

Utilization of Information and Communication Technologies as a Predictor of Educational Stress on Secondary School Students

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ABSTRACT

The purpose of this study is to examine the relationship between utilization of information and communication technologies and educational stress. Participants were 411 secondary school students. Educational Stress Scale and Utilization of Information and Communication Technologies Scale were used as measures. The relationships between students' educational stress and utilization of information-communication technologies were examined by using correlation analysis and stepwise regression analysis. Educational stress was predicted positively getting information, research, communication, game and self-expression. Results were discussed with respect to the related literature.

Keywords: Educational stress, information and communication technologies, high school students.

INTRODUCTION

Nowadays, the expectation of the society has increased and this has created some undesirable feelings on people. The expectation of the society and family members are perceived as pressure by individuals. Hence, doing something under pressure in order to meet the expectations creates emotional stress. Canon (1914) described stress as cognitive and physical conditions in alarm situations. Moreover, according to Selye (1936), stress is a physical condition characterized by strain and resistance to external stimuli and this situation is called as General Adaptation Syndrome (GAS) (Lazarus and Folkman, 1984). This stress condition that can result in both favorable and unfavorable outcomes affects work, school, and family lives. The relationship with family members and friends affects students' health and happiness (Weber, 2003). Especially in education process in Turkey, family's pressure on students in order to be successful in school life plays a significant role on students and their behaviors. Hence, students deal with academic, personal, and social pressures (Gemmill and Peterson, 2006). These pressures impose students. The source of this can be the use of information technologies. However, if the students have already used the information technologies, and they have been familiar to it, it can be considered as a factor that decreases the pressure. Well then, in which areas information technologies come into students' daily lives? Currently, information technologies have been used by students more than ever before. Information and communication technologies are information technologies that are used in reaching information, storing that information, producing information or making regulations on it, and transmitting this information to wherever we want with the help of networks (Eroğlu and Yazar, 2013). Each visual, auditory, written, and published material, used in acquiring and producing information, builds up information and communication technologies. Information technologies, taking part in every area of our lives, are technologies that enable transmitting information without time, place, and distance (MEB, 2013). Recently, technology has begun to be used in our education system, the information technology classes have been formed in most of the schools, and technology has equipped schools (Eroğlu and Yazar, 2013). The use of technology in education has affected the structure of education system, and thus technology has been used in teaching learning activities. Educational technologies enable students to reach information by acting as a bridge. Therefore, students can acquire information easily. At this point, the important thing is that educational technologies used in teaching- learning process should be appropriate to students' learning skills, and they should be used by students easily (İşman, 2011). What kind of information technologies is used by students and for what purpose? The social networks come first since internet resources have an important role. Obtaining information can be actualized via internet. Students need some technological devices in their daily lives and school environment (Gemmill and Peterson, 2006). Despite the benefits of these devices, psychologists and educationists are aware of the negative effects of them in terms of psychological and physical features (Greenfield, 2000).

Recently, technology use has become a necessity in order to meet the expectation of peers and teachers as well as the society. In addition, students have to use this technology and this situation puts a pressure on students. Students' feeling of deficient and insufficient because of not being able to use technological devices creates some negative outcomes. Besides, several studies show that stress factors are related to individual's psychological conditions, and they have negative effects on health (Pandya, Deshpande and Karani, 2012). Information technologies of which use is difficult or unknown may confront students with negative situations among their peers. Benefiting from information technologies in class environment as a teaching- learning material has a significant effect because these technologies change the teaching process and confront students with unknown technologies (Bitner and Bitner, 2002). Hence, the anxiety related to information technologies has become widespread in academy (Ekizoglu and Ozcinar, 2010; Rahimi and Yadollahi, 2011). As a result of this, students may be unsuccessful in courses or they may dislike courses so that this situation may be one of the reasons of stress. Therefore, not being able to meet the expectation of external factors comes into question (Ang., Klassen, Chong, Huan, Wong, Yeo, and Krawchuk, 2009). Indeed, if individuals have no ability to deal with these expectations, arising of stress will be inevitable (Lazarus, 1966). The current study aims to investigate the relationship between students' educational stress and the level of their information technology use.

The present study

Few studies have connected educational stress with Information and Communication Technologies characteristics (Rahardjo, Juneman ve Setiani, 2013; Fakun, 2009; Gemmil ve Peterson, 2006) and, to our knowledge, no research has been conducted investigating educational stress' relationship to Information and Communication Technologies. Thus, the aim of the present study is to examine the relationship between Utilization of Information and Communication Technologies and Education Stress. In the present research, the educational stress has been considered as an outcome and students' Utilization of Information and Communication Technologies as the predictor. It is hypothesized that students' Utilization of Information and Communication Technologies would be associated positively with educational stress based on the studies on support Information and Communication Technologies (Gemmil and Peterson, 2006; Mark, Wang and Niiya, 2014) and educational stress (Arslan, 2015; Lin, Lin, Wang and Chen, 2009; Rahardjo, Juneman and Setiani, 2013).

METHOD

Participants

Participants were 411 (212 (%51) female and (199 (%49) male secondary school students from Sakarya. Of the participants, 263 (64 %) were seventh grade-students, 148 (36%) were eight grade-students. Their ages ranged from 12 to 14 years old ($M = 13.2$, $SD = .66$).

Measures

Educational Stress Scale (ESS). *Educational Stress Scale (ESS).* The ESS is developed by Sun, Dunne, Hou, and Xu (2011) consists of 16 items (five factor: workload, worry about grades, self-expectation, and despondency) and each item was presented on a 5-point Likert-type scale ranging from 1 = strongly disagree to 5 = strongly agree with a higher score indicating greater stress. Turkish adaptation of this scale had been done by Akın, Gediksiz, Arslan, and Akın (2012). They found that internal consistency was .87 for Turkish university students. The goodness of fit index values of the model were $RMSEA=.037$, $NFI=.97$, $NNFI=.99$, $CFI=.99$, $IFI=.99$, $RFI=.96$, $GFI=.95$, $AGFI=.92$ and $SRMR=.041$. The corrected item-total correlations of ESS ranged from .40 to .60. Factor loadings ranged from .68 to .95.

The Utilization Of Information And Communication Technologies Scale. The Utilization Of Information and Communication Technologies Scale developed by Özmusul (2011) consists of 18 items and each item was presented on a 4-point Likert type scale ranging from 1= Never to 4= Always. It was determined that the scale had five factors. These factors are acquiring information, research and examination, communication, entertainment-game and self expression. The calculated alpha Cronbach coefficient for the scale was 0.85. A sum of all scores yields a total score that ranges from 4 to 72; a higher score indicates a higher utilization of information and communication technology level.

Procedure

Students voluntarily participated in research, completion of the scales was anonymous and there was a guarantee of confidentiality. The scales were administered to the students in groups in the classrooms. The measures were counterbalanced in administration. Prior to administration of scales, all participants were told about purposes of the study. In this research, Pearson correlation coefficient and multiple regression analysis were utilized to determine the relationships between dimensions of Utilization of Information and Communication Technologies and Educational Stress.

Procedure and Data Analysis

Convenience sampling technique was used in selection of participants. Convenience sampling is a non-probability sampling technique in which participants are selected because of their convenient accessibility and proximity to the researcher (Bryman, 2004). For this reason, the results of this study did not make inference from population which let to decrease external validity. Participants voluntarily participate and are free to fill out questionnaires without pressure. Completion of the questionnaires was anonymous and there was a guarantee of confidentiality. The instruments were administered to the students in groups in the classrooms. The measures were counterbalanced in administration. Prior to administration of measures, all participants were told about purposes of the study. In this research, Pearson correlation coefficient and multiple regression analysis were utilized to determine the relationships between Utilization of Information and Communication Technologies and Educational Stress. These analyses were carried out via SPSS 11.5.

RESULTS

Descriptive Data and Inter-correlations

Table 1 shows the means, standard deviations, inter-correlations, and internal consistency coefficients of the variables used. Preliminary correlation analysis showed that information ($r = .35$), research ($r = .21$), communication ($r = .12$), game ($r = .35$) and Self-expression ($r = .35$) related positively associated with educational stress.

Table 1: Descriptive statistics and inter-correlations of the variables

Variables	Informational	Research	Communication	Game	Self-ExpressionS.	Educational
Information	—					
Research	.58**	—				
Communication	.40**	.44**	—			
Game	.52**	.40**	.44**	—		
Self-expression	.44**	.41**	.36**	.66**	—	
Educational Stress	.35**	.21**	.12**	.35**	.35**	—
Mean	48.4	13.1	8.9	14.56	7.5	5.4
Standard deviation	7.4	3.5	2.3	4.0	2.6	1.8

** $p < .01$

Multiple Regression Analysis

Before applying regression, assumptions of multiple regression were checked. The data were examined for normality by the Kolmogorov-Smirnov test. The Kolmogorov-Smirnov test indicated normality of distributions of test scores for all tests in the current study. Outliers are cases that have data values that are very different from the data values for the majority of cases in the data set. Outliers were investigated using Mahalanobis distance. A case is outlier if the probability associated with its D^2 is .001 or less (Tabachnick & Fidell, 2001). Based on this criterion, five data were labeled as outliers and they were deleted. Multi-collinearity was checked by the variance inflation factors (VIF). All the VIF values were less than 10 (Tabachnick & Fidell, 2001), which indicated that there was no multi-collinearity.

Multiple regression analysis have been applied to determine which dimensions of communication technologies were the best predictors of educational stress. Table 2 showed the results of multiple regression analysis where the independent variables were dimensions of between utilization of information and communication technologies and the dependent variable was educational stress.

Table 2: Summary of stepwise multiple regression analysis for variable predicting educational stress

Variables	<i>B</i>	<i>SE_B</i>	β	<i>t</i>	<i>p</i>	<i>R</i>	<i>R</i> ²	<i>F</i>	<i>p</i>
Step 1									
Information	.71	.096	.34	7.4	.00	.34	.120	55.75	.00
Step 2									
Information	.70	.11	.34	5.9	.00	.34	.12	27.82	.00
Research	.03	.17	.01	.17	.86				
Step 3									
Information	.71	.12	.34	5.9	.00	.34	.12	18.5	.00

Research	.05	.18	.01	.29	.77				
Communication	-.04	.09	-.02	-.44	.65				
Step 4									
Information	.50	.12	.24	4.00	.00				
Research	.001	.18	.00	.008	.99	.40	.16	20.3	.00
Communication	-.17	.09	-.09	-1.72	.08				
Game	.73	.15	.26	4.76	.00				
Step 5									
Information	.48	.12	.23	3.8	.00				
Research	-.08	.18	-.02	-.44	.65				
Communication	-.17	.09	-.09	-1.83	.06	.43	.17	.18.6	.00
Game	.43	.18	.15	2.40	.01				
Self-expression	.77	.24	.19	3.14	.00				

* $p < .01$

Information entered the equation first, accounting for 12% of the variance in predicting educational stress. Game entered on the fourth step accounting for an additional 5% variance. The last regression models Information, Research, Communication, Game, and Self-expression as predictors of educational stress and accounted for 18% of the variance in educational stress. The standardized beta coefficients indicated the relative influence of the variables in last model with Information ($\beta = .23$, $p < .01$), Research ($\beta = .02$, $p < .01$), Communication ($\beta = .09$, $p < .01$), Game ($\beta = .15$, $p < .01$), and Self-expression ($\beta = .15$, $p < .01$) all significantly influencing educational stress and information was strongest predictor of educational stress.

DISCUSSION

The present study, aimed to investigate the relationship between students' educational stress and the level of their information technology use, was conducted on the 7th grade students, and results showed that there was a positive relationship between students' educational stress and the level of their information technology use. In other words, when students have to use information technologies their educational stress increases. Rahardjo, Juneman and Setiani (2013) conducted a study on college students in Indonesia and investigated the effect of academic stress and anxiety of computer use and they found similar results. It was found that students who had anxiety due to computer use, and experienced academic stress, procrastinated the necessity of the course which requires computer use. Gemmil and Peterson (2006) carried out a study on university students and indicated that students spent lots of time with technology and related to this, they investigated students' perceived stress level. Indeed, 25% of students had problems related to technology use, and perceived stress level increased in accordance with technology use. Mark, Wang and Niiya (2014) conducted a study on university students and examined the relationship between time spending on computer and stress. In this research, 48 university students in America let using computer for 7 days when students were awake in their natural environment. Students' stress level was measured by biosensors. Thus, they found that there was a positive relationship between time spending on computer and students' stress level. According to Fakun (2009), individuals' anxiety due to computer use affected their perception about the easiness of computer use negatively. Individuals who experienced anxiety had trouble with fulfilling duties which required computer use even if they knew computer use. Lin, Lin, Wang and Chen (2009) carried out a study on students who studied at ten different technology schools, and they investigated the reasons of students' educational stress. Students experienced stress related to their academic problems at technology schools, and they perceived themselves as insufficient to solve these problems. Hence, this made students unhappy and affected their cognitive and physical health negatively. At the end of the study, authors divided students' educational stress reasons in four dimensions: stress related to test scores (the content of tests, test results, and expectations of families), stress related to teachers (the content of course materials, teaching methods and techniques, and assignments), stress because of themselves (expectations about themselves, selection of topics, time management), and stress due to their peers (group works, academic competition, and disappointing behaviors of their classmates). Findings that supported the results pointed out that students' stress due to course materials, teaching methods, and assignments at technology schools were related to technological devices they had to use. Furthermore, according to the study which investigated information technology use on 7th grade students (Tuti, 2005), students preferred mostly the following activities; playing games, downloading music, searching information resources, drawing and painting.

Students benefited information technologies mostly because of doing entertaining activities. Another finding was that students had positive opinions about information technology use in education. Students thought that if teachers use information technologies in teaching, topics will be more interesting and enjoyable. When examined previous researches, students thought that using information technologies for enjoyable activities, and social media in their daily lives decreased their stress. On the other hand, when they had to use information technologies for assignments, they experienced stress and anxiety. This stem from students' troubles in terms of using information technologies. Especially, for 7th grades, they may have problems in terms of having and using information technologies. In fact, maybe students do not know using information technologies effectively. Therefore, when information technology use is necessary for teaching- learning process, students may perceive this as a pressure and they may experience stress. All in all, using information technologies causes educational stress on 7th grades. It can be suggested that in teaching process, applications, seminars, and courses related to students' effective information technology use should be arranged.

REFERENCES

- Akın, A., Gediksiz, E., Arslan, S., & Akın, Ü. (2012). The validity and reliability of the Turkish version of educational stress scale for adolescents (ESSA). International Conferences on New Horizons in Education, 2-8 Haziran, Czech Republic/Prague.
- Arslan, S. (2015). The Predictive Role of Educational Stress on Social Emotional Learning in Elementary Students. *Educational Research and Reviews*, 10 (1) 184-190.
- Ang, R. P., Klassen, R. M., Chong, W. H., Huan, V. S., Wong, I. Y., Yeo, L. S., & Krawchuk, L. L. (2009). Cross-cultural invariance of the academic expectations stress inventory: adolescent samples from Canada and Singapore. *Journal of Adolescence*, 32 (5), 1225-1237.
- Bryman, A. (2004). *Social Research Methods* (2nd edition). Oxford: Oxford University Press.
- Bitner N., & Bitner, J. (2002). Integrating technology into the classroom: eight keys to success. *Technology and Teacher Education* 10, 95-100.
- Ekizoglu, N., & Ozcinar, Z. (2010). The relationship between teacher candidates' computer and internet based anxiety and perceived self-efficacy. *Procedia Social and Behavioral Sciences*, 2: 5881-5890.
- Eroğlu, E. & Yazar, D. (2013). *Ortaöğretim Bilgi ve İletişim Teknolojisi Ders Kitabı*. Ankara: Milli Eğitim Bakanlığı Yayınları.
- Fakun, D. (2009). How to mitigate the significant negative influence of computer anxiety on ease of use perceptions. *Behaviour & Information Technology*, 28, 223-238.
- Gemmill, E. & Peterson, M. (2006). Technology use among college students: implications for student affairs professionals. *NASPA Journal*, 43 (2), 280-300.
- Greenfield, D. N., (2000). Psychological characteristics of compulsive internet use: A preliminary analysis. *Cyber Psychology & Behavior*, 5, 403-412.
- İşman, A. (2011). *Öğretim Teknolojileri ve Materyal Tasarımı*. Ankara: Pegem Akademi Yayınları.
- Lazarus, R.S. (1966). *Psychological Stress and the Coping Process*. New York: McGraw-Hill.
- Lazarus, R. & Folkman, S. (1984). *Stress, appraisal, and coping*. New York: Springer.
- Lin, Y. M., Lin, S. C., Eang, M. Y. & Chen, F. S. (2009). What causes the academic stress suffered by students at universities and colleges of technology? <http://ir.lib.cyut.edu.tw:8080/bitstream/310901800/9028/1/What%20causes%20the%20academic369.pdf> adresinden 24 Eylül 2014 tarihinde indirilmiştir.
- Mark, G., Wank, Y. & Niiya, M. (2014). Stress and multitasking in everyday college life: an empirical study of online activity. *CHI 2014*, April 26 - May 01, Toronto, ON, Canada.
- MEB, (2013). Bilgi ve İletişim Teknolojileri (BİT) Ürünleri. meb12.meb.gov.tr/meb_iys_dosyalar/22/01/706462/dosyalar/2013_12/06113759_1.3.1.btrnleri1.3.2.bteitleri.pdf adresinden 25 Ekim 2014 tarihinde indirilmiştir.
- Özmuşul, M. (2011). Bilişim teknolojilerinden yararlanma ölçeğinin geliştirilmesi. *Kuramsal Eğitim Bilim*, 4(1), 1-17.
- Pandya, B. U., Deshpande, M. R. C., & Karani, A. (2012). A Study on Impact of Academic Stress on MBA Students of Gujarat Technological University. *Researcher's World-Journal of Arts, Science and Commerce*, 3(3).
- Rahimi, M., & Yadollahi, S. (2011). Success in learning English as a foreign language as a predictor of computer anxiety. *Procedia Computer Science*, 3, 175-182.
- Rahardjo, W., Juneman, Setiani Y. (2013). Computer anxiety, academic stress, and academic procrastination on college students. *Journal of Education and Learning*, 7 (3), 147-152.
- Sun, Jiandong, Dunne, Michael P., Hou, Xiang-Yu, & Xu, Ai-qiang (2011). Educational stress scale for adolescents : development, validity, and reliability with Chinese students. *Journal of Psychoeducational Assessment*, 29(6), 534-546.
- Tabachnick, B. G., & Fidell, L. S. (2001). *Using Multivariate Statistics*. Boston: Allyn and Bacon.

- Tuti, S. (2005). Eğitimde Bilişim Teknolojileri Kullanımı Performans Göstergeleri, Öğrenci Görüşleri Ve Öz-Yeterlik Algılarının İncelenmesi. Yayımlanmamış yüksek lisans tezi, Hacettepe Üniversitesi, Fen Bilimleri Enstitüsü, Ankara.
- Weber, L. (2003). Relationships among spirituality, social support, and childhood maltreatment in university students. *Counseling and Values*, 47 (2), 82-96.