World Applied Sciences Journal 11 (11): 1439-1445, 2010
ISSN 1818-4952
© IDOSI Publications, 2010

The Turkish Version of the Computer Attitude Scale

H. Eray Çelik

Departmant of Statistics, Faculty of Science and Literature,
Yüzüncü Yil University, 65080, Van, Turkey

Abstract: The aim of this study was to adapt the CAS (Computer Attitude Scale) instrument, which was developed by Nickell and Pinto in 1986, in region of Turkey. The sample consisted of 300 university students, attending toYüzüncü Yil University 2010. The Turkish version of the CAS instrument was applied to these students by means of translation and back translation. Internal consistency, stability and validity of the CAS measurement instrument were also tested and discussed. The findings indicated that the CAS demonstrated acceptable construct validity, reliability and stability over time, as well as the ability to predict computer usage.

Key words: Computer Attitudes · Confirmatory Factor Analysis · Attitude · Turkish

INTRODUCTION

Within this century, technology is becoming more important factor in education and is considered to have a great impact on education [1]. Over the last 30 years, computers and computer-based information systems have assumed a critically important role in almost every facet of our society. Computers have become a big part of people's lives. They are in houses, banks, cars, shops, workplaces and schools. As one moves toward future, the interaction with computers seems to have become daily routine. People are becoming aware of the fact that they would have to be knowledgeable about computers in order to be productive in their society.

Attitude is an important element in an individual's behaviors. According to Allport (1967), an attitude is a mental and neural state of readiness, organized through experience, exerting a directive or dynamic influence upon the individual's response to all objects and situations with which it is related. Eagly and Chaiken [2] defined attitude as a psychological tendency that is expressed by evaluating a particular entity with some degree of favor or disfavor. The theory of reasoned action [3] supports the view that beliefs about an object imply the creation of an attitude toward the object. This attitude leads to behavioral intentions, which in turn affect actual behavior and finally, actual behavior causes the revision of the initial attitudes. Attitudes can be examined at different levels of generality, depending on the action, target, context and time elements being evaluated. Computer attitude was defined as a person's general evaluation or feeling of favor or antipathy toward computer technologies and specific computer related activities [4]. Understanding why people accept or reject computers was proven to be one of the most important, albeit, challenging issues in information systems (IS) research [4, 5]. Computer attitude evaluation usually encompasses statements that examine users' interaction with computer hardware, computer software, other people related to computers and activities that involve computer use. Computer-related activities examined are either single instances of behavior or classes of behavior [4]. Computer usage may be viewed from the general perspective of multiple-act criteria [6]. That is, computer usage comprises a wide variety of behaviors because users employ many different computer applications for diverse tasks in their works. If one is trying to predict general computer usage and specific types of computer usage, a general attitude measure would be a better predictor than a more specific attitude measure.

Over the last 20 years or so, many computer attitudes scales were developed: they were presented in Shaft, Sharfman and Wu's [7] study. In their study some of the examples included: Attitude Toward Computer Scale [8], Attitude Toward Computer Scale [9], Attitude Toward Computers, Computer Attitude Items [10], Computer Attitude Questionnaire (CAQ) [21], Computer Attitude Scale (CAS) [11] and Computer Attitudes Scale for Secondary Students (CASS) [4, 12-15]. The CAS was first fully reported by Loyd and Gressard (1984). CASs can be

Corresponding Author: H. Eray Çelik, Departmant of Statistics, Faculty of Science and Literature,
Yüzüncü Yil University, 65080, Van, Turkey-ecelik@yyu.edu.tr

analyzed into several intrinsic variables, such as computer anxiety, computer liking, perceived usefulness, perceived ease of-use, self-confidence (SC) and perceived consequences for society [11, 12, 15-20]. Based on the literature, there is an expected relationship among computer attitudes, computer anxiety and computer skill. A positive correlation is expected between attitude toward computers and computer skill levels and a negative attitude should be associated with lower computer skill levels [4, 16, 18, 21, 22].

Shaft, Sharfman and Wu [7] determined that only four instruments' stability over time was assessed in their study in which they used 31 computer attitude scales. These instruments are Beliefs About Computers [23], Computer Attitude Scale [24], Attitude Toward Computer Usage Scale (ATCUS) [25] and Computer Attitudes Scale for Secondary Students [14]. The scale which we chose in this study is the Computer Attitude Scale (CAS) [24].

The aim of this paper is to adapt the computer attitude scale into Turkish version by considering its reliability and predictive/construct validity. We presented evidence of CAS reliability through confirmatory factor analysis and internal consistency (Cronbach's alpha) analysis. In this study we presented early studies about CAS, methods, analytic techniques and all of the analysis results one by one.

MATERIAL AND METHODS

Sample: The questionnaire was completed with a sample of 300 undergraduate students from Yüzüncü Yıl University. The 165 males and 135 females aged between 17-28 (M= 22.04, SD=1.25). 45 of these undergraduate students were from the faculty of Economics and Administrative Sciences (departments of Economy, Administration and Finance), 150 of them were from the faculty of Science and Literature (departments of Mathematics, Physics, Statistics, History, Turkish literature) and 105 of them were from the faculty of Engineering (departments of Electronics, Machine, Computer, Industry).

Students stated that the less important factor in using computer is creating and presentation (Word Processing Activities, PowerPoint, etc.), while 154 of the them stated that the most important factor is communication (e-mail, advertisement, etc.)

Materials and Procedure: Nickell and Pinto [26] constructed the 20-item, self-reporting, CAS to measure general positive and negative attitudes toward computers. Eight of the 20 items measured positive attitudes, while the remaining indicated negative attitudes. Responses to the items were made on five-point Likert scales from '1. strongly disagree' to '5. strongly agree'. Scores on the measure range from 20, indicating a very negative attitude toward computers, to 100, signifying a very positive attitude. The originally reported internal consistency using Cronbach's alpha was 0.81 for the entire scale. Test-retest data indicated a significant, positive correlation ($r = 0.86$, $p < 0.001$). Predictive validity was measured by correlating CAS scores with final course grades. These showed a significant, positive correlation ($r = 0.32$, $p < 0.01$). This particular scale is fairly generic in nature and, thus perhaps has been widely used [262]. In addition, the CAS was used in a variety of populations [6,26,28, 29]. However, Nickell and Pinto [26] did not perform factor analysis on the CAS [6].

Harrison and Rainer [21] examined the factor structure and concurrent validity of the CAS. Utilizing exploratory factor analysis, they found that the CAS contained three underlying dimensions labeled negative attitudes toward computers, positive attitudes toward computers and feelings of intimidation toward computers. The internal consistency reliability coefficients for these three construct were 0.82, 0.79 and 0.86, respectively.

Omar [30] studied on the computer attitudes of people from different countries and he found significant differences between the CAS scores of students from two different countries. He also stated that the CAS scores were related to certain cultural and background characteristics of students in each country. In his study he found Cronbach's alpha value as 0.93 and 0.91 for the statements of students of two countries. In his study he did not perform factor analysis for the CAS scores.

In their study, Rainer and Miller [6] did research on the employees' behaviors toward computers. To measure the employees' general negative and positive attitudes and attributes toward computers, they used CAS, which Nickell and Pinto developed in 1986. In their study, they presented the results of multiple regression analysis, test-rated analysis, reliability analysis and explanatory and confirmatory factor analysis of the CAS in order to assess the instruments' predictive ability, construct validity and reliability. In their study, in which they studied on two administrations and researched the reliability of positive and negative attitudes and features of intimidations toward computers, they found Cronbach's alpha values as 0.81 and 0.85 respectively for the negative attitudes of two administrations and 0.79 and 0.84 for the positive attitudes and 0.91 and 0.94 respectively for the features of

intimidations of the two administrations. It indicated acceptable reliability, stability over time and construct validity [6].

Garland and Noyes [13] found that the mean score for the items in CAS was 66.25 (SD= 8.74). A high Cronbach's alpha value as 0.79 was obtained. The removal of one item ('Computer will never replace human life') would have increased alpha to 0.81. Five components were extracted by PCA (explaining 59.82% of variance).

Translation of the CAS into Turkish: The 20 items of the CAS were translated into Turkish and then back into English to confirm the adequacy of the translation. The comparison of the original and back-translated versions led to some minor revisions of the Turkish version. These items were arranged for scoring on a five-point Likert scale from '1. Strongly disagree' to '5. Strongly agree'.

Data Analyses: Factor analysis is a statistical process used to investigate relationships between observed and latent variable sets. Two basic factor analyses are exploratory factor analysis (EFA) and confirmatory factor analysis (CFA). In exploratory factor analysis, the researcher is not aware of the number of factors measured through the measurement tool. When attempting to obtain information on the nature of factors detected a priori, instead of examining a specific hypothesis, the researcher uses exploratory factor analysis. In case of examining a theory developed by the researcher to test a hypothesis, confirmatory factor analysis is used [31, 32]. At the beginning of this study, exploratory factor analysis was applied to the data set obtained for the 20 items that made up the measurement. The data were analyzed by the SPSS statistical package.

After performing factor analysis, the Cronbach's coefficient was used to determine homogeneity of the measurement tool. In test theory, the reliability of the instrument was one of the most important and basic features of a test [33].

The linear structural relation analysis program was used for CFA with the aim of examining the fit of the factor models carried out by the exploratory analysis. CFA is a type of structural equation modeling that deals specifically with measurement models, that is, the relationship between observed measures or *indicators* (e.g., test items, test scores, behavioral observation ratings) and latent variable or *factors*. A fundamental feature of CFA is its hypothesis-driven nature. CFA is almost always used during the process of scale development to examine the latent structure of a test instrument (e.g., a questionnaire [34]. In determining the fit of the model, multi-fit measures are used. In this study, adjusted goodness-of-fit index (AGFI), goodness-of-fit index (GFI), normed fit index (NFI), nonnormed fit index (NNFI) and root mean square error of approximation (RMSEA) were used as absolute fit measures for determining the model fit [35,36].

RESULTS

Data were tested to unidimensional before factor analysis is carried out. Multi-fit measures for the unidimensional scale for data was Chi-Square = 712.40 ($df = 164$, $p < 0.001$), RMSEA = 0.11, CFI = 0.80. RMSEA was greater than 0.10 and the large Chi-Square : df ratio. Unidimensional model was considered extremely weak because of the values. The value of Cronbach's alpha was 0.79, which indicated a good internal consistency of the total scales. Data were analyzed in two stages. Responses were assigned to two data sets (n = 145 and 155) and these two data sets were subjected to a two-stage factor analysis. The first data set ($n_1 = 145$) was used to explore the underlying factor structure of the scale using EFA. The second data set ($n_2 = 155$) was used to confirm the factorial structure derived from the EFA procedure using CFA. There were two basic assumptions to be met for factor analysis: normality and correlation among variables. The Q-Q plot in SPSS was used to test the normality assumption and it verified that the 20 variables tested in this study were all normally distributed. The research also used Bartlett's Test of Sphericity (BTS) which tests the hypothesis 'correlation matrix = unit matrix'. The rejection of the hypothesis showed that correlation between the variables was different from 1.0 and the factor analysis was appropriate for the variables [37]. Both the Bartlett's Test of Sphericity (1939.614 at $p < 0.001$) and the Kaiser-Meyer-Olkin measure of sampling adequacy (KMO = 0.721) indicated that there were sufficient inter-item correlations within the data for performing factor analysis.

Table 1-3 presents the item characteristics of the negative attitudes toward computers sub-scale, positive attitudes toward computers sub-scale and feelings of intimidation toward computers sub-scale, respectively, in terms of mean, standard deviation and factor loadings on the first factor of the un-rotated solution proposed by principal component analysis, together with alpha coefficient and proportion of variance accounted for by the first factor. The factor loadings range between 0.42 and 0.77 on negative attitudes, between 0.45 and 0.73 on positive attitudes and between 0.68 and 0.87 on feelings

Table 1: Negative Attitudes toward Computers Sub-Scale

Factor N-Negative Attitudes Toward Computers	Mean	SD	Factor Loading
N1. People are becoming slaves to computers.	2.87	1.04	0.538
N2. Soon our lives will be controlled by computers.	3.11	1.10	0.584
N3. The overuse of computers may be harmful and damaging to humans.	2.13	0.96	0.480
N4. Computers are dehumanizing the society.	2.48	1.11	0.577
N5. Computers turn people into just another number.	3.30	0.76	0.771
N6. Computers are lessening the importance of too many jobs now done by humans.	3.11	1.03	0.749
N7. Computers will replace the need for working human beings.	2.26	1.01	0.421
N8. Soon our world will be completely run by computers.	3.41	1.06	0.565
Eigenvalue	2.846		
% Variance	35.576		
Cronbach's alpha	0.731		

Table 2: Positive Attitudes toward Computers Sub-Scale

Factor P-Positive Attitudes Toward Computers	Mean	SD	Factor Loading
P1. Computers are responsible for many of the good things we enjoy.	3.35	1.20	0.452
P2. There are unlimited possibilities of computer applications that haven't even been thought of yet.	3.66	0.86	0.513
P3. Computers can eliminate a lot of tedious work for people.	3.72	0.90	0.574
P4. Computers are a fast and efficient means of gaining information.	4.01	0.93	0.622
P5. The use of computers is enhancing our standard of living.	3.41	0.81	0.695
P6. Computers are bringing us into a bright new era.	3.04	0.72	0.682
P7. Life will be easier and faster with computers.	3.57	0.88	0.732
Eigenvalue	2.67		
% Variance	38.093		
Cronbach's alpha	0.700		

Table 3: Feelings of Intimidation toward Computers Sub-Scale

Factor F-Feelings of Intimidation Toward Computers	Mean	SD	Factor Loading
F1. Computers will never replace human life	3.77	1.38	0.869
F2. Computers make me uncomfortable because I don't understand them.	4.02	1.05	0.684
F3. I feel intimidated by computers.	3.48	1.11	0.871
F4. Computers intimidate me because they seem so complex.	4.01	0.98	0.753
F5. Computers are difficult to understand and frustrating to work with.	3.56	1.03	0.683
Eigenvalue	3.014		
% Variance	60.276		
Cronbach's alpha	0.833		

All items were answered on 5-point Likert scales ranging from 1 ''strongly disagree'' to 5 ''strongly agree''.

Table 4: Results of CFA

Factors/Items	*Completely standardized loading*	*t-value*[a]	R^2
Factor N-Negative Attitudes Toward Computers			
N1	0.57	7.41	0.33
N2	0.56	7.20	0.31
N3	0.41	5.13	0.17
N4	0.50	6.38	0.25
N5	0.26	3.23	0.10
N6	0.45	5.63	0.20
N7	0.35	4.37	0.12
N8	0.47	5.95	0.22
Factor P-Positive Attitudes Toward Computers			
P1	0.36	4.60	0.13
P2	0.40	5.13	0.16
P3	0.47	6.21	0.22
P4	0.51	6.78	0.26
P5	0.63	8.65	0.40
P6	0.61	8.25	0.37
P7	0.68	9.41	0.46
Factor F-Feelings of Intimidation Toward Computers			
F1	0.97	18.83	0.95
F2	0.46	6.93	0.21
F3	0.98	19.01	0.96
F4	0.47	7.03	0.22
F5	0.42	6.23	0.18

[a]$p < 0.05$

of intimidation toward computers. The three Cronbach's alpha coefficient of 0.73, 0.70 and 0.83 were good indicators of the homogeneity and unidimensionality of each of the sub-scales. The reliability coefficient computed for the CAS of 20 items was 0.79. Based on the Cronbach's value, the measurement tool used appeared to be fairly reliable [12, 38, 39].

The conformity of the three sub-scales obtained as a result of exploratory analysis was evaluated as confirmatory factor analysis. Results concerning CAS analysis were presented in Table 4. By using LISREL 8.54, data regarding 20 items of attitudes were used in the application of CFA. In the examination of this model with three latent variables, fit statistics were examined in detail. The goodness-of-fit indices suggested satisfactory results for the data; Chi-Square = 485.59 ($df = 178$, $p < 0.001$), RMSEA = 0.09, Standardized RMR = 0.10, CFI = 0.93, GFI = 0.90 and AGFI = 0.86. Another step in the assessment of the fit of individual parameters in a model is to determine the viability of their estimated values. The completely standardized factor loadings for each indicator are listed in Table 4. The results showed that all loadings in the model were significant (*t-value > 1.96*) and the indicators loaded very well on their respective factors. Since all items were loaded on their designated factors and were substantially explained by latent factors, it was concluded that the relationships between the attitude items and the three latent factors were confirmed by the data. As seen in Table 4, there was a low negative correlation between the latent variables of N and P ($r = -0.08$, $p > 0.01$). It was not statistically significant. The relationship between F latent and N latent was determined to be moderately strong ($r = 0.47$, $p < 0.001$). There was a moderate relationship between F and P latent variables ($r = 0.28$, $p < 0.001$). The loads of the items in the dimension of F varied between 0.42 and 0.98, which were determined to have a less error covariance. These items were also assumed to have a higher validity than the items in the other dimensions. The dimensions with the lowest loads were represented by F5 in F dimension (0.42), N5 in N dimension (0.26) and P1 in P dimension [37].

DISCUSSION

According to the results of ICT Usage Survey on Households and Individuals carried out in 2007 by Turkish Statistical Institute, 18.94% of households had access to the Internet at home. According to the survey results 79.39% of households with Internet access at home connected to Internet via PC. Broadband connection (ADSL etc.) was the most widely used Internet connection type with 78.03% [40].

In the period of April-June 2007, proportion of computer use of all the individuals in 16-74 age groups was 29.46% and Internet use was 26.67%. At the same period, 61.11% of all Internet users used the Internet on an almost daily basis in the 3 months preceding the survey, while 25.50% stated they used the internet at least once a week.

By considering the age group, proportion of computer use and Internet use of individuals was the highest in 16-24 age groups, followed by those between 25-34 age group. By considering the education level, proportion of computer use and Internet use were the highest for university graduates by 84.86% and 82.89% respectively. Proportion of computer use and Internet use for students were 86.83% and 81.89% respectively. By considering the employment status, proportion of computer and Internet use were 54.82% and 51.38% respectively for employees. These proportions were 44.06% and 41.15% for unemployed individuals respectively.

In the period of April-June 2007, 90.54% Internet user used Internet for searching for information and on-line services, 80.74% used for communication activities, 52.27% used for education activities, 26.18% used for interaction with public authorities. 5.65% of Internet users ordered goods or services over the Internet in the period of April-June 2007. 28.20 percent of Internet users bought electronic devices such as mobile phone, camera, radio, TV, DVD player, video etc. over the Internet between June 2006 and June 2007. According to results of the survey, 76.49 percent of internet user had no need for ordering goods or services over the Internet.

In Turkey, where computer usage is increasing rapidly everyday, the computer education basically starts at university. In primary education, by 8 years, students take courses on computer education only once a week. In developing countries, like Turkey, people should be earned positive attitudes towards computer use.

Whereas people use computer technology to play video games, to have fun or to communicate (msn, chat), it should serve as a means of education to improve their personal characteristics. The positive attitudes toward using computer will also put them into a form of correct behavior.

General behaviors toward computers require a general measure of computer attitudes. Although current instruments that measure computer attitudes are useful, they have limitations. Many of these instruments target a specific type of computer, a specific type of software, or a specific user population. These instruments are excellent when used in conjunction with a specific behavior toward computers or a specific population [5]. The CAS is such a general measure of attitudes. When used to measure general attitudes toward computers, the CAS demonstrates acceptable reliability and construct validity, stability over time and ability to predict computer usage [6, 7].

In this study the Turkish version of CAS, which was developed by Nickell and Pinto, was studied. We used this scale because the CAS was determined as a stability instrument over time in many studies. As a result of the analysis, similar results were found as in other studies.

REFERENCES

1. Birisci, S., M. Metin and M. Karakas, 2009. Prospective Elementary Teachers' Attitudes Toward Computer and Internet Use: A Sample from Turkey. World Appl. Sci. J., 6(10): 1433-1440.
2. Eagly, A.H. and S. Chaiken, 1993. The psychology of attitudes. Fort Worth: Hardcourt Brace Jovanovich.
3. Ajzen, I. and M. Fishbein, 1980. Understanding attitudes and predicting social behavior. Englewood Cliffs, NJ: Prentice-Hall.
4. Smith, B., P. Caputi and P. Rawstorne, 2000. Differentiating computer experience and attitudes toward computers: an empirical investigation. Computers in Human Behavior, 16: 59-81.
5. Davis, F.D., R.P. Bagozzi and P.R. Warshaw, 1989. User acceptance of computer technology: a comparison of two theoretical models. Management Science, 35: 982-1003.
6. Rainer, R.K. and M.D. Miller, 1996. An assessment of the psychometric properties of the computer attitude scale. Computers in Human Behavior, 12(1): 93-105.
7. Shaft, T.M., M.P. Sharfman and W.W. Wu, 2004. Reliability assessment of the attitude towards computers instrument (ATCI). Computers in Human Behavior, 20: 661-689.
8. Francis, L.J., 1993. Measuring attitude toward computers among undergraduate college students the affective domain. Computers in Education, 20(3): 251-255.
9. Reece, M.J. and R.K. Gable, 1982. The development and validation of a measure of general attitudes toward computers. Educational and Psychological Measurement, 42: 913-916.
10. Pelgrum, W.J. and T.J. Plomp, 1993. The IEA study of computers in education: Implementation of an innovation in 21 educational systems. Oxford: Pergamon Press.
11. Loyd, B.H. and C.P. Gressard, 1984. Reliability and factorial validity of computer attitude scale. Educational and Psychological Measurement, 44: 501-505.
12. Francis, L.J., Y.J. Katz and S.H. Jones, 2000. The reliability and validity of the Hebrew version of the Computer Attitude Scale. Computers and Education, 35: 149-159.
13. Garland, K.J. and J.M. Noyes, 2007. Computer attitude scales: How relevant today. Computers in Human Behavior, 24(2): 563-575.
14. Jones, T. and V.A. Clarke, 1994. Diversity as a determinant of attitudes: A possible explanation of the apparent advantage of single-sex settings. J. Educational Computing Res., 12: 51-64.
15. Robertson, S.I., J. Calder, P. Fung, A. Jones and T. O'Shea,1995. Computer ttitudes in an English secondary school. Computer Education, 24(2): 73-81.
16. Beckers, J. and H. Schmidt, 2001. The structure of computer anxiety: a six-factor model. Computers in Human Behavior, 17: 213-224.
17. Coffin, R. and P. MacIntyre, 1999. Motivational influences on computer-related affective status. Computers in Human Behavior, 15: 549-569.
18. Hasan, B., 2003. The influence of specific computer experiences on computer self-efficacy beliefs. Computers in Human Behavior, 19(4): 443-450.
19. Heinssen, R.K., C.R. Glass and L.A. Knight, 1987. Assessing computer anxiety: Development and validity of the computer anxiety rating scale. Computers in Human Behavior, 3: 49-59.
20. Levine, T. and S. Donitsa-Schmidt, 1998. Computer use, confidence, attitudes and knowledge: A causal analysis. Computers in Human Behavior, 14: 125-166.
21. Harrison, A.W. and R.K. Rainer, 1992. An examination of the factor structures and concurrent validities for the computer attitude scale, the computer anxiety rating scale and the computer self-efficacy. Edu. Psychol. Measurement, 52: 735-745.

22. Knezek, G.A. and K.T. Miyashita, 1993. Handbook for the young children's computer inventory. Denton, TX: Texas Center for Educational Technology.
23. Ellsworth, R. and B.E. Bowman, 1982. A "beliefs about computers" scale based on Ahl's questionnaire items. The Computing Teacher, 10: 32-44.
24. Nickell, G.S. and J.N. Pinto, 1986. The computer attitude scale. Computers in Human Behavior, 2: 301-306.
25. Belleau, B.D. and T.A. Summers, 1993. Comparison of selected computer attitude scale. J. Consumer Studies and Home Econom., 17: 303-316.
26. Nickell, G.S. and P.C. Seado, 1986. The impact of attitudes and experience on small business computer use. American Journal of Small Business, 10: 37-48.
27. LaLomia, M.J. and J.B. Sidowski, 1991. Measurement of computer attitudes: A review. Intl. J. Human-Computer Interaction, 3: 171-197.
28. Pinto, J.N., M. Calvillo and G.S. Nickell, 1985. Concurrent validity study of the computer attitudes scale. ERIC Document Reproduction Service No. ED., 263: 138.
29. Winkel, M., G. Nickell, J. Pinto, D. Novak, L. Contrares and P. Seado, 1985. Attitude toward computers: A cross-cultural comparison. Paper presented at the meeting of the Southwestern Psychological Association. Austin, TX.
30. Omar, M.H., 1992. Attitudes of college students towards computers: a comparative study in the United States and the Middle East. Computer in Human Behavior, 8: 249-257.
31. Sharma, S., 1996. Applied multivariate techniques. United States: John Wiley and Sons.
32. Wlash, W.B. and N.E. Betz, 1995. Test and assessment (3rd ed.). Prentice Hall.
33. Anastasi, A., 1988. Psychological testing (6th ed.). New York: MacMillan.
34. Browne, T.A., 2006. Confirmatory Factor Analysis for Applied Research. The Guilford Press, New York.
35. Byrne, B.M., 1998. Structural equation modeling with LISREL, PRELIS and SIMPLIS: Basic, concepts, applications and programming. New Jersey: Lawrence Erlbaum Associates Publisher.
36. Jöreskog, K. and D. Sörbom, 2001. LISREL 8: User's reference guide, scientific software. Chicago: International Inc.
37. Hutcheson, G. and N. Sofroniou, 1999. The multivariate social scientist: Introductory statistics using generalized linear models, Sage Publication, Thousand Oaks, CA.
38. Carter, C.D., 1997. Doing quantitative psychological research: from design to report. UK: Psychology Press Ltd.
39. Yilmaz, V. and H.E. Çelik, 2008. A model for explanation of personal attitudes toward traffic of candidate drivers attending drivers' courses: Risky candidate driver's attitude model. Transportation Research Part F: Traffic Psychology and Behaviour, 11(4): 233-24.
40. Turkish Statistical Institute, 2007. Result of The ICT Usage Survey on Households and Individual, Number: 186.