

Gender Differences in Online Learning

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Abstract. Online learning is proving to be a new milestone in education, the advantages that were known from the beginning are now days more appealing and important than ever, the opportunity to learn and teach not depended on location and time and has brought online learning in front of each education institution. We will focus on one dimension of how online learning impacts academic success based on gender. Gender has always been an interest since we assume that male and female students vary in their environment of learning and especially online, with a promising advantage for male students since it is assumed that male students would be better handling the technical part, than female students. We conducted two online courses on the Moodle platform, and observed how gender will influence students' outcomes. The initial results show little differences based on gender where male students slightly have higher results in only online courses while female students show higher overall success for the Faculty of Computer Science.

Keywords: Gender Online learning · Preferred materials

1 Introduction

The increasing popularity of distance learning classes in colleges and universities has given rise to an interest in research on students and the quality of their distance learning experience. Virtual education assumes greater importance in the preparation of students in all disciplines. Research isolating and analyzing variables within students that either help or hinder their capacity to thrive inside distance learning environments is becoming increasingly relevant [2]. To date, few empirical studies have established the possible impact of gender-related disparities on these students' learning environments, although there is an "important body of work in other fields that shows that both male and female students face a distinct online classroom setting. The initial assumption that the Internet was a democratic and equal medium for communication has been questioned. Some see the Web as male-dominated, whereas women are constrained by the need to juggle work and family obligations. It has given rise to equity in education, particularly for women. Computer technology and the Web have historically been related to men [3]. Within that regard, it has been observed that males and females do not use technology in the same manner or with the same degree of ability or practice [4], males are

more likely than females to use online media, whereas females are more likely to have less general technical expertise. Research has demonstrated that men and women display differing degrees of discomfort, tolerance and curiosity in emerging technology over time [17] and that the gender difference is shrinking over time [18]. Access and preparation have been described as one of the reasons leading to the elimination of the gender divide. Nevertheless, due to their perception of computers as social networking, people favor communicative practices. The growth of web 2.0, with its emphasis on networking and social media, has contributed to a rise in the number of female Internet users [3]. This female emphasis on contact and teamwork often has a significant impact on learning circumstances. Men prefer to make comments longer and more often, whereas women are more open to other people's ideas and able to comply. People tend to work in communities whereas people are more inclined to tackle issues on their own [3]. We aim at testing the existence of significant differences in academic achievements in online learning by men and women. Through the Moodle platform two online courses at the Faculty of Computer Science and Engineering, Skopje, were taken during one semester by participants, where we have analyzed how gender impacts test results. With scarce results, of male and female students' performance in online classes it makes it challenging to conclude that gender is significant for academic achievements in online learning.

2 Related Work

With regard to gender differences in online teaching, there has been partial empirical evidence for the presence of gender differences on overall academic achievement in online classes. There are several contradictory findings about how male and female students engage in online learning settings, according to Beer, Clark, and Jones [5] reports, which indicate that male students do better in online learning, contrary to McSparran and Young's [6] study that indicates higher grades for female students in online learning. The Cuadrado-García [1] research also revealed small variations between how male and female students connect amid online environments. In general, the findings suggest that there are no major dissimilarities in overall male-female attendance, level, motivation and satisfaction. The usage of certain Moodle tools and a limited number of elements linked to further assumed conflict with social life in men and a stronger sense of duty in women was clearly distinguished, Morante, Annette, among others [10]. College students' who interact more directly with their learning groups achieve better outcomes regardless of gender [6]. However, online engagement is something very individual and cannot be generalized in terms of gender. Even in studies where visual advertisement is being studied based on the factor of gender, there were no gender related differences of how the images are processed by human visual system Little-Wiles [7] [15] research is aligned with the analysis of Beer, Clark, and Jones, which demonstrates that there is a shortage of gender gaps in grades in which male students do marginally better. However, this research is compatible with the analysis by Morante, Annette et al., which indicates that when more participants become involved in online settings, higher academic achievement is achieved [8]. According to researches where multimedia learning environments and the role of gender has been

studied indicating that the gender of a learner does not affect initial SI within a multi-media learning environment [16].

3 Methodology

This research used a field experiment to empirically examine how gender influences the academic success of the student. This experiment was conducted at the Faculty of computer science and Engineering, Ss. Cyril and Methodius University, Skopje. The interactive Moodle interface has been used to manage student-content during the experiment, as well as teacher-content interaction. Before the experiment, none of the students had seen the content. For one semester, all participants completed two online classes. The research population for this study was registered in two courses Search Engines (C1) and Interactive websites (C2). The first course (C1) may be regarded a less advanced course in computer science, while the second (C2) is a more comprehensive course that requires some basic experience of computer science. The two distance learning courses “Search Engines” and “Designing Dynamic Web Sites” were set up on the faculty’s Moodle interactive e-learning platform. The experiment was concluded with a final test to assess student learning outcomes [12].

3.1 Participants

The initial number of students undertaking this project was 155, 61 females and 94 males as seen in Table 1. The number of students who dropped out during the trial is 101, of which 74 are male and 27 are female. A total of 54 students (34 females and 20 males) finished the case study and took the final exam. Participants' average age was 21 varying from 19 to 22. For one semester, both courses were attended by the selected students. The effects of their study were evaluated at the final exam. In order to inspire students to engage thoughtfully, they received extra credit for their grades depending on their results [14]. This research attempted to establish a connection gender influence student academic success when taking online courses.

Table 1. Number of students participating in the experiment

	Female	Male	Total
Initial no. of students	61	94	155
Nr. of students that dropped out during the experiment	27	74	101
Nr. of students that completed the courses	34	20	54

3.2 Course Delivery

The students were divided into two groups (A and B) for each course. A group of students attending the C1 course were asked to select their favorite form of content distribution (one of the three educational components mentioned below). They were categorized into three categories according to their preference of materials delivered, and the lectures were provided according to their expectations for each form of stereotype. The B category of students attending the C1 course did not have the choice to select the desired form of content delivery. The selection of the method of distribution of instructional materials (one of the three forms mentioned below) was made by the lecturer, without taking into consideration the desires of the students. Group B students have selected the type of content they prefer for the C2 tutorial, while group A students have been offered the type of content they prefer for the teacher. We used different presentation types, for delivering the educational content of each course:

Offline document content - PDF files, videos, and links to the Website. This method allows students to control their time individually and to study at their desired speed.

Offline video content - Video presentations have been captured and distributed to the students in the form of a streaming file. This helps students to see the content discussed more animatedly, but also to build their learning plan.

Online video conferencing - Live video conferences have been planned with the instructor of each course. The classes were held at a set date, so the students had to be registered in the correct course.

Based on our analysis, we have formulated this hypothesis: *Does gender have any significance in students test results in online classes?*

4 Result Analysis and Discussion

In this study we have analyzed if gender differences in students' have a significance in academic success, we have examined the test results of two online courses taken by students' and the overall academic success for students at the faculty of Computer Science. Test results are based only on the two online classes, whereas the overall academic success rate is based on traditional classes during studies. We have used correlation to determine how gender and the aspect of delivered materials affects students' academic success, based on these results we can see that delivered materials did not affect students' Test Average. At first Students' were asked to choose which content they preferred the most during the online course, they had three options Video Stream, Video Conference and PDF documents or offline documentation, If we look at the graph we can observe that female students' prefer all three types of contents but mostly offline documents which indicates that female students' felt more secure while having the offline document and learn at their own. Male students on the other hand preferred VC and PDF documentation, which indicates that male students' feel comfortable having video conferences.

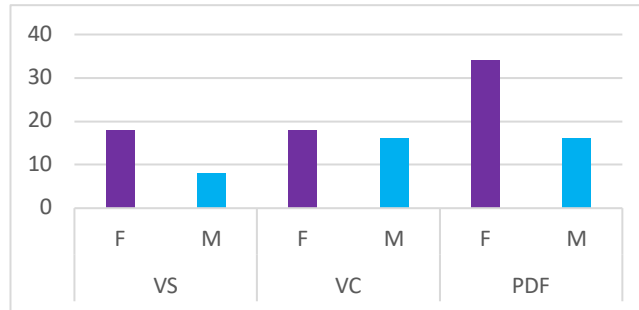


Fig. 1. Student's material preference

If we compare of what materials students' have preferred based on gender, we can see that Female students prefer mostly PDF Documents, and male students preferred materials are Video Conference and PDF files.

In this paper the Pearson correlation measure has been used, this measure shows a linear dependence between two variables (x and y). It's also known as a parametric correlation test because it depends to the distribution of the data.

$$r = \frac{\sum (x - m_x)(y - m_y)}{\sqrt{\sum (x - m_x)^2 \sum (y - m_y)^2}}$$

m_x and m_y are the means of x and y variables.

Table 1. Correlation of preferred and provided materials for both courses

correlate preferred=provided with results									
both courses	count			Test Avg			GPA Avg		
	F	M	T	F	M	T	F	M	T
Pref.=Prov.	42	24	66	3.22	3.65	3.38	7.65	7.36	7.54
Pref.<>Prov.	26	16	42	3.67	3.99	3.79	7.39	7.27	7.34

Table 1 shows the correlation of preferred and provided materials based on gender, and how they impact test results and academic achievement. We can see that students' which got their preferred materials do not show any higher test results, in contrast students which did not get the prefer material scored higher in test results, it is also noteworthy to mention that male students' scored slightly better in the two online classed that female students', where's female students' have a higher GPA which indicates that they score better in overall traditional classes.

Table 2. Correlation of preferred and provided materials for SE course

only course	SE	count			test avg			GPA avg		
		F	M	T	F	M	T	F	M	T
Pref.=prov.		21	12	32	4.22	4.38	4.28	7.67	7.33	7.54
Pref.<prov.		13	8	21	3.63	4.77	4.07	7.37	7.32	7.35

Table 3. Correlation of preferred and provided materials for DWS course

only course	DWS	count			test avg			GPA avg		
		F	M	T	F	M	T	F	M	T
Pref.=prov.		21	12	33	2.23	2.92	2.48	7.63	7.39	7.54
Pref.<prov.		13	8	21	4.65	3.2	3.5	7.41	7.23	7.34

And if we look at table 2 and 3 which show the correlation of materials delivered and preferred with test results and overall GPA, the results are mixed based on materials preferred and provided, which indicates that they do not have any significance but what is to be observed it is that Course difficulty has impact on test results and female students' score slightly better in the less advanced course than male students' in the more advanced course. Nevertheless, the overall GPA for all courses is always marginally higher for female students. From the aspect of gender, even though the difference is very small nevertheless male students score slightly better in the overall percentage, but if we look for both courses we can determine that male students' score better for the more difficult course than female students', where female students' for the DW course have an higher average.

5 Discussion and Conclusion

This Paper tried to identify gender differences in online learning, even though the internet is considered as a gender-neutral environment nevertheless there are differences of how students react and use the internet. Male students are more linked to technology aspect, but if we see at our initial results female students have higher academic success in the Computer Science field but for traditional classes. Whereas for online learning based on our study *course difficulty* is perhaps the main factor of students' average where male students' pass female students' slightly. Our research indicates that gaps in the measurement and usage of e-learning by class are rare. According to some previous studies, the findings indicate that there are usually no substantial variations in overall

attendance, ranking, encouragement and performance between males and females [13]. However, this evidence is not conclusive, as this experience should be replicated in other courses in order to guarantee its validity. In addition, we understand that there are limitations to this research. So far as objective statistics are concerned, the findings collected could be biased owing to the limited number of students in those classes.

According to our findings gender has scarce implication in online courses, our test results are mixed, and we cannot define any pattern which gender performed better. What is important is that course difficulty is the main factor which signifies test results. The findings of this study are, however, preliminary and limited in nature. We need a repeat study with a larger dataset and a larger population of subjects to confirm our results and determine that the link between gender and online learning is very scarce.

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