# The Relationship between Gender and Academic Success Online

Lori Kupczynski, Ed.D., Texas A&M University-Kingsville

Michelle Brown, Ed.D., Walden University

Glenda Holland, Ed.D, Texas A&M University

Brian Uriegas, Ed.D.,

## Abstract

Distance learning may pose challenges to students in terms of satisfaction and academic success. This study examined the relationship between the final grade received in a distance learning course and the student characteristic of gender. Examined were differences in online course achievement between male and female students through the lens of identity theory. The sample included 959 education majors at a regional university. Simple main effect tests were conducted after assumption tests for the planned analysis of covariance were not met. Findings indicated that for students with lower overall GPAs, there were differences in online course achievement between male and female education majors. For students with mid-level and higher overall GPAs, no differences existed.

**Keywords:** Online learning, Distance learning, Technology, Online Course Achievement, Identity Theory

## INTRODUCTION

Past studies examining distance learning have demonstrated that it is, in many respects, different from traditional learning. These differences and the ways in which they manifest affect student success and satisfaction (Shachar & Neumann, 2003). Although it is known that these differences do exist, the exact nature of these differences and how they are created, and therefore controlled, remain insufficiently researched and identified (Yukselturk & Bulut, 2007). Specific factors inherent to each course, such as the course structure, the instructors themselves and their characteristics, the chosen instructional design, and the instructional support system, have all been acknowledged as playing a role in student satisfaction and success (Council for Higher Education Accreditation, 2002).

 Furthermore, many specific characteristics of individual students themselves, such as gender, age, race, learning style, and overall GPA, have been noted to be a part of student success in the online classroom puzzle (Council for Higher Education Accreditation, 2002). Merely establishing what factors may or may not affect student engagement, participation, and success within online classrooms is insufficient, but rather how each piece fits together to form a part of the larger picture must be determined (Yukselturk & Bulut, 2007).

### Purpose of the Study

The purpose of the current study was to compare, across genders, the academic success in an online course for education majors. The study was conducted at a regional institution in South Texas, serving a diverse student population of approximately 6,200 students. Grounded in

identity theory, this study examined differences in online course achievement between gender groups for 959 education majors at the university.

## Theoretical Framework

Social identity theory was first proposed by Tajfel and Turner in the late 1970s and early 1980s for the purposes of explaining group behaviors. Tajfel (1981) defined social identity as "that part of an individual's self-concept which derives from his knowledge of his membership of a social group (or groups) together with the value and emotional significance attached to that membership" (p. 255). Related to social identity theory is the concept of identity which is based on self-categorization, wherein persons within social structures assign labels to others and themselves as a manner of recognizing each other as occupants of specific roles (Stets & Burke, 2000). Roles are basic, stable components of structured society that are culturally defined and learned (Stets & Burke, 2000). Herein, gender serves as the self-identification of one's self as male or female. Central to the concept of identity is the incorporation of the meanings and expectations associated with a self accepted role. This process of self-labeling, acceptance and incorporation guides behavior (Stets & Burke, 2000). Labels, roles, meanings and expectations are set by the structured society and culture. Gender identity, as defined by society and culture, determines everything from what color a nursery should be to what type of television a person should prefer (Trepte, 2006). It has been noted that aspects of identity play a large role in the actualization of educational goals and should be engaged in order to foster student success (Schachter & Rich, 2011).

## REVIEW OF LITERATURE

Despite evidence which suggests that student learning skills and informational processing differ based on gender due to both biological and social constructs, studies examining the effects of

gender on success in the online classroom have been largely inconclusive (Yukselturk & Bulut, 2007). One such factor may be how gender works in concert with course design and the operating software's ease-of-use, as males and females tend to interact with technology in different ways that, in turn, affect how they interact and behave within the online classroom (Arbaugh, 2000). Primarily, men and women interact with technology in ways that are dependent on their attitudes and perceptions of computers and technology, which in turn may be influenced by their male/female identity and the prescribed view of how specific genders interact with technology (Arbaugh, 2000; Blum, 1999; Trepet, 2006). Some researchers have suggested that women's participation in e-learning and in online discussions is directly related to their comfort level with computers and the software being utilized to host the online course which may also be compounded by generalized learning insecurities (Johnson, 2011; Blum 1999). Since males tend to use computers more frequently and have a more positive attitude towards them, they may have an advantage over females in the online classroom solely based on their comfort level with computers (Ashong & Commander, 2012). However, it must be noted that some researchers have posited that gender based access and computer literacy level problems are becoming less prevalent to the point of extinction (Anthony, 2012).

In addition to differences related to comfort levels, men and women generally tend to communicate differently. These differences are so important that linguistic constructions are considered to be indicators of one's identity (Ochs, 1993). As males and females communicate differently in face-to-face interactions, they may communicate via online communications, such as those necessary to varying degrees in online courses, very differently as well (Arbaugh, 2000, Blum 1999, Xu & Jaggers, 2013). In general terms, males tend to approach online learning and internet-based communication as a cost-effective means to education. Their communications

tend to be more competitive and result in systems where some are ranked higher than others leading them to access fewer discussion forum posts than their female counterparts and less dialogue (Arbaugh, 2000; Xu & Jaggers, 2013). Contrastingly, women tend to view online communication as an opportunity to expand the collaborative circle and create dialogue—learning as a social experience rather than a competition - and are generally more adept at online communication (Arbaugh, 2000; Xu & Jaggers, 2013). As distance learning necessitates active motivated self learning in which the student relies on the instructor as a tutor, feminine communications may be more adept in the online learning environment (González-Gómez, Guardiola, Rodríguez, & Alonso, 2013). Additionally, some research has suggested that women may actually hold a preference for online learning because the online pedagogy is more collaborative and allows for more sharing and interaction than regular face-to-face classrooms (Blum, 1999) This gendered difference extends to Internet usage in general as males are more exploration oriented and females tend to be more social and communication oriented online (Ashong & Commander, 2012). However, some research has indicated that when controlling for grade point average and internet experience, there were no significant differences in the level of participation in online discussion forums based on gender (Anthony, 2012) Furthermore, while male students do tend to make more and longer contributions to discussion forums than female students, female student contributions were more interactive, leading to more discussion (Anthony, 2012) These differences tend to allow for women to experience a more connected and satisfying online learning experience as research has noted that female students tend to find e-learning more satisfying than male students (González-Gómez, Guardiola, Rodríguez, & Alonso).

Some researchers, however, have found that the online classroom environment can be openly hostile towards females as communication differences lead to dominant students, usually males, overtaking discussions and likely making negative rather than constructive comments and even resorting to sexualized joking (Johnson, 2011; Blum, 1993). It has been suggested that courses promoting collaboration and student interaction may be more beneficial to female students and may improve their attitudes towards online learning as these course structures are more likely to allow women to play to their strengths (Arbaugh, 2000).

Ultimately, the inconclusive nature of past research examining gender differences in online learning suggests that success for men and women in the online classroom is largely based on how varying attitudes and approaches characteristic of male/female gender identity interact with other factors such as course design, instruction style, and the course hosting software, as well as individual attitudes and personalities.

## Research Question

The study was guided by the research question:

> For Education majors, what is the relationship between student gender and achievement in an online course, holding constant the cumulative GPA of students?

## METHODS AND PROCEDURES

### Population and Sample

A sample of 959 education majors was drawn from the available student population of just over 1,000 education majors at a Hispanic-serving institution in South Texas. Of the total sample, 69% were female and 31% were male. Ethnically, the college reflects the demographics of the surrounding area, and the sample was 64% Hispanic, 28% White, and 8% classified as Other in terms of ethnicity. The sample participants were education majors who had taken an online course the semester of the study. The study sample included all available participants ($N = 959$).

### Research Design

This quantitative study utilized a comparative design, in which comparisons on the dependent variable (online course grade) were made across groups that were based on the variable of interest (gender). For this study, student gender groups were compared in terms of academic success achieved in an online course. The planned data analysis included descriptive statistics and analysis of covariance (ANCOVA) to determine whether relationships existed between the gender of students and online course grades, holding constant the cumulative GPA of the students.

### Data Collection and Analysis

After approval to collect data was received from the institution, we collected the variables of interest, including online course grades, cumulative GPA, and student gender. The data were collected for 959 education majors at the university. A one-way analysis of covariance (ANCOVA) was planned to examine the question under study. The independent variable, gender, included two levels: female and male. The dependent variable was the course grade

received in the online course (F = 1; D = 2; C = 3; B = 4; A = 5). Cumulative GPA served as the covariate in order to partial out the effects of students' overall achievement.

## RESULTS

### Descriptive Statistics and ANCOVA Assumption Test Results

For the overall sample, male students had slightly higher online course grades ($M = 4.64$, $SD = .933$) than female students ($M = 4.55$, $SD = .958$). A preliminary analysis was conducted to test the homogeneity of slopes between the covariate and the dependent variable across groups, which is an assumption underlying ANCOVA. The assumption test indicated that the relationship between cumulative GPA and the online course grade differed significantly as a function of gender, $F(1, 955) = 8.87$, $MSE = .540$, $p = .003$, partial $\eta^2 = .009$. Therefore, the assumption of homogeneity-of-slopes was not met, meaning the interaction effect was significant. Based on the results of the assumption test, the ANCOVA was not conducted, and instead, simple main effect tests were conducted to assess differences among gender groups at low ($25^{th}$ percentile), medium ($50^{th}$ percentile), and high ($75^{th}$ percentile) values on the covariate. A $p$ value of .017 (.05/3) was required for significance for each of the tests.

### Results of Simple Main Effect Tests

The simple main effects test was significant for the low GPA group, $F(1, 955) = 7.45$, $p = .006$, partial $\eta^2 = .008$. For students at the lower end of overall GPA, there was a significant difference between the online course grades received for females ($M = 4.08$) and males ($M = 3.86$).

Table 1

*Estimates for Low GPA Group (Dependent Variable: Official Grade)*

| Gender | Mean | Std. Error | 95% Confidence Interval | |
|---|---|---|---|---|
| | | | Lower Bound | Upper Bound |
| Female | 4.082[a] | .036 | 4.011 | 4.152 |
| Male | 3.863[a] | .072 | 3.722 | 4.003 |

*Note.* a. Covariates appearing in the model are evaluated at the following values:

Cumulative GPA = 3.00.

Table 2

*Univariate Tests for Low GPA Group (Dependent Variable: Official Grade)*

| | Sum of Squares | *df* | Mean Square | *F* | Sig. | Partial Eta Squared |
|---|---|---|---|---|---|---|
| Contrast | 4.025 | 1 | 4.025 | 7.451 | .006 | .008 |
| Error | 515.817 | 955 | .540 | | | |

*Note.* The *F* tests the effect of Gender. This test is based on the linearly independent pairwise

comparisons among the estimated marginal means.

In contrast, the simple main effect tests failed to be significant for the mid-GPA group, $F(1, 955)$

$= 1.14$, $p = .286$, partial $\eta^2 = .001$ or for the highest GPA group, $F(1, 955) = .924$, $p = .337$,

partial $\eta^2 = .001$. For students at the central level for overall GPA, females received slightly

higher online course grades (female $M = 4.59$; male $M = 4.53$), but the difference between the

groups was not significant. For the high GPA group, males received higher online course grades

(female $M = 4.94$; male $M = 5.00$), but similar to the middle group, the difference between the groups was not significant.

In summary, for students with lower overall GPAs, there is a significant difference in scores received in an online course between male and female education majors, with male students scoring significantly lower in the online course. For students with mid-level and higher overall GPAs, there is no difference in online course grades between males and females. The interaction effect can be seen in Figure 1, with the slope line for males and females crossing near the middle GPA range.

**Figure 1.** The Interaction Effect between Student Gender and Cumulative GPA
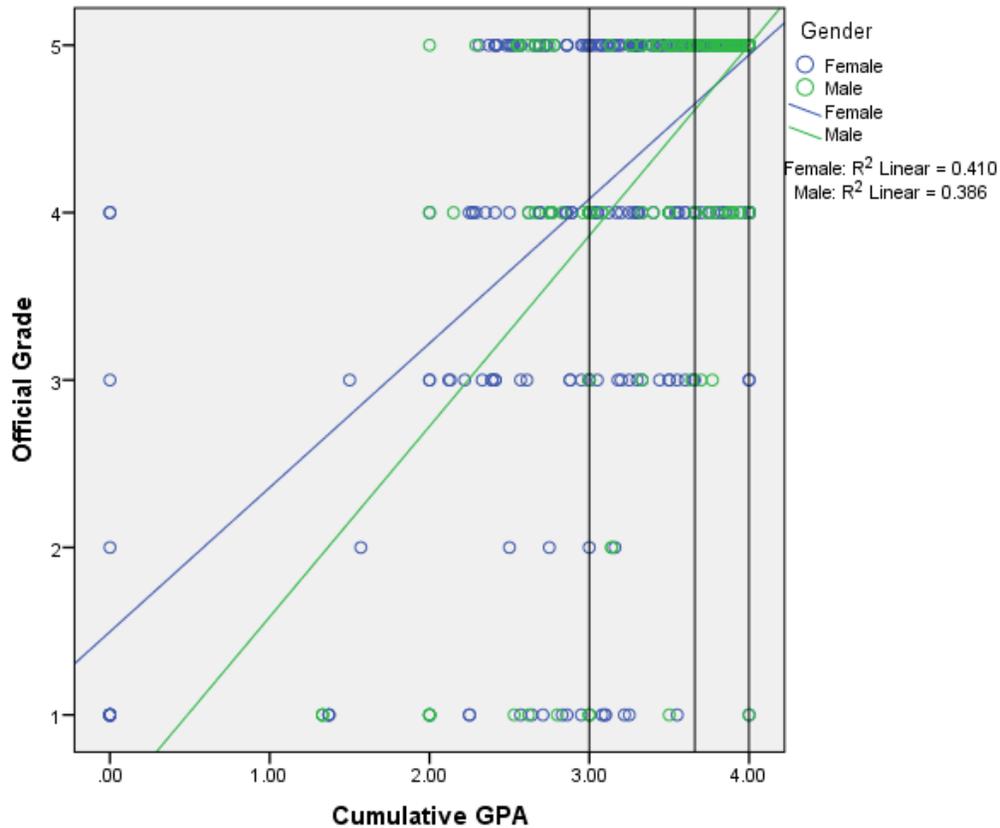


## DISCUSSION AND CONCLUSION

In this study, we were surprised by the interaction found between student gender and overall GPA. It appears that the impact of gender may be different for low achieving versus high achieving students. Additionally, we suspect this interaction has broader effects than those examined in this study.

Simple main effects testing demonstrated that female students scored significantly higher than male students in the lower overall GPA range. Based on descriptors of the female identity and researched characteristics representative of female groups, female students are more likely to

seek collaboration and interaction with fellow students, than male students for whom interactions are competition based (Arbaugh, 2000; Ashong & Commander, 2012). Similarly, female students are more likely to seek assistance from fellow students, especially after positive initial responses, than male students (Blum, 1999). This type of connected and supportive learning may assist female students in the lower overall GPA group, as opposed to their male counterparts. Within the mid- and higher-GPA ranges, interacting factors may influence online course success, such as personal factors like motivation and self-efficacy, and other factors such as course design, instruction style, and the course hosting software. It appears as though varying factors may level out any advantages or disadvantages offered by identity labels such as gender. For example, males' comfort level with computers did not appear to be a factor in this study.

It is recommended to continue to explore the many interactions among both personal and course-related factors, and the gender identity of students. To ensure the success of all students, it is important to continue to study how the pieces fit together and interrelate (Yukselturk & Bulut, 2007). The role of gender identity in distance learning, as well as other factors, should continue to be explored, to guarantee all students have the same opportunities for online success.

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