL: Center for Applications of Psychological Type, Inc.

Liu, S. (2008). Student interaction experience in distance learning courses: A phenomenological study. *Online Journal of Distance Learning Administrators*, *11*(1). Retrieved from http://www.westga.edu/~distance/ojdla/spring111/Liu111.html

Mangold, K. (2007). Educating a new generation: Teaching baby boomer faculty about millennial students. *Nurse Educator, 32*(1), 21-31.

Miller, L. E., & Smith, K. L. (1983). Handling nonresponse issues. *Journal of Extension*, *21*(5). 45-50. Retrieved from http://www.joe.org/joe/1983september/83-5-a7.pdf

Moore, G. E., & Wilson, E. B. (2005). Perceptions of graduate students taking on-line and on-campus courses. *Journal of Agricultural Education, 46*(4), 23-35. doi: 10.5032/jae.2005.04023

Moore, M. G. (1989) Editorial: Three types of interaction, *American Journal of Distance Education*, *3*(2), 1-7, doi:10.1080/08923648909526659

Moore, M. G. (1993). Three types of interaction. In K. Harry, M. Hohn, & D. Keegan (Ed.), *Distance education: New perspectives*, (pp. 12-24). London: Routledge.

Moore, M. G. (2013). *Handbook on Distance Education*. London: Routledge.

Oblinger, D. (2003). Boomer, gen-Xers, & millennials: Understanding the new students. *EDUCAUSE Review, 38*(4), 37-47. Retrieved from http://www.educause.edu/ero/article/boomers-gen-xers-and-millennials-understanding-new-students

Prosser, C. A., & Allen, C. R. (1925). *Vocational education in a democracy*. New York: The Century Co.

Raines, C. (2002). *Managing millennials.* Retrieved from http://www.generationsatwork.com/articles_millenials.php

Sher, A. (2009). Assessing the relationship of student-instructor and student-student interaction to student learning and satisfaction in web-based online learning environment. *Journal of Interactive Online Learning. 8*(1), 102-120. Retrieved from http://www.ncolr.org/jiol/issues/pdf/8.2.1.pdf

Smith, K. L. (1997). Preparing faculty for instructional technology: From education to development to creative independence. *Cause/Effect*. *20*(3), 36-44, 48. Retrieved from https://net.educause.edu/ir/library/html/cem/cem97/cem9739.html

Vroom, V. H. (1964). *Work and motivation*. San Francisco, CA: Jossey-Bass.

Wang, A., & Newlin, M. (2000). Characteristics of student who enroll and succeed in psychology web–based courses. *Journal of Education Psychology*. *92*(1), 137-143. doi:10.1037/0022-0663.92.1.137

Zirkle, C. (2002). Identification of distance education barriers for trade and industrial teacher education. *Journal of Industrial Teacher Education*, 40 (1), 20-44.

Zirkle, C. (2003). Distance education and career and technical education: A review of the research literature. *Journal of Vocational Education Research*, 28(2), pp. 161-181