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PERCEPTIONS OF STUDENTS ABOUT TECHNOLOGY INTEGRATION

ABSTRACT

The researches mainly focused on the students' achievement in technology integrated courses. However, there are limited researches on students' perceptions of technology and their perceptions of whether technology use has an effect on their academic achievements. The major aim of this study is to reveal junior high school students' technology perceptions. For this purpose, both quantitative and qualitative data were gathered. Adopted Turkish version of CATTS and four open-ended questions were distributed to the participants to reveal their perception on the technology integration in education. The validated Turkish version of CATTS has three dimensions; "technology interest", "technology resistance" and "technology aptitude". These factors will be evaluated based on pupils' demographic characteristics (gender, family educational level, and computer possession), level of computer use, and purpose of computer and internet use. Students' and their teachers' ICT use will be presented by the help of open ended questions. Along with this, students' perceptions on the use of such technological devices on their personal development will also be revealed by the analysis.

Keywords: Technology Perception, Technology Integration, Junior High School Students, Computer Use, Academic Achievement

ÖĞRENCİLERİN TEKNOLOJİ ENTEGRASYON ALGISI

ÖZET

Bireysel ve dijital öğelerle donatılmış çağımızda çalışmalar sonucunda teknolojinin eğitimde teknoloji entegrasyonunun öğrencilerin öğrenmesine olumlu katkısı olduğu bulunmuştur. Genelde teknoloji entegre edilmiş derslerdeki öğrenci başarısı üzerine araştırmalar yapılmıştır. Bunun yanı sıra öğrencilerin hem teknoloji algısı ve hem de eğitimde teknoloji entegrasyonunun kendilerinin akademik başarısına etkisi üzerine görüşlerine yer veren çok az sayıda çalışma bulunmaktadır. Bu çalışmanın amacı ilköğretim seviyesindeki öğrencilerin teknoloji algısını ortaya koymaktır. Bu neden den dolayı hem nicel hem de nitel veriler toplanmıştır. Nicel bölüm için Children's Attitudes toward Technology Survey (CATTS)anketinin Türkçe uyarlaması kullanılmıştır. Nitel bölümde ise Öğrencilerin ve öğretmenlerin teknoloji kullanımları ve bunların öğrencilerin akademik başarılarına etkileri de açık uçlu sorular analiz edilmiştir.

Anahtar Kelimeler: Teknoloji Algısı, Teknoloji Entegrasyonu, İlköğretim Öğrencileri, Bilgisayar Kullanımı, Akademik Başarı

1. INTRODUCTION (GİRİŞ)

Since technology become one of the most popular tool for daily activities, some problems about various aspects of it has been emerging. There might be many reasons for these problems, but finding the roots might be really challenging because the audience is very crowded with different technology backgrounds, gender, attitudes, perceptions, and so forth. Children have a considerable piece within this crowd. They are especially interested in technological devices such as television, computers, video game consoles, cellular phones, etc. Interactive nature of such devices as cellular phones makes the use of technology "anytime and anywhere". For example, it is very common seeing an elementary school child texting as s/he walks. Sometimes, such kind of a communication can become the main style of interaction with social circle [1]. As these children are growing within these environments surrounded by technological developments, their perceptions on technology have started to become a vital element to provide them with healthy educational environments.

Among current technologies, computers play an important role within educational context. That is why, schools have been trying to adapt children to catch up with computer-related skills [2]. School offerings of technological experiences are important but to take the advantage of these technologies, there might be varying factors affecting these experiences. In other words, physical accessibility to the computers either at home or at school does not guarantee the effective use of computers. Student's own perceptions might play an important role to enable them to be technology-literate people. However, technology perceptions might get affected by many surrounding factors such as gender, computer possession, and etc. Although most of the studies showed that gender is no more an issue of technology [3 and 4], in the literature the contrary studies also exists [5]. Another effect on technology perceptions of children could relate with parent's educational level. There are studies indicating the positive effects of high parent's education level on child's use of technology [6].

Although computer possession and level of computer use might not directly affect the technology perception, there are studies showing indirect impacts. For example, in a study conducted by [7] it was found that students' perceptions about effectiveness of technology increase as computers are used frequent. Similarly, in another study, both computer possession and computer use levels was found related to attitudes towards computers [8]. In addition to these factors, the purpose of computer and/or Internet use might influence the technology perceptions of children despite the limited studies in the literature. For example, Birgin and collegue found the differences between males and females with regard to purpose of the computer use [10].

2. RESEARCH SIGNIFICANCE (ÇALIŞMANIN ÖNEMİ)

In this study, the main concern is to explore the technology perceptions of junior high school students. Besides, factors affecting the technology perceptions were discovered. To collect data, Children's Attitudes toward Technology Survey (CATTS) [9] was used, but since the target sample are Turkish students, adopted version of the scale was administered (11). According to this scale, technology perception was measured into three subscales that are "technology interest," "technology resistance," and "technology aptitude." Moreover, students' demographics, level of computer use, purpose of computer and/or Internet use were also collected and analyzed in order

to understand better the underlying issues about technology perceptions of students.

3. METHODOLOGY OF THE STUDY (ÇALIŞMANIN YÖNTEMİ)

3.1. Participants (Örneklem)

The data was collected from seven elementary schools in a city from south eastern part of the Turkey. From each school one seventh grade class was selected and the instrument was distributed to a total of 225 students. After discarding the incompletes, 189 participants' 54.5% (N= 103) female and 45.5 % (N= 86) male students composed of the study participants.

3.2. Instrumentation (Kullanılan Araçlar)

The Turkish version of Children's Attitudes toward Technology Survey (CATTS-T) was used to assess 7th grade students technology perceptions. The instrument was originally developed by Frantom, Green, and Hoffman (2002) and Baser et al (2011) translated into Turkish and validated the Turkish version of CATTS. The CATTS-T is composed of 19 items. The analysis revealed three-factor solution; "technology interest", "technology resistance" and "technology aptitude" with Cranach's alphas .68, .74, and .70 respectively. In this study, Turkish version of CATTS survey was administrated to 189 seventh grade students. For the current study, to reveal latent construct and validate the instrument, exploratory factor analysis (EFA) was conducted with principle axis factoring extraction method by direct oblique rotation. The result of 19-item EFA presented three factor solution same with the previous study. The technology interest subscale was composed of five items (item no: 1, 2, 3, 4, and 7) with a cronbach's alpha .71. The technology resistance subscale was composed of six items (item no: 5, 6, 8, 9, 10 and 11). Remaining items (item no: 12, 13, 14, 15, 16, 17, 18, and 19) were loaded to the technology aptitude subscale with cronbach's alpha .80.

3.3. Procedure (Araştırma Yöntemi)

This study was aimed to investigate seventh graders' technology perceptions. Along with this, factors affecting children's' technology perceptions were also investigated. Students' technology perceptions were assessed by using 19-item four-point Likert type CATTS-T. During a regular class, the instrument was distributed and it took 15- 20 minutes for participants to complete it. Data were transcribed into SPSS- 15 and descriptive analysis, factor analysis, reliability analysis, t- test and ANOVA were conducted.

4. RESULTS (SONUÇLAR)

To profile participants' data on their parents' education levels, home computer possession, students' computer use levels, their daily computer and internet use hours and purpose of computer and internet use were gathered (see Table 1 & Table 2). The results presented that most of the participants' parents are elementary school graduate. Most of the participants have home computers (63.5%). Half of the participants stated themselves as proficient in computer use and most of them use computer and internet for educational purposes and fun. In Table 2, participants' daily computer and internet uses were presented. Most of the participants use computer and internet less than an hour on daily bases and almost 10% of the participants use internet more than two hours a day.

Table 1. Demographic and descriptive results
(Tablo 1. Demografik ve tanımlayıcı analiz sonuçları)

		Frequency (N)	Percentage f (%)
Gender	Male	86	45.5
	Female	103	54.5
Mother education level	Elementary school	132	69.8
	High school	41	21.7
	University	13	6.9
Father education level	Elementary school	112	59.3
	High school	56	29.6
	University	21	11.1
Computer own	Yes	120	63.5
	No	69	36.5
Computer use level	Novice	10	5.3
	Intermediate	83	43.9
	Proficient	96	50.8
Computer use for	Homework	162	85.2
	Game	139	73.5
Internet use for	Homework	159	84.1
	Fun	146	77.2

Mean scores of three subscales showed that students scored high in 'technology interest' (M=3.17, SD=.62) and 'technology aptitude' (M=3.10, SD=.64) while they scored low in 'technology resistance' (M=1.73, SD=.65). An independent t-test was conducted to understand whether gender has an effect on students' technology perception. The results showed no significant difference in three subscales between boys and girls.

Relationship between parents' education level and students' technology perception was also investigated. Table 1 summarizes parent education level of the students. ANOVA results showed no significant difference among fathers' and mothers' educational levels in three subscales. This indicates that technology perception of the students does not change according to their parents' educational level.

Students' technology perception was investigated according to their computer possession. Independent t-test results revealed no significant mean difference in 'technology interest' and 'technology aptitude' sub-dimensions. However, students who possess a computer at home had significantly low scores on 'technology resistance' factor [$t_{(187)}$= -2.51, p<.05].

Table 2. Daily computer and internet use
(Tablo 2. Günlük bilgisayar ve internet kullanımı)

Daily use hour	Up to 1		Up to 2		Up to 3		More than 3	
	N	f (%)	N	f (%)	N	f (%)	N	f (%)
Computer	124	65.6	35	18.5	16	8.5	10	5.3
Internet	134	71	34	18	11	5.8	6	3.2

One-way ANOVA was performed to investigate whether students' level of computer use has effect on their technology perception. The results indicated significant differences on two subscales, 'technology resistance' [F(2,186)=4.48, p<.05] and 'technology aptitude' [F(2,186)=4.88, p<.05]. for 'technology resistance' subscale

post-hoc comparison test showed significant mean difference between 'novice', and 'intermediate' computer use levels and 'novice', and 'proficient' computer use levels. Students perceive themselves as 'proficient' (*M*=1.70, *SD*=.69) and 'intermediate' (*M*=1.69, *SD*=.54) had scored lower in 'technology resistance' factor rather than students see themselves as 'novice' (*M*=2.32, *SD*=.85). For 'technology aptitude' subscale post-hoc comparisons among computer use levels showed significant differences between 'proficient', and 'novice' computer users and 'intermediate', and 'novice' computer users. The mean scores of the 'proficient' (*M*=3.15, *SD*=.68) and 'intermediate' (*M*=3.11, *SD*=.56) computer users are significantly different from 'novice' (*M*=2.50, *SD*=.65) ones.

Lastly, independent t-test results showed whether purpose of computer and internet use of students has effect on their technology perception. No significant differences were found between those using computer and internet for homework preparation and those who do not. However, using computers for game purposes showed significant mean differences in three factors. T-test results in 'technology interest' factor presented significant difference [$t_{(186)}$=2.46, p<.05] which is in favor of students using computers for game purposes (*M*=3.24, *SD*=.57). In 'technology resistance' factor [$t_{(186)}$=-2.44, p<.05], students who use computers for game purposes (*M*= 1.66, *SD*=.61) scored lower than who do not (*M*=1.92, *SD*=.92). Students using computers for game purposes scored significantly higher [$t_{(186)}$=1.97, p<.05] in 'technology aptitude' factor. Using internet for fun has significant mean difference [$t_{(186)}$=1.99, p<.05] in 'technology aptitude' factor. Students using internet for fun (*M*=3.15, *SD*=.64) had better scored than who do not (*M*=2.93, *SD*=.60) in this subscale.

According to the qualitative data results, 121 out of 189 students believe that technological devices they use have positive effect on their academic achievement while 38 students presented their negative effect. A large number of the students (*N*=156) think that their teachers' technology use in teaching have benefit to their academic success. Whereas, a few students (*N*=12) stated opposite view.

Three most popularly used technological devices declared by students that they use are computer (*N*=160), TV (*N*=151) and cell telephone (*N*=123). The least used technologies defined by students are projector (*N*=13), internet (*N*=10) and music player (*N*=8). The technologies that teachers use in class are computer (*N*=148), projector (*N*=108), internet (*N*=12) and TV (*N*=3) which are stated by students.

Results showed four main categories in question "do technological devices you use contribute to your academic achievement?" These four categories are "information search for learning", "motivator", "complementary tool", and "entertainment tool". 68 out of 189 students declared that technological devices they used help them out with information search for their learning. Students (*N*=27) perceive technological devices as motivational element in education. They use technological devices as complementary tools (*N*=18) to enhance their academic achievement. Only seven students see technological devices as "entertainment tools" in contribution to their academic achievement.

Three categories such as "better understanding", "visual aid", and "motivator" revealed from question "do technological devices that your teachers use in teaching contribute to your academic achievement?" 56 students declared that technological devices used in class help them to understand the content better. Some students (*N*=32)

define technological devices as visual aids which help students understand or remember information easily. Lastly, 19 of students stated that they perceive technological device use as motivator for their academic achievement.

5. CONCLUSION AND DISCUSSION (SONUÇ VE TARTIŞMA)

The purpose of the study is to investigate 7th grade elementary school students' perceptions about technology. The overall focus is on three main constructs which are "technology interest", "technology aptitude", and "technology resistance" and their mutual relationship with "parent education level", "computer possession", "level of computer use", and their "purpose of computer and internet use".

Examination of the data yielded parallel results with literature in terms of level of the mean scores of the three constructs. While students' demonstrated relatively high scores on "technology interest" and "technology aptitude" subscales, "technology resistance" scores were found comparatively low. Since more than half of the students have access to a computer outside of their school, they are less resistant to the technology [12]. Actually this situation was supported by the results of interview conducted with students. Majority of students expressed that they are comfortable with the technology used for academic purposes.

If we look the results of the study from the "gender" perspective, it's seen that there is not any difference between "technology interest", "technology aptitude", and "technology resistance" scores of male and female students. It is interesting since most of the studies indicate existence of gender differences. For example, a study indicated that although there is no difference about the computer use confidences of children, some children believed that computers are boy things [2]. Similar results were also discussed by Kirmani, Davis, and Kalyanpur and Barker and Aspray [13 and 14]. But opposite findings which are in line with the results of this study were also available. The frequency of computer use of boys and girls were investigated and no significant difference was found if they use similar types of computer applications [5]. Participants in our study are all at the same grade and they are classmates. Therefore it is a big probability to share similar interests. This could direct them to use computers in a similar way with others and reduce the gender differences.

Students' technology perceptions did not show difference in terms of their parents' level of education. With the continuous emergence of new technologies, number of the computers available in regular families' homes has been increasing in a positive direction. Therefore, being exposed to these technologies could decrease students' openness to be effected from factors other than technology itself. Since most of the students can reach technology whether their parents are well educated, this factor has lost the impact on children's perceptions on technology. This situation was also related with "the quality of the family time" [1]. In other words, an hour spent with family members by talking to each other face to face could not yield same effect by spending an hour with watching TV or using a computer. Therefore, much deeper analysis on communication structure of family members is needed to understand effect of family based variants on students' technology perceptions.

Even if technology use is increased, still a considerable percentage of students do not have computers. Although schools are important to provide access to technology related experiences, outside

of the school is also effective on development of technology related perception [12]. This opinion was supported by the results of this study. While technology interest and aptitude of students do not differ, students who possess computer showed lower resistance to technology. It is obvious that "time" allocated for using any kind of tool, object or process reduces the resistance to these tool, object or process. For this reason, students having personal computers might show lower resistance to technology. For example, the most preferable technological tool for students was found as computer according to the qualitative data results of this research.

Despite the existence of a few exceptions, every child might have a tendency to use technology such as computers, cell phones, music players, and etc. whether they have these technologies or whether they can use them or not. Results of the study are parallel with that. That is, level of computer use has no effect on students' technology interest. On the other hand, technology aptitude and resistance is much more related with using these technologies. The study results indicated that novice computer users showed lower technology aptitude and higher technology resistance. The study also illustrated that students who have personal computers defined themselves more proficient computer users than who do not have computer at home.

Another interesting result of the study is the positive significant effect of the computer games on students' technology perceptions. In addition, using computers as entertainment tools also positively affected students' technology perceptions in terms of technology aptitude. There are studies enhancing benefit of educational games on students' learning. From this point of view, these results especially present the readiness of students to educational games. Using games for academic purposes could make school much more entertaining for students with increasing their technology interest and aptitudes while reducing technology resistance. On the other hand, as discussed in the research, schools, especially in Turkey, have strict curriculums and these curriculums have to be covered in relatively short periods of time and this situation prevents the integration of educational games into the classroom activities because games are thought as "time consuming"[15].

People are spending a lot of time and effort to integrate technology into education all over the world. In addition to the physical integration of these tools, perceptions of all the stakeholders such as teachers, students, and parents towards computers and other technologies are crucial for a successful integration. Technological tools, especially computers, are not only academic tools for schools but also great motivators for students. Therefore, it is necessary to look at the students' "technology perception" concept from different perspectives.

NOTICE (NOT)

In this study, 22-24 September 2011 in Elazig between the "(ICITS-2011) 5 International Computer and Instructional Technologies Symposium" presented as an oral presentation in.

REFERENCES (KAYNAKLAR)

1. Coyl, D., (2009). Kids Really Are Different These Days. Teaching Upper Elementary Students, 2 (7), pp:404-407.
2. Dooling, J., (2000). What students want to learn about computers?, Educational Leadership, 58(2), pp:20-24.

3. Shashaani, L. and Khalili, A., (2001). Gender and computers: similarities and differences in Iranian college students' attitudes toward computers. Computers & Education, 37, pp:363-375.
4. Shaw, G. and Marlow, N., (1999). The role of student learning styles, gender, attitudes and perceptions on information and communication technology assisted learning. Computers & Education, 33, pp:223-234.
5. Volman, M. and Van Eck, E., (2001). Gender equity and information technology in education. The second decade. Review of Educational Research, 71 (4), pp:613-631.
6. Kurt, A.A., Coklar, A.N., Kilicer, K., and Yildirim, Y., (2008). Evaluation of the Skills of K-12 Students Regarding the National Educational Technology Standards for Students (NETS*S) in Turkey. Turkish Online Journal of Educational Technology, 7(3), pp:9-15.
7. Lowerison, G., Sclater, J., Schmid, R.F., and Abrami, P.F., (2006).Student perceived effectiveness of computer technology use in post-secondary classrooms. Computers & Education, 47, pp:465-489.
8. Levine, T. and Donitsa-Schmidt, S., (1998). Computer use, aonfidence, attitudes, and knowledge: A causal analysis. Computers in Human Behavior,14(1), pp:125-146.
9. Frantom A.G., Green K.E., and Hoffman E.R., (2002). Measure development: the children's attitudes toward technology scale (CATTS). Journal of Educational Computing Research, 26(3), pp:249-263.
10. Birgin, O., Coker, B., and Catlioglu, H., (2010). Investigation of first year pre-service teachers' computer and internet uses in terms of gender. Procedia Social and Behavioral Sciences, 2, pp:1588-1592.
11. Baser, V., Mutlu, N., Sendurur, P., and Sendurur, E., (2011). Investigation of factors affecting technology perception of elementary and junior high school students. In 2nd International Conference on New Trends in Education and Their Implications, 27-29 April, 2011, Antalya, Turkey.
12. Mawson, B., (2010). Children's developing understanding of technology. International Journal of Technology and Design Education, 20(1), pp:1-13.
13. Kirmani, M.H., Davis, M.H., and Kalyanpur, M., (2009). Young Children Surfing: Gender Differences in Computer Use. Dimensions of Early Childhood, 37(2), pp:16-23.
14. Barker, L.J., Aspray, W., and Aspray, W., (2006). The state of research on girls and IT. Women and information technology research on under representation (p. 3-54). Cambridge, MA: MIT Press. Retrieved from http://mitpress.mit.edu/books/chapters/0262033453chap1.pdf
15. Tuzun, H., (2007). Blending video games with learning: Issues and challenges with classroom implementations in the Turkish context. British Journal of Educational Technology. 38(3), pp:465-477.