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The comparison of learning strategies, computer anxiety and success states of students taking web-based and face-to-face instruction in higher education

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Abstract

The aim of this research is to put forward the relationship of students' success with learning strategies and computer anxiety of students taking Web-based and face-to-face instruction higher education. In the equalized control group in the present study, the semi-experimental model was used. There were 31 students in one group taking Web-based instruction and 22 students in the other group taking face-to-face instruction. The research data were obtained from three scales - which were Cognitive Learning Strategies Scale, Metacognitive Learning Strategies Scale and Computer Anxiety Scale - and from Success Test. Before the application, these scales and the success test were given as pre-test to the students who were in experiment group, and at the end of the application, they responded to the same scale as post-test. At the end of the application, it was found that there was no significant difference between the average scores of students – taking Web-based and face-to-face instruction - regarding cognitive and metacognitive learning strategies. However, there was a significant difference between the average scores of students – taking Web-based and face-to-face instruction - regarding learning anxiety and success in favor of face-to-face instruction group.

Keywords: Learning strategies, Computer anxiety, Success, Web-based instruction, Face-to-face instruction, Higher education

1. Introduction

Any kind of information constituting the basis of the information society can rapidly be transferred to a wide range of population thanks to today's developing science and technology. In this information age, in which a growing amount of information rapidly spreads out, it is necessary that students become active individuals who can reach, organize, process and internalize the constantly-increasing information instead of becoming passive learners in the learning process. Students can become more active in the learning process when they are in learning environments that can facilitate their learning; when the internal and external factors that will prevent their learning are decreased; and when they know about the techniques that help them carry out their own learning duties independently. It is believed that anxiety and learning strategies – which are individual differences and techniques facilitating students' autonomous learning – influence learning and that considering these differences, the

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organization of Web-based teaching environments - which are individualized teaching environments – will help train more qualified individuals.

1.1. Learning Strategies

One of the basic factors in the learning process is related to learning strategies. Learning strategies are operations that help students learn on their own. Students who can manage or direct their own learning are called "strategic learners", "independent learners", "self-regulating learners" or " self-instructional learners" (Senemoğlu, 2001). In other words, for students to develop themselves in this information age, they should gain the competency of learning on their own and of following up their learning. Informing students about the characteristics of students' learning strategies, the similarities and differences between these strategies, and about the areas of use of these strategies will influence their success positively (Ergür, 2000). Therefore, while teaching students the basic concepts and principles of certain disciplines for effective learning at schools, learning strategies should also be taught (Subaşı, 2000; Özer, 2004). Besides learning strategies, one of the factors influencing students' success could be said to be anxiety. Anxiety can be considered as a state of excitement whose source is not known at all and which is milder but lasts longer than fear.

1.2. Computer Anxiety

It is stated that anxiety leads to failure and a decrease in coping mechanisms. As reported by Namlu and Ceyhan (2002) from Russel and Bradley (1996), in general, machines including new information technologies worry people and cause resistance to these machines. It could be stated that computer anxiety is a result of this resistance. According to Rohner and Simonson (1981), computer anxiety "is the mixture of feelings of fear, worry and hope that people experience when they interact with or plan to interact with computers."

It could be stated that students who have a low level of success in Web-based educational activities – which provide an individualized learning environment different from the traditional class environment – experience a higher level of anxiety. The reason is that anxiety generally occurs when individuals learn new things or when they show resistance to change (Hakkinen, 1994). Since students interact with computers in Web-based educational activities, one of the variables that influence students' learning and their success is computer anxiety.

In this respect, the overall purpose of the study is to compare the learning strategies of students – who take Web-based and face-to-face courses in higher education -, their states of computer anxiety and their states of success. In line with this overall purpose, the following research questions were directed:

- Is there a significant difference between the post-test scores of students – taking the course of Information Technologies in Education II on the basis of Web-based and face-to-face instruction –
  a) in terms of cognitive and metacognitive learning strategies?
  b) in terms of their success?
  c) in terms of computer anxiety levels?

2. Method

In the study, the unequalized control group model was applied. The participants of the study included two groups: the group taking the course on the basis of Web-based instruction included a total of 31 students, 11 of whom were female and 20 of whom were male, the group taking the course on face-to-face basis, was made up of a total of 22 students, 14 of whom were female and 8 of whom were male.

The "Cognitive Learning Strategies Scale" was developed by Namlu (2005). It was a 4-point Likert type including 36 items. The internal coefficient of consistency of the scale was calculated as 0.89. The scale included six sub-dimensions of strategies such as application, memory, analysis, summarizing, repetition and teaching. The "Metacognitive Learning Strategies Scale" was developed by Namlu (2004). It was a 4-point Likert type including a

total of 21 items. The internal coefficient of consistency of the whole scale was calculated as 0.81. The scale included four sub-dimensions of strategies such as planning, organizing, monitoring and evaluation. The "Computer Anxiety Scale" was developed by Namlu and Ceyhan (2000). The validity and reliability studies of the scale were carried out. The scale was a 4-point Likert type including a total of 28 items. The internal coefficient of consistency of the whole scale was found as 0.92. The scale included three sub-dimensions such as affective anxiety, fear of damaging computers and learning anxiety. The success test was a multiple-choice one including 40 items developed by the researcher.

2.1. Pre-test results

No significant difference was found between the cognitive learning strategies scores of students taking Web-based and face-to-face instruction and their scores of meta-cognitive learning strategies. And also there was no significant difference in students' average success scores revealed by the success test in terms of Web-based and face to-face instruction (p=.779). However, there was a significant difference in favor of face-to-face instruction group regarding the average scores revealed by the computer anxiety scale for the students in Web-based and face-to-face instruction groups (p=.003). The computer anxiety scores of the students who were in the face-to-face instruction group were higher than those of the students who were in the Web-based instruction group.

3. Findings and Discussion

3.1. Findings and Interpretations Regarding Cognitive and Metacognitive Learning Strategies

In order to find answers to the questions regarding whether there was a difference between the cognitive and metacognitive learning strategies post-test scores of students taking Web-based and face-to-face instruction, ANCOVA was applied. According the results of ANCOVA, no significant difference was found between the average scores of students regarding cognitive learning strategies corrected according to the "Computer Anxiety Scale" ($F(1\text{-}50)=0.528$, $p>.05$). In other words, the cognitive learning strategies post-test scores of students did not have any relationship with the type of instruction they received either as Web-based or face-to-face. No significant difference was found between the average scores of students – taking Web-based and face-to-face instruction – regarding metacognitive learning strategies corrected according to "Computer Anxiety Scale" ($F(1\text{-}53)=1.886$, $p>.05$). In other words, the metacognitive learning strategies scores of students did not have any relationship with whether they received Web-based or face-to-face instruction in their groups.

3.2. Findings and Interpretations Regarding Success

In order to reveal whether there was a significant difference between the post-test success scores of students found in the groups taking Web-based and face-to-face instruction, t-test was run. The results revealed that there was a difference of 4.52 between the success scores of Web-based and face-to-face instruction groups in favor of the face-to-face instruction group ($t= 2.652$, $p<.05$). In other words, the post-test success scores of students taking face-to-face instruction were higher than those of the students taking Web-based instruction. Depending on these results, it could be stated that the students taking face-to-face instruction were more successful.

3.3. Findings and Interpretations Regarding Computer Anxiety

In order to find out whether there was any difference between the post-test computer anxiety levels of students in the groups taking Web-based and face-to-face instruction, MANCOVA was applied and no significant difference was found between the average scores of students – taking Web-based and face-to-face instruction – regarding

affective anxiety corrected according to the "Computer Anxiety Scale" ($F(1\text{-}50)=1.546$, $p>.05$). Similarly, there was no significant difference between the average scores of students –taking Web-based and face-to-face instruction – regarding the damaging anxiety corrected according to the "Computer Anxiety Scale" ($F(1\text{-}50)=.722$, $p>.05$). However, there was a significant difference between the average scores of students – taking Web-based and face-to-face instruction – regarding learning anxiety corrected according to the "Computer Anxiety Scale" ($F(1\text{-}50)=4.794$ $p<.05$). This difference was in favor of the group taking face-to-face instruction. In other words, the learning anxieties of students had a relationship with the type of instruction they received as either Web-based or face-to-face. The students in the group taking face-to-face instruction experienced more anxieties of learning.

4. Conclusion

The finding that both cognitive and metacognitive learning strategies scores of students did not change with respect to the type of instruction they received is similar to the finding obtained in a study carried out by Köymen (1990). Köymen (1990) found out that there was no difference between traditional higher education students' use of learning strategies and the learning strategies use of students attending Open Education Faculty. The finding of a study conducted by Namlu (2003) that there was a significant increase in the learning strategies of students who were in the experimental group taking training on learning strategies does not support the finding of the present study. A similar finding was also reported by Carns and Carns (1991). The reason why these two research findings were different from the finding of the present study could be the fact that the students received training on learning strategies, while in the present study; no such training was given to the students. Depending on the research findings reported, it could be stated that without taking any training on strategies, there was no significant difference in the learning strategies of students with respect to the type of instruction they received. Moreover, it could also be stated that the strategy training received by students might lead to a significant difference.

The finding of a study conducted by Kabakçı (2001) that instructional activities excluding Internet use is more effective in achieving student success according to Internet-based instructional activities supports the finding of the present study. On the other hand, findings of other studies conducted by Schutte (1999), Altınışık (2001), Demirli (2002), Şahin (2000) and Tezci (2003) do not support the finding of the present study. In the study carried out by Altınışık (2001), the researcher reached the conclusion that multimedia did not cause any difference in students' success. In contrast with the finding of the present study, the studies carried out by Schutte (1999) and Şahin (2000) revealed that the success of students taking education in multimedia classrooms were higher than that of students taking education in traditional classrooms.

Several factors could be considered as the reasons why the findings of the present study were not supported by most of the findings reported in related literature. Among these factors was the fact that the study groups of the studies reported were different; that the socio-cultural, financial and psychological structures of the students found in the study groups were different; that the courses and contents involved in the studies were different; that the students participating in the studies were different, the Web-based instruction models used in the applications were different; and that the students had different experiences in Web-based instruction before the studies.

In studies reported in literature, computer experiences of students decrease their computer anxiety (Maurer and Simonson, 1993; Hakkinen, 1994; Chua, Chen and Wong, 1999; McInerney et. al., 1999; Namlu and Ceyhan, 2000; Arıkan, 2002). In the study carried out, although the computer experiences of the students increased regarding the course content in both groups, the anxiety level of the students taking Web-based instruction increased. The students' anxiety levels might have increased due to the fact that there was frequent failure in internet connection during the talks with the students and that the students were confused as they asked questions without first taking answers to their previous questions. In addition, the students' anxiety levels might have increased due to the fact that connection was established because the servers of the client faculty and of the server faculty were different in the white-board application; that the application was thus not carried out at the planned time; and that the subject of Basic found in the course content mostly included visual applications. Furthermore, the fact that the students were

supposed to learn the course content and take a score high enough to be successful in the course might have increased the anxiety levels of the students taking Web-based instruction and thus decreased their success.

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