Khazar Journal of Humanities and Social Sciences Volume 22 № 1 2019, 52-62
 DOI: 10.5782/2223-2621.2019.22.1.52

The Relationship between Computer Anxiety and Learning Styles (Sensory-intuitive and Verbal-visual) among Persian University Students

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Abstract

This study was conducted in central Iran among all first-year university students studying engineering courses at Arak University of Technology. All students (No = 310) were included in this study. Instruments used mostly consisted of a computer anxiety questionnaire plus a learning style questionnaire. The data was analyzed by both descriptive and inferential statistics (Mean, Frequency, Standard Deviations, Independent T-test as well as Point Biserial Correlation Coefficient). The results indicated that there was a statistically significant relationship between computer anxiety and sensory-intuitive learning styles, in that the students having sensory learning style suffered from computer anxiety more frequently than the student having intuitive learning styles. In addition, there was a statistically significant relationship between computer anxiety and verbal-visual learning style, given that the students having visual learning style suffered from computer anxiety more than the students having verbal learning style. No statistically significant relationship, however, was found between computer anxiety and gender.

Keywords: Anxiety, Computer, Learning style, Individual differences

Introduction

In today's rapidly evolving world, people should be equipped with evolving capacities. They should be able to acquire necessary knowledge and skills using modern technologies. Thus, combining computer technology with teaching and learning is inevitable. For those who use this computer technology on a daily basis, living without this technology is almost unimaginable. Teaching through the use of computer technology has facilitated learning and all traditional teaching methods have been affected by this computer technology (Cingi, 2013). So, it can be seen that computers play a key role in this regard. The integration of this technology into teaching and learning has been so widespread that nowadays students' interaction

with this technology is more than the interaction with the teacher. The rapid growth of educational applications has expanded learning beyond formal classrooms and learners choose what to learn and how to learn through using these educational applications. It follows that personal computers and their related technologies have dramatically changed learning and teaching (Oliver, 2002).

One of the reasons that some learners still hold back from using this technology is computer anxiety. Some scholars define computer anxiety as reluctance to face computers and refrain from using these machines (Boche, Davis & Vician, 2007). A researcher considers this reluctance as a mental phenomenon (Olatoye, 2009). Computer anxiety is seen as a part of general anxiety and manifests itself as a reluctance to work with computers (Celik & Yesilyurt, 2013). This kind of anxiety affects directly or indirectly the selection of learning activities related to computer and attaining an acceptable level of proficiency in using these machines (Morgan, 2010). In one case study, some researchers decided to find components related to computer anxiety (Beackers & Schmitt 2001). Based on their findings, they listed four components namely lack of confidence in working with computers, passive response to computers, feeling of agitation when faced with computers and finally negative beliefs about the role of computers in everyday life.

Based on what was said, it is necessary to investigate this anxiety in that it can negatively affect the use of computers among educators and students. One of the issues in this regard can be attributed to different learning styles. In the learning process, learners choose their learning methods and may refrain from those they are not happy with (Pritchard, 2009). Therefore, learning styles are the cornerstones of learning and learners choose them based on their own personality traits (Woolfolk, 2004). Studies indicate that one style is not applicable to all learners and learners prefer their own styles individually (Cheng, 2014). Two researchers (Felder & Spurlin, 2005) have identified four main components for learning styles, each consisting of two criteria. They are called perception (sensory or intuitive), input, (visual or verbal), processing (active or reflective) and understanding (sequential or holistic).

This research is aimed at investigating the relationship between learning styles and computer anxiety among students of Arak University of Technology (Iran). The following hypotheses were addressed in this study:

1. There is a statistically remarkable relationship between computer anxiety and sensory-intuitive learning style.

2. A statistically noticeable interrelation between computer anxiety and verbal-visual learning style can be seen.

3. A statistically remarkable connection can be detected between computer anxiety and student gender.

Methodology

Statistical method used for this study was descriptive using correlation coefficient. The population for this study was all the undergraduate engineering students at Arak University of Technology (n=800). For sampling, multistage clustering was employed. From among 5 engineering courses available at the university, namely mechanical engineering (solid and manufacturing), mining, civil engineering and electrical engineering, some students were randomly selected to participate in the study. Based on Morgan Table, the sample used in this study was 310, 30 percent of which were female and 70 percent male.

Table 1. Frequency distribution for students taking part in this study

Course	Frequency	Percentage
Mechanical engineering (solid)	60	19.66
Mechanical engineering (manufacturing)	59	18.71
Mining	64	20.95
Civil engineering	57	18.07
Electrical engineering	70	22.58
Total	310	100

To collect data, two questionnaires were sued.

1. Heinssen, Glass and Kinight (1987) computer anxiety matrix. This matrix contained 19 items. They were five scale questions arranged from 1 to 5 based on complete agreement and complete disagreement. So, each subject could get a score from 19 to 95. Subjects were considered having high anxiety if their score was above

55.32 or they were considered having low anxiety level if their score was below 31.86. The designers of the questionnaire reported alpha index of 0.87 for their research but for our research it tended to be 0.75

2. Felder and Soloman (2000) learning style questionnaire. This questionnaire was used to measure four learning styles namely sequential-holistic, sensory-intuitive, verbal-visual and active-reflective. The learning styles were based on Felder and Silverman (1988). The questionnaire contained 44 two–choice questions (11 questions for each learning style). In this research, two aspects namely sensory-intuitive and verbal-visual were used. Another researcher (zywno, 2003) has tested the reliability of this questionnaire with 558 students and the reliability index tended to be 0.53 and 0.71 respectively. The reliability index for this research using Kuder Richardson 20 was found to be 0.83.

In this study, to analyze the data, both descriptive statistics (frequency, percentage, mean and standard deviation) and inferential statistics (point-biserial correlation test and independent t-test) were used.

Discussion

At first, we report the number of students with sensory-intuitive learning style. The percentage has also been calculated in table 2.

Table 2. Learning styles frequency distribution

Learning style	frequency	Percentage
Sensory	113	36
Intuitive	30	10
None	167	54
Total	310	100

Table 3 illustrates the frequency distribution for the verbal–visual learning style. Based on this table, 35 percent of students have verbal learning style, 16 percent visual and 49 percent cannot be attributed to any of those two learning styles.

Table 3. Frequency distribution for subjects' learning styles (verbal-visual)

Learning style	Frequency	Percentage
Verbal	109	35
Visual	51	16
None	153	49
Total	310	100

Table 3 displays the frequency distribution for subjects having verbal-visual learning styles. Based on the results, 35 percent of the subjects have verbal learning styles whereas 16 percent have visual learning styles. In addition, 49 percent did not belong to any learning styles.

Table 4. Frequency distribution for subjects' anxiety level

Computer anxiety level	Frequency	Percentage
Low	44	14
Medium	220	71
High	46	15
Total	310	100

Table 4 displays frequency distribution for anxiety level. Based on these results, 14 percent of subjects have low anxiety, 71 percent medium anxiety and 15 percent high anxiety.

Before verifying the hypothesis for this research, we examine the computer anxiety level for the students having sensory-intuitive and verbal-visual learning styles (Tables 5 and 6).

Table 5. Independent t-test to compare anxiety level score for students having sensory-intuitive learning styles

Dependent variable	learning style	No	mean	SD	Levene test		t	Degree of freedom	Level of significance
					F	Significance			
Computer anxiety	Sensory	113	42.80	9.67	0.174	0.677	.917	142	0.01
	intuitive	30	50.20	8.1					

Table 5 displays the results of independent t-test to compare anxiety level mean-score for students having sensory-intuitive learning style together with Levene test to make sure variances are the same. Since the value for F in Levene test is not statistically significant (sig=0.677), we can be sure variances are the same. In other words, the variances for sensory-intuitive group are not statistically significant so the t-value for the homogeneity of variances should be reported. In addition, based on the data in table 5 since the t (3.917) is bigger than the t-value in table (2.58) at α=0.01 level of significance with DF 141, there is a statistically significant difference between anxiety level of sensory and intuitive learning styles. In other words, the computer anxiety means score for intuitive learning style is significantly higher than students having sensory learning style.

Table 6. Independent t-test to compare computer anxiety mean scores for students having verbal and visual learning styles

Dependent variable	learning style	No	mean	SD	Levene test		t	Degree of freedom	Level of significance
					F	Significance			
Computer anxiety	verbal	109	42	10.33	0.212	0.647	2.64	157	0.01
	visual	51	47	10.7					

Table 6 displays results for independent t-test analysis compare computer amnesty mean score for student having verbal holist learning style together with Levene test to show the homogeneity of variances. Based on table 7, since Levene F value significance level (sig=0.647) is bigger than 0.05, homogeneity of variances is not rejected. In other words, the variances for verbal and visual learning styles are not significantly different so the t-value should be reported to prove the homogeneity of variances. In addition, based on the results displayed, in table 7, since the t-value (2.64) is bigger than the t value in table (2.58), there is a statistically significant difference between computer anxiety level score for students having verbal and visual learning styles. In other words, computer anxiety level score for students having visual learning styles is significantly higher than the score for student having verbal learning styles.

Hypothesis 1. There is a statistically significant relationship between computer anxiety and sensory-intuitive learning style.

Table 7. Results for point-biserial correlation coefficient test to investigate the tie between computer anxiety and sensory-intuitive learning style

Statistical index	relationship between computer anxiety and sensory-intuitive learning style
Point biserial correlation coefficient	0.32
Level of significance	0.0001
Numbers	144

Based on Table 7, the value for rpbis is equal to 0.32. This figure is bigger than the value given in the table (0.2) with the DF 144 in Alpha 0.01. Therefore, there is a statistically significant relationship between sensory-intuitive learning style and computer anxiety.

Hypotheses 2. A statistically close tie between computer anxiety and verbal-visual learning style can be discerned.

Table 8. Results for point-biserial correlation coefficient test to investigate the relationship between verbal visual learning style and computer anxiety

Statistical index	relationship between computer anxiety and verbal-visual learning style
Point biserial correlation coefficient	0.208
Level of significance	0.04
Numbers	159

Table 8 shows the results of point-biserial correlation coefficient to investigate the relationship between verbal visual learning style and computer anxiety. Based on the values given in table 8, the value for rpbs is equal to 0.208. The value gained is bigger than the value in the table (0.159) with the significant relationship between verbal visual learning style and computer anxiety.

Hypothesis3. There is a statistically significant relationship between computer anxiety and student gender.

Table 9. Results of point-biserial correlation coefficient to investigate the relationship between computer anxiety and gender

Statistical index	relationship between computer anxiety and gender
Point biserial correlation coefficient	-0.008
Level of significance	0.907
Numbers	310

Table 9 displays the results for point-biserial correlation coefficient to investigate the relationship between gender and computer anxiety. Based on the data in this table, the value for rpbis is equal to -0.008. The gained value for the relationship gained is smaller than the value in the table (0.148 with DF 308 in Alpha 0.01. Therefore, there is no statistically significant relationship between gender and computer anxiety.

Conclusion

Individual differences can be seen in all aspects of human life (Annamaria & Fabio, 2009). The reasons for these differences can be attributed to physical strengths, intelligence, aptitude, personality, motivation and many other factors (Anthony, Clarke & Anderson, 2000). These differences should be taken into account in teaching and learning (Baron, 2000). The important issue in this regard can be attributed to student's learning styles (Bozionelos, 2001). If teachers are aware of these styles, and anxiety affecting students' performance, they can adjust their teaching to achieve maximum results (Bross, 2005).

The findings of this study are compatible with the findings of other researchers (Chou, 2003; Doronina, 2003; Graf et al., 2007). They showed that there was a relationship between learning style and computer anxiety. Students having divergent learning style tended to have more computer anxiety, whereas those of a convergent learning style had a lower anxiety level. The findings of this study are also in line with the findings of another researcher (Anderson, 2001), who claims that there is a statistically significant difference between students having detailed views with having a higher degree of autonomy (Anderson, 2001).

It should be noted that since the subject of this study came from a technical university, the findings may not be applicable to all kinds of learners and thus, more research has to be done in this field. So, it is suggested that this research is repeated in various universities with students of different majors.

Educators are strongly advised to take theses individual differences into account among students and adapt their teachings to specific types of learners. They are also advised to pay attention to these issues while developing teaching material. It is suggested that by using variety of multimedia material, this anxiety level may be decreased. This can also be a topic of research to examine the impact of multimedia on the possible reduction of anxiety level among students.

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