The Effect of Gender on Performance in a Web-Based Knowledge Communication Task

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ABSTRACT

This study was conducted in a mid-sized University in the southern part of the U.S. Eighty subjects participated in an experiment that assessed their performance in learning about international trade terms through a series of web-based screens. The objective of the study was to test the relationships between age, motivation to do well in the task, gender, scholastic ability, (GPA) and performance in a knowledge communication task. Performance was assessed through the participants' ability to learn about international trade terms (content performance), and to recall aspects of the web-based screens through which those terms were learned (details performance). The results suggest that age positively influences motivation, females have better details performance than males, and GPA positively influences content performance.

INTRODUCTION

The assessment of the influence of motivation on task performance has been a topic of study for a number of years (Ryan & Deci, 2000). Some of the first studies of the relationship of motivation and performance date back to the 1930's and some studies are still being conducted today (Seo et al., 2004 on Kanfer, 1991). These studies have led to the proposal of a number of motivation theories (Robbins & Coulter, 2005).

Another factor which can moderate task performance is gender. There have been a number of studies which use gender as the differentiating variable in the learning patterns as well as the outcomes produced by individuals in the academic and corporate worlds (Meyers-Levy, 1989; Graham et al., 2002; Chung & Monroe, 2001). In a number of these studies the results indicate that women have the tendency to be more detail oriented than men (Graham et al., 2002).

In addition, the types of motivation often differ for women and men. Women tend to be intrinsically motivated as opposed to extrinsically motivated (Liping, 2000). While men and women may have similar expectations for the future, women tend to be goal setters, often focusing on deeper, more personal goals than men and these differences may lead to different performance levels between the two (Greene & DeBacker, 2004). In other words, through existing studies one can see that there are relationships between motivation, gender and performance.

The study presented here was conducted in a mid-sized university located in the south of the United States. The learning performance of a group of subjects was assessed at two levels: content performance and details performance. Both content performance and details performance of the participants was evaluated though the use of web-based screens in order to test the relationships between age, motivation, gender, GPA and performance. The objective of this study was to develop, as well as test, a theoretical model which can help clarify the nature of these relationships.

BACKGROUND AND HYPOTHESES

Motivation can be defined as the degree to which an individual seeks to achieve a goal, while fulfilling a personal need (Robbins & Coulter, 2005). There are two types of motivation which can influence an individual: intrinsic and extrinsic. Intrinsic motivation acts as a reflection of human nature. It relates to the innate tendency in human beings to engage in certain actions. This kind of motivation cannot be enhanced through tangible rewards because the reward, consists of a feeling of accomplishment or satisfaction which is provided by the action itself (Ryan & Deci, 2000). Deci & Ryan (1991) believe that those who are intrinsically motivated tend to "have more interest, excitement, and confidence" than those who are extrinsically motivated (p. 69).

Extrinsic motivation, on the other hand, relates to an expectation of an outcome or a fulfillment of a requirement as the reason for performing an action. That is, the activity is not performed "just for fun." The individual has an interest in the outcome of the activity as well as in the associated rewards (Ryan & Deci, 2000). Both intrinsic and extrinsic motivation may lead to increased learning levels as well as improved performance (Ryan & Connell, 1989; Deci & Ryan, 1996).

Because motivation is related to performance, researchers have been interested in finding out what motivates individuals (Ryan & Deci, 2000). Several motivation theories have resulted from this interest, some dating back to the 1930's (Seo et al., 2004 on Kanfer, 1991). Well-known motivation theories include Maslow's (1954) hierarchy of needs theory, Skinner's (1971) reinforcement theory, Vroom's (1964) expectancy theory, and Adam's (1965) equity theory.

These theories are all related to performance and convey the idea that in order to achieve a desired outcome there should be some type of motivation in place. Therefore, it is expected in this study that a student with higher motivation will also have an increased performance. Since this study uses content and details-related performance measurements, the following is hypothesized:

***H_1**: Higher motivation will lead to higher content performance.*

***H_2**: Higher motivation will lead to higher details performance.*

A number of studies have also explored the relationship between age and motivation. In these studies age has been found to influence attitudes and motivation in the work environment (Schamback, 2001 on Igbaria & Greenhaus, 1992; Warr & Birdi, 1998). Wolfgang and Dowling (1981) studied the differences in motivation between young and adult college students and Digelidis and Papaioannou (1999) studied the difference in motivation between different age groups of students. These studies recognize that a relationship exists between different age groups and their motivation levels. Since much of the existing research suggests that age is likely to have a positive effect on motivation, the following is hypothesized:

***H*$_3$**: *More years of age in an individual will lead to increased motivation.*

Chen et al. (1997) found that motivation levels in men and women can be equally high. However, women tend to be more goal oriented than men and their goals tend to be of a more intrinsic nature than those of men (Greene & DeBacker, 2004). Because women's goals are of a more personal nature, female students in this study are expected to have higher motivation levels.

Gender is another factor which can affect the learning process. Pearsall et al. (1996) found that gender mediates biology students' learning processes and Rochford & Mangino (2006) found that gender and achievement level can cause differences in a student's learning needs. Studies such as these have found that males and females learn differently, due to biological as well as social factors (Bevan, 2001; Miller et al., 2001; Giordano & Rochford, 2005). Taking such differences into consideration can help students increase their learning abilities (Rochford & Mangino, 2006).

A number of researchers have also found that males and females differ in the way they process information (Honingsfeld & Dunn, 2003; Bevan, 2001; Ablard & Lipshultz, 1998). Males look for simpler patterns of information which may stand out, while women look at more subtle details in the information (Meyers-Levy, 1989; Graham et al. 2002; Chung & Monroe, 2001). In addition, females tend to pay more attention than males to certain details. Because these studies lead to some expectations regarding the relationships between motivation, gender and performance the following is hypothesized:

***H*$_4$**: *Female students will have higher motivation.*

***H*$_5$**: *Female students will NOT have a higher level of content-oriented performance.*

***H*$_6$**: *Female students will have a higher level of detail-oriented performance.*

Finally, in this study, grade point average (GPA) is used as a control variable because of its relation to academic performance (Zheng & Saunders, 2002). In African-American females, a high GPA has been linked to a better perception of the self (Saunders, et.al. 2004). Having an increased self-perception, which is related to having a high GPA, is likely to positively affect the performance of males as well as females. Figure 1 presents the complete model of this study including this control variable.

RESEARCH METHOD

This study was conducted through a web-based experiment involving 80 subjects. All the subjects were business students from a mid-size university in the southern part of the United States. The sample included both graduate and undergraduate students. More than 80 percent of the subjects were undergraduates. Slightly over 50 percent of the subjects were female and the average age was 25.

The experiment was divided into a learning module section and a survey section. The first section consisted of ten learning modules containing ICC Incoterms 2000. Context details, consisting of four different capital letters individually framed by a colored square, were also included in each one of the modules. The second section of the experiment consisted of a web-based survey which subjects were required to complete after reading the time-controlled modules.

The instrument was designed to measure content performance, details-oriented performance, and perceived motivation. In order to measure content performance, three multiple-choice questions were asked for each module. The subjects' performance was assessed by dividing the number of correct answers by thirty (which was the maximum number of correct answers). The details performance was calculated in a similar way since the options for the colors and letters were provided in drop boxes from which subjects could choose.

This study lasted approximately one hour; twenty-five minutes were spent on the learning module section, and the remaining time was spent on the survey. To serve as motivation, the subjects were offered extra credit points which were dependent on their performance in the experiment.

DATA ANALYSIS

One of the best known variance-based SEM methods is the partial least squares (PLS) method (Chin et al., 1996; Chin, 1998). The flexibility (relaxed statistical assumptions for the data, inclusion of control variables, and definition of formative constructs, etc.) and robust significance tests make PLS a good choice for the analysis of the data collected through this study. Therefore, this method was used to assess the relationships of the model presented in this study.

The model presenting the latent variables and the different relationships as well as the calculated coefficients can be seen in Figure 2. Motivation, represented by an oval is a latent variable which is connected to the remaining variables by arrows which represent the causal relationships between the variables. The significance of the results determines the type of connectors used. A solid arrow was used when the relationship was found to be significant and a dotted arrow was used when the relationship was found to be non-significant. For those relationships that were found to be significant, the β coefficients are displayed. These coefficients are not shown for the relationships that are not significant. In this model the path coefficients are represented by β and the variance explained by the model is shown through the R^2.

Notes:
NS Non significant links
H Supported Hypothesis
* Link significant at the .10 level
** Link significant at the .05 level
*** Link significant at the .01 level

Figure 1. Model of gender and motivation effect on performance

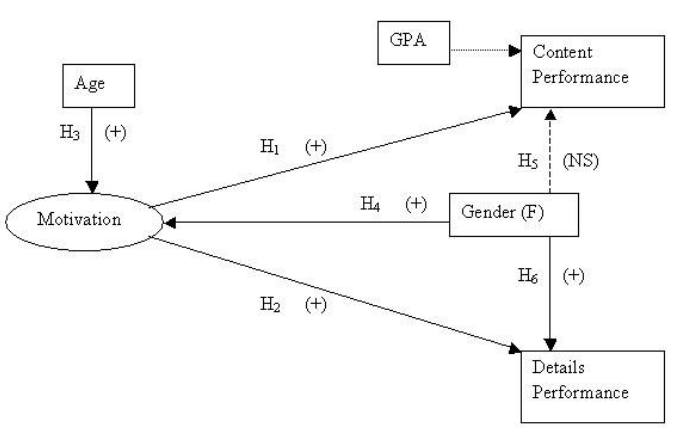
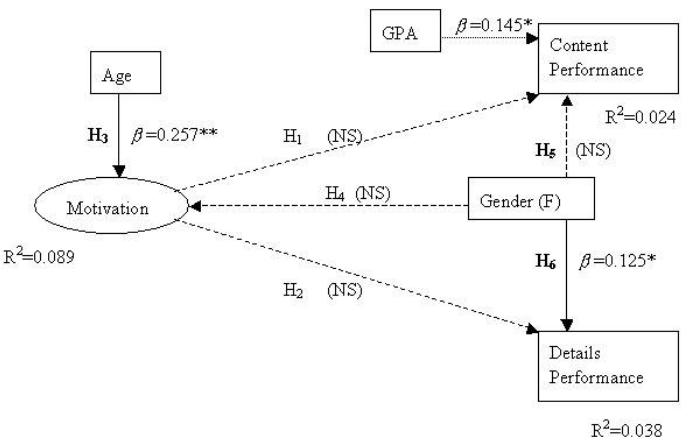


Figure 2. Results of gender and motivation effect on performance



The path coefficient for "Motivation" to "Content Performance" is slightly negative (β=-0.007) but not significant. The coefficient for "Details Performance" is positive (β=0.132), as expected, but not significant either. These results go against hypotheses H_1 and H_2. The relationship between "Age" and "Motivation" is positive and significant (β=0.5257) at the 0.05 level. This indicates that the older the student the more motivated he/she will be, which lends general support for hypothesis H_3.

In regards to "Gender", results show a positive ((β=0.137) but not significant influence on "Motivation" (contradicting hypothesis H_4). The results also show a very low (β=0.055) and non significant influence on "Content Performance" (supporting hypothesis H_5), and a positive (β=0.125) and significant (at the 10% level) influence on "Details Performance" as predicted in hypothesis H_6.

The above results allow us to conclude that while female students are more detail oriented than male students, the performance in content does not differ based on gender. It is important to note that the relationship of the control variable (GPA) with the content performance was significant at the 0.10 level.

CONCLUSION AND DISCUSSION

In this study, the content and details performance of a group of individuals was assessed in order to develop a theoretical model which may clarify the nature of the relationships between age, motivation, gender, GPA and performance. This study assessed the effect which age and gender can have on the motivation to perform well on a given computer-aided learning task. The influence that motivation and gender have on performance was also assessed. The results suggest that older subjects perceive themselves as being more motivated than younger subjects. The results also suggest that females are more detail-oriented than males, leading to the conclusion that females can perform better in tasks which require the recall of detail-oriented information.

There was no significant difference between males and females regarding the content performance. An unexpected result was that motivation level did not significantly affect either content related or details related performance of the subjects. A possible explanation for the lack of influence motivation had over performance may be the fact that the individuals were extrinsically as opposed to intrinsically motivated, decreasing the likelihood that the subjects would have an increased level of learning and performance (Ryan & Connell, 1989; Deci & Ryan, 1996).

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