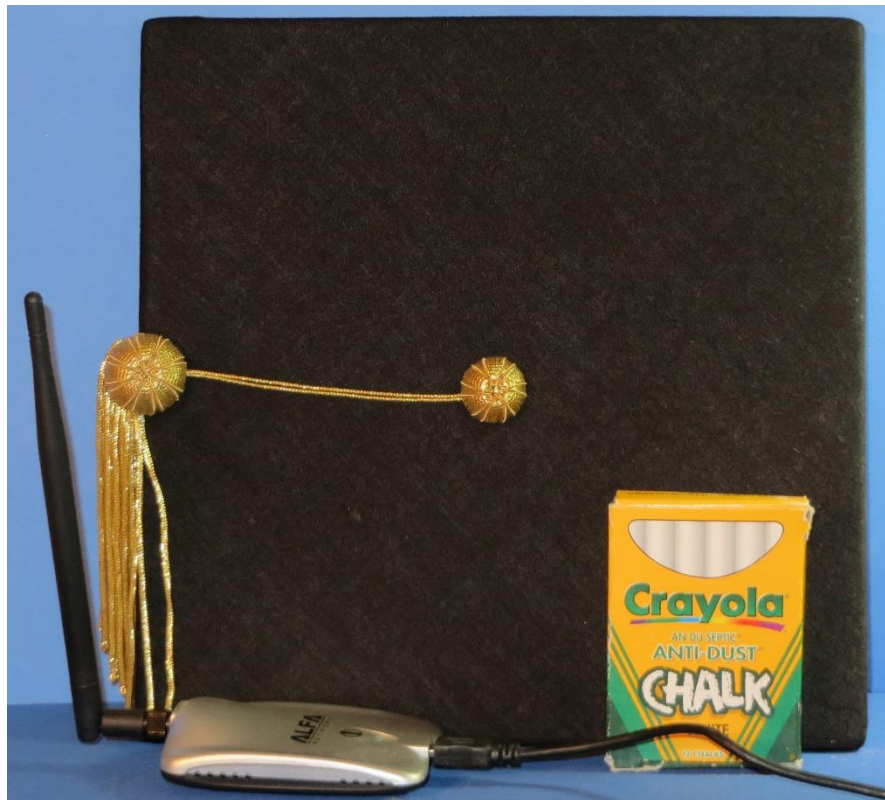


***“Although the most recent data indicates that the growth rate of online course enrollment has decreased to 9.3 percent, the proportion of students enrolled in online courses is at an all-time high of 32 percent.”***



## **A Comparison of Student Performance Between Lower-Division and Upper- Division Business Courses in Online vs. Traditional Delivery Methods**

by T. Brian Smith and Rosalind C. Paige



Peer Reviewed

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## **Abstract**

The purpose of this research was to fill a void in the literature regarding a comparison of student performance between lower-division business courses and upper-division business courses. This study investigates whether a difference exists in student performance of lower-division business courses and an upper-division business courses. Additional integrals were incorporated into the research to compare the outcomes of online and traditional versions of each course. The final grade earned in the course was the comparative measure. To ensure consistency and eliminate performance variation due to “other” factors, the same instructors taught both the online and traditional versions of the courses from which the data was acquired. The data analyzed was from major semester classes of a lower-division core business course and an upper-division course. Analysis of variance and Fisher Exact tests were used for the comparisons. No significant differences were found in student performance in the online and traditional integrals. There was a statistically significant difference in the performance of students in the lower-division course and those in the upper-division course. This performance difference is partially explained by the student population of lower-division courses, which are skewed to lower classmen more likely to drop the course or be dropped from the program. The upper level course grades included in the study are those of junior and mainly senior marketing majors.

## **Introduction**

The increasing popularity of courses offered to students via the Internet utilizing Web-based instructional mechanisms over the last decade indicates the changing face of how education is being delivered in higher education in a broad range of disciplines. Further, online courses have emerged in not only a variety of disciplines but also at nearly all levels of post-secondary education. Lower-division college classes have long shown lower student performance and retention in colleges and universities nationwide (Horn, Peter & Ronney, 2002). This problem is especially evident in required lower-division business courses in which success is a prerequisite for acceptance into business programs (Office of Planning and Research, 2003).

Lower-division and upper-division college courses have been generally accepted in academia as follows: Lower-division courses include 100-level courses in which students are introduced to new terms and concepts and basic information of the course topic and 200-level courses that focus on continued introduction to terms and concepts within a discipline with greater emphasis on understanding connections among those terms and concepts. Upper-division courses include 300-level courses in which the focus is on more specialized terms, concepts, techniques and approaches to a more

narrowly defined topic within a discipline and 400-level courses in which application and analysis of terms, concepts, techniques and approaches are expected student outcomes. Although this is a generic definition, every institution and academic unit will have some overlap of the above characteristics.

Although studies have analyzed the difference in student performance between lower-division business courses and upper-level business courses, there is minimal evidence to demonstrate whether any difference exists between student performance in lower-division business courses delivered online and traditionally delivered lower-division courses. Additionally, a void in the literature reveals a lack of comparison between student performance in online courses in both lower-division business courses and upper-division business courses.

## **Online vs. Traditional Course Effectiveness**

Higher education and how it is delivered and received is being transformed by the Internet. Post-secondary institutions are morphing with different technological configurations of instruction as a result of changing student needs and wants in today's world. While cost and convenience are important motives for pursuing online courses, there may be profound implications on student learning outcomes from these changes.

According to a recent study by the Babson Survey Research Group of more than 2,500 colleges and universities (both non-profit and for-profit institutions), this transformation in higher education is indicated by several factors: student enrollment, defined as enrolled in a minimum of one online course per enrollment period, has increased to a new high of 6.7 million, and nearly 70 percent of academic leaders report that online learning is a critical element in their long-term strategic plans (Allen & Seaman, 2013). Additionally, in 2011, the U.S. Department of Education reported that approximately 90 percent of four-year public colleges included online courses in their curricula (Parker, Lenhart, & Moore, 2011). Although the most recent data indicates that the growth rate of online course enrollment has decreased to 9.3 percent, the proportion of students enrolled in online courses is at an all-time high of 32 percent (Allen & Seaman, 2013).

As online education continues to grow, a persistent question has justifiably been raised regarding the effectiveness and quality of education in online classes relative to those in a traditional classroom. One of the most consistent measures for measuring performance and outcomes of any product or service is the quality of that which is being offered and purchased. Questioning the quality of online education is a justifiable concern. Quality is essential in higher education and is a key element in effectiveness in online instruction in relation to student performance outcomes (Bennett, et al., 2007; Bryant, Kahle & Schafer, 2005).

Currently an extensive and rich body of scholarly investigations has been conducted and will continue to grow regarding the effectiveness of online course delivery and student performance compared to that of traditional, in-class, face-to-face courses. Evidence that a debate exists can be witnessed through the mixed findings in the literature regarding the effectiveness and impact of the mode of course delivery on student performance outcomes (Gerlich & Sollosy, 2011).

On one end of the debate spectrum is a broad consensus among proponents of online learning who defend the efficacy of online instruction and conclude that no significant difference exists between the two instructional modalities (Gerlich & Sollosy, 2011; Jandaghi & Matin, 2009; Werhner, 2010). Included among the most cited studies are the longitudinal meta-analyses of 232 studies (Bernard, Abrami, Lou, Borokhovski, Wade, Wozney, Wallet, Fiset, & Huang, 2004) and 51 studies (Zhao, Lei, Yan, Lai, & Tan, 2005). Over 67 percent of academics rate online courses as equal-to or better than traditional face-to-face instruction (Allen & Seaman, 2013). Further, a study by the U.S. Department of Education in 2009, in which over 1,000 studies conducted between 1996 and 2008, reported that, on average, student performance was better in online courses than in traditional, face-to-face courses (Feintuch, 2010; Means, Toyama, Murphy, Bakia, & Jones, 2009).

These studies reflect a change in perception from the findings of a 2000 National Education Association study that found online teaching to be less effective (Nielsen, 2008). Robust negative outcomes were also discovered between the two methods of instruction by Xu & Jaggars (2013) in which an extensive database of nearly 500,000 courses in community and technical colleges was examined, thereby providing a contradiction in the literature. In a similar study, Xu & Jaggars again discovered a significant negative impact on course grades in online courses (Xu & Jaggars, 2013).

The Association to Advance Collegiate Schools of Business (AACSB) includes accreditation mandates with a strong push for business schools to invest in technology, including online instructional technology. Deans of AACSB-accredited business schools rate technology-driven instruction in the classroom higher than their counterparts in non-accredited business schools (Kemelgor, Johnson, & Srinivasan, 2000).

Within the business discipline literature the research findings are also mixed. A stream of research chronicles a general difference between students' performance in lower-division business courses with that of upper-division business courses in the traditional course format only. However there is a void in the literature investigating how students specifically perform in online lower-division business courses versus in a traditional classroom format. For the purposes of this paper a lower-division course is a lower-division course in the business college of the university from which this study was conducted. Throughout this paper the business college will be identified as UJC. There is some evidence that the gap in student performance in upper-division classes is narrowing, including accounting and the more rigorous disciplines (Jones, Moeeni, and Ruby, 2005). The results of a recent three-year comparison between lower-division and

upper-division accounting courses were inconclusive regarding any difference in the efficacy of delivery method and student outcomes (Chen, Jones, & Moreland, 2013).

Continuing to look at the various individual business disciplines, in economics courses, the findings are mixed. Several studies showed no negative impact on student outcomes in online versus traditional courses (Bennett, Padgham, McCarty & Carter, 2012; Hernandez-Julian & Peters, 2012), and yet others discovered significant differences between the two course venues (McCarty, Bennett & Carter, 2013). For marketing, Priluck (2004) found no difference in student performance between the two modes of instructional delivery, while another study by Smith and Stephens (2010) revealed that upper-division students perform better in online courses. Several studies focused on upper-division management courses revealed no significant differences in student performance between the two delivery methods (Gerlich & Sollosy, 2011; Wilson & Allen, 2011). In both business statistics and MIS courses, no significant differences in student performance were found between the two teaching modalities (Kartha, 2006; McFarlan & Hamilton, 2005/2006).

## **Purpose of the Study**

The purpose of this study was to examine the differences, if any, between student performance in online courses versus traditional, in-class, face-to-face classes. Further, this study went beyond the initial generalities of comparing the two modes of delivery and more specifically examined the difference in student performance between a lower-division business core course and an upper-level course for students after acceptance into a business program. The primary research questions were:

1. Do students perform better in online courses than they do in traditional business courses?
2. What difference, if any, exists between students' performance in lower-division business courses than that in upper-division business courses in online versus traditional business courses?

## **Methodology and Hypotheses**

Data were extracted from a database taken from a sample of 645 students pursuing a business degree in four different classes at a Division II state university throughout a 15-week semester in an AACSB accredited college of business and economics which will be referred to as USJ. Specifically students were from two sections of two distinctly different business courses: a core lower-division business course, Introduction to Business Information Systems, taught to students who had yet to be accepted into the business school and an upper-division business course, Consumer Behavior, whose students had been accepted into the business school. Both of these courses were taught via the two comparative modes of delivery for the purpose of the

study: traditional (or face-to-face) with the physical presence of an instructor 100 percent of the time versus online with an instructor having no physical presence who communicated with students through email or web-based instructional technology, chat room, or discussion boards.

To test our hypotheses, the data from 439 students in the traditional lower-division course were analyzed, along with 155 students in the online venue of the same course. For the upper-division course, data from 33 students in the traditional manner of delivery was used alongside 18 students in the same online class.

The primary focus of this study, to examine the efficacy of online course delivery compared with traditional classroom delivery, warranted certain control measures to be maintained for the analysis. Specifically, there were two instructors involved; the same instructor taught each of the two lower-division classes while a second instructor taught both of the upper-division courses. Both instructors were aware of the research objectives, questions, and hypotheses prior to the beginning of the semester. This awareness helped the instructors to purposefully maintain a focus on precise consistency among all aspects of the online and face to face course delivery methods. This consistency assured greater accuracy of the final results.

Each instructor utilized the same course requirements in their traditional and online courses. The online lower-division course was managed using the Blackboard Learning System (BLS) software. Audio/visual lectures supplemented with instructional computer desktop content were delivered live using Adobe's Pro Connect software.

Multiple mechanisms for student/instructor engagement were utilized during lecture and including two-way audio, chat, and a Q&A box which allowed students to post questions anonymously during class. Classes were also recorded. Supplemental instruction was pre-recorded using Camtasia screen recording and video editing software. All recorded content was stored as Flash or MP4 video files on a media-enabled university server with content accessible 24X7 to students for the duration of the semester or per instructor directive.

There were three "in-semester" exams which were delivered using the BLS software and a final exam delivered in a traditional classroom setting. The online exam questions and responses were both scrambled with a time-limit and were presented to the student one question at a time. Attendance credit was awarded to encourage active and consistent participation in the lower-division course's virtual class.

Content coverage in the traditional lower-division classes was identical to that of the online classes. Variances were: 1) the delivery methodology: oral instruction and student engagement were delivered in a traditional classroom setting, rather than electronically, and 2) assessment: traditional classroom exams were taken in a controlled classroom environment without access to reference or note materials, while students in the online classes took their exams via BLS with no such possible restriction. In both classes the final exam was given in a traditional classroom setting without access to reference or note materials.

The upper-level, online course was also delivered using the Blackboard (BLS) platform. Through BLS, students had access to the same Power Point presentations provided in the traditional class, yet engaged in live chat rooms that were recorded for the purpose of listening at more convenient times. The audio and recorded presentations and chat rooms focused on a discussion of identical required readings and answering specific questions posed by the instructor. Attendance in online chat rooms was graded based on the quality and relevance of student comments. Exams were taken online using the aforementioned control measures in the lower-division classes. The delivery of course content in the traditional upper-division classes mirrored that in the online courses, except that the instructor orally presented the material and PowerPoint presentations, moderated the discussions, and administered hard copies of the exams in person.

The instruments used to compare student performance were the same in each type of class delivery: Both the lower-division and upper-division course exams consisted of objective and subjective questions. Another control element for the analysis was administering exams with identical questions and formatting with equal amounts of time to finish the exam, whether they were enrolled in the online or the traditional classroom. The timed aspect of the assessments was critical in decreasing students' use of a textbook or peer collaboration while taking exams online and to underscore the importance of knowing the material prior to the exam rather than depend upon textbook or peer assistance which would use up time in a finite period. Additionally, the online exam questions, although identical, were presented one question at a time and scrambled among students. Responses to each question in the online exams were also randomly presented. No non-response took place in any of the exams.

The common elements between the traditional and online lower-division classes were assessment and assignments. Variability was in delivery methodology and control mechanisms. The primary focus of the analysis was a comparison of class performance using final grades as the dependent variable. Based on the previous longitudinal studies documented in the literature that the mode of delivery bears no difference in student outcomes, the following hypotheses were developed:

- H1: In the lower-division business courses, there will be no significant difference in final grades between online and traditional courses.
- H2: In the upper-division business courses, there will be no significant difference in final grades between online and traditional courses.
- H3: Between the lower-division and upper-division business courses, there will be no significant difference in final grades between online and traditional courses.



## Limitations

The following limitations were taken into consideration in the interpretation of the data: This study was exploratory rather than conclusive, in that only two courses were investigated at USJ. And although the courses fulfilled the comparative categories of a lower-division business course and an upper-division business course, the two courses were not identical in content: Business Information Systems (a lower-division course) and Consumer Behavior (an upper-division marketing course). The sizes of the two courses in focus also differed with the lower-division business course having a larger sample of students than in the upper-division business course. The sample was a convenience sample drawn from one university, thereby limiting the generalizability of the study's results. Finally, many business schools apply selection criteria to limit student admissions to major status to those most likely to succeed in a business major. USJ was no exception, imposing acceptance criteria in terms of minimal GPA acceptance and minimal performance levels on a select group of courses (English 101 and 102, Speech, Calculus, Economics, Accounting I). It did not impose a minimal GPA across all lower-division core business courses. There was, however, an implied expectation within USJ that lower-division courses should offer sufficient academic rigor to prepare students for the upper-level courses. As a result overall performance in the lower core classes trended lower due to the inclusion of grades of students who ultimately dropped or were dropped from the program. And finally because this was a one-time study and not a longitudinal study that would provide extensive sample data, we were unable to adjust for inter-faculty grading differences.

## Results

Hypothesis One (H1) focused on lower-division business student performance and investigated the variable of the venue of instruction (online vs. traditional) and student performance as evidenced in their final grades. The hypothesis tested the underlying question: In lower-division business courses, will there be a significant difference in final grades between students enrolled in online and traditional courses. Analysis of variance results shown in Table 1 (below) of the final grade scores revealed no significant difference in the final grades of the web vs traditional students with  $F(1,593) = .025, P=.875 > .05$ . There were no issues with kurtosis or skew in the data.

Table 1  
**Group Summary Details ANOVA Lower-Division**

Group	Number	Mean Grade	Standard Deviation
Web	155	1.929	1.264
Traditional	438	1.946	1.162



At UJC a passing grade for lower-division business courses is D or higher. A Fisher's exact test was used to analyze a 2X2 contingency table shown below to determine if there was a difference in the pass/fail rate of online vs. traditional lower-division courses. Test results indicated there were significant differences in the pass/fail rate of the two types of the lower-division course with a one-tailed  $P = .0282 < .05$ . Students were more likely to fail if they took the online version of the lower-division class. The pass/fail difference of the two course types is significant and perhaps warrants further study as to what the underlying cause is. This does not suffice as reason to reject the null hypothesis  $H_1$  because there is no overall significant difference in raw grade distribution.

Table 2  
**Contingency Table for Lower-Division**

Course	Grade	Actual	Expected
Web	D or Higher	125	132.78
Traditional	D or Higher	383	375.22
Web	F	30	22.22
Traditional	F	55	62.78

The second hypothesis ( $H_2$ ) examined the upper-division course and whether students performed differently in online versus traditional classes. The  $H_2$  hypothesis is that In upper-division business courses there will be no significant difference in final grades between online and traditional courses. Analysis of variance of the final grade scores of the upper-division course does confirm this hypothesis. (See Table 3 below.) No significant difference was found in the final grade scores of students of the online course and the traditional course with  $F(1, 51) = .104, P = .749 > .05$ . Again there were no issues with kurtosis or skew in the data.

Table 3  
**Group Summary Details ANOVA Upper-Division**

Group	Number	Mean Grade	Standard Deviation
Web	18	2.444	.784
Traditional	33	2.348	1.121

A Fisher's exact test of contingency shown in Table 4 (below) indicated no significant differences in the pass/fail rate of the two types of the upper-level course with one-tailed  $P=.606 > .05$ .

Table 4:  
**Contingency Table for Upper Division**

Course	Grade	Actual	Expected
Web	C or Higher	15	14.82
Traditional	C or Higher	27	27.18
Web	D or Lower	3	3.18
Traditional	D or Lower	6	5.82

Finally, for Hypothesis Three (H3) the focus was on determining a difference between student performance in the two instructional methods and the level of the course, lower-division and upper-division, after acceptance into a business program. There was not enough data to do a class type interval analysis of the two courses. However an analysis of variance of the final grade scores of the lower-division and upper-level course revealed a statistically significant difference in the performance of students from the two courses with  $F(1,644) = 6.593, P=.010 < .05$ . (See Table 5 below.)

Table 5  
**Group Summary Details ANOVA Lower-Division vs.  
 Upper Division**

Group	Number	Mean Grade	Standard Deviation
Lower Division	594	1.942	1.189
Upper Division	51	2.382	1.008

A Fisher's exact test was run for the two types of online and traditional courses. (See Table 6 below.) Comparison of the online lower and upper division course grades revealed no statistically significant difference in the pass/fail rates with a one-tailed  $P=.538>.05$ . Comparison of the traditional lower and upper division course grades also revealed no statistically significant difference in the pass/fail rates with a one-tailed  $P=.244>.05$ .

Table 6  
**Contingency Table for Lower Division vs  
 Upper Division Course**

Online Course	Grade	Actual	Expected
Lower-Division	D or Higher	125	125.43
Upper-Division	C or Higher	15	14.57
Lower-Division	F	30	29.57
Upper-Division	D or Lower	3	3.43
Traditional Course	Grade	Actual	Expected
Lower-Division	D or Higher	383	381.27
Upper-Division	C or Higher	27	28.73
Lower-Division	F	55	56.73
Upper-Division	D or Lower	6	4.27

In summary: students in the upper-division courses on average performed better than lower-division course students, with  $F(1,644) = 6.593, P = .010 < .05$ . Reasons for the ANOVA analysis results include but are not limited to: 1. The student population of lower-division courses are skewed to lower classmen and therefore include the grades of students who ultimately dropped or were dropped from the program. 2. The upper-division course grades are those of junior and mainly senior marketing students already accepted into the program. Based upon the results of the ANOVA analysis we reject the null hypothesis ( $H_3$ ) that between the lower-division and upper-division business courses there will not be a difference in final grades. A Fisher's exact test of Pass/Fail rates for lower-division and upper-division courses reveal no statistically significant difference in the pass/fail rates for either online or traditional courses.

## **Discussion and Recommendations for Future Research**

U.S. business colleges are making tremendous investments in classroom instructional technology to meet the growing demand for a new generation of students attempting to earn a degree while working and/or raising a family. Enrolling students in online courses in colleges and universities eliminates some of the barriers to earning a higher education, such as location, time, and cost, which may fuel a continual increase in demand for online education. This study set out to contribute to the literature in regard to the continuing academic dialogue about the effectiveness of online course instruction and student performance, specifically between lower and upper-division business courses.

Even though this study was conducted at one university, the results of this study do contribute to the larger, ongoing discussion about the efficacy of online course delivery versus traditional face-to-face course delivery. These results can be generalized to other similar business schools in higher education who are considering the addition of online instruction for their programs. Although this study yields more evidence in the debate over the efficacy of online course delivery, additional research appears warranted in other institutions and business courses and between lower and upper-division business courses.

This study contributes to the literature debate that supports the position that no significant difference appears in student performance between online and traditional courses. In this particular case nearly identical results in performance were demonstrated in the two types of both the lower-division systems course and the upper-level marketing course. There was a statistically significant difference in the overall student performance between the lower and upper-division business courses at USJ.

Future research is recommended using a larger sample size and one that is more equitable in size between the two levels of courses being investigated. Additional research is recommended to investigate more specific demographic variables such as

gender, ethnicity, and age (traditional versus non-traditional students). Beyond undergraduate education, further research is recommended to add to the discussion of online course efficacy in graduate business courses.

## References

- Allen, I.E., & Seaman, J. (2013). *Changing Course: Ten Years of Tracking Online Education in the United States*.
- Bennett, D.S., Padgham, G.L., McCarty, S.C. & Carter, M.S. (2007). Teaching Principles of Economics: Internet vs. Traditional Classroom Instruction. *Journal of Economics and Economic Educational Research*, 8(1), 21-31.
- Bernard, R., Abrami, P., Lou, Y., Borokhovski, E., Wade, A., Wozney, L., Walseth, P., Fiset, M., & Huang, B. (2004). How Does Distance Education Compare with Classroom Instruction? A Meta-Analysis of Empirical Literature. *Review of Educational Research*, 74, 379-439.
- Bryant, S., Kahle, J., & Schafer, B. (2005). Distance Education: A Review of the Contemporary Literature. *Issues in Accounting Education*, 20(3), 255-272.
- Chen, C.C., Jones, K.T., & Moreland, K.A. (2013). Online Accounting Education versus In-Class Delivery: Does Course Level Matter? *Issues in Accounting Education*, 28(1), 1-16.
- Feintuch, H. (2010). Keeping Their Distance. *Diverse Issues In Higher Education*, 27(3), 20.
- Gerlich, R.N. & Sollosy, M. (2011). Comparing Outcomes Between a Traditional F2F Course and a Blended ITV Course, *Journal of Case Studies in Education*, 1-9.
- Hernandez-Julian, R., & Peters, C. (2012). Does The Medium Matter? Online versus Paper Coursework. *Southern Economic Journal*, 78(4), 1333-1345.
- Horn, L., Peter, K., & Rooney, K. (2002). *Profile of Undergraduates in U.S. Postsecondary Institutions: 1999-2000* (NCES 2002-168). U.S. Department of Education, National Center for Education Statistics. Washington, DC: U.S. Government Printing Office.
- Jandaghi, G., & Matin, H.A. (2009). Achievement and Satisfaction in a Computer-Assisted Versus a Traditional Lecturing of an Introductory Statistics Course. *Australian Journal of Basic and Applied Sciences*, 3(3), 1875-1878.
- Jones, K., Moeeni, F., & Ruby, P. (2005). Comparing Web-Based Content Delivery and Instructor-Led Learning in a Telecommunications Course. *Journal of Information Systems Education*, 16(3), 265-271.

- Kartha, C.P. (2006). Learning Business Statistics: Online vs. Traditional. *The Business Review* 5(1), 27-32
- Kemelgor, B., Johnson, S., & Srinivasan, S. (2000). Forces Driving Organizational Change: A Business School Perspective. *Journal of Education for Business*, 75(3), 133-137.
- McCarty, C., Bennett, D., & Carter, S. (2013). Teaching College Microeconomics: Online vs. Traditional Classroom Instruction. *Journal of Instructional Pedagogies*, 11, 1-13.
- McFarlan, D., & Hamilton, D. (2005/2006). Factors Affecting Student Performance: Online versus Traditional Course Delivery. *Journal of Computer Information Systems*, 46(2), 25-32.
- Nielsen, S.M. (2008). "Half Bricks and Half Clicks": Is Blended Onsite and Online Teaching and Learning the Best of Both Worlds? COERC 2008 – *Proceedings of the Seventh Annual College of Education Research Conference*, 105-110. Miami, FL: Florida International University.
- Office of Planning and Research (2003). *Retention of Northern Arizona University's Fall 2002 Freshman Class: Survey of the Non-Retained Freshmen*. Unpublished Technical Report. Flagstaff, AZ: Northern Arizona University. Retrieved from <http://www2.nau.edu/~facdev-p/TR/Factors.pdf>
- Parker, K., Lenhart, A., & Moore, K. (2011). *Online Learning 101*. U.S. Department of Education.
- Priluck, R. (2004). Web-Assisted Courses for Business Education: An Examination of Two Sections of Principles of Marketing. *Journal of Marketing Education*, 26(2), 161-174.
- Smith, D.F. & Stephens, B.K. (2010). Marketing Education: Online vs. Traditional. *Proceedings of ASBBS Annual Conference*, Las Vegas, NV, 17(1). Retrieved from <http://asbbs.org/files/2010/ASBBS2010v1/PDF/S/SmithD.pdf>
- Wherner, M.J. (2010). A Comparison of the Performance of Online Versus Traditional On-Campus Earth Science Students on Identical Exams. *Journal of Geoscience Education*, 58(5), 310-312.
- Wilson, D., & Allen, D. (2011). Success Rates of Online versus Traditional College Students. *Research in Higher Education*, 14, 1-9.

Xu, D., & Jaggars, S.S. (2013). *Adaptability to Online Learning: Differences Across Types of Students and Academic Subject Areas*, (CCRC Working Paper No. 54) New York, NY: Columbia University, Teachers College, Community College Research Center. Retrieved from <http://ccrc.tc.columbia.edu/media/k2/attachments/adaptability-to-onlinelearning.pdf>

Xu, D., Jaggars, S.S. (2013). The Impact of Online Learning on Students' Course Outcomes: Evidence From a Larger Community and Technical College System. *Economics of Education Review*, 37, 46-57.

Zhao, Y., Lei, J., Yan, B., Lai, C., & Tan, H.S. (2005). What Makes The Difference? A Practical Analysis of Research on the Effectiveness of Distance Education. *Teachers College Record*, 107, 1836-1884.

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