Attitudes and opinions of special education candidate teachers regarding digital technology

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Abstract

Parallel to the rapid development of information and communication technology, the demand for its use in schools and classroom is increasing. So, the purpose of this study is to determine the attitudes and views of students who will be special education teachers in the future regarding digital technology on the use in education. A mixed method, qualitative and quantitative, was used to collect data. Attitude Scale for Digital Technology was used as a quantitative data collection tool and a semi-structured interview form was used to collect qualitative data. A total of 275 students studying at Special Education teaching department of Near East University participated in this study. The findings indicated that the candidate teachers had a positive attitude towards the use of technologies. The findings obtained from the qualitative dimensions of the study showed that the candidate teachers had positive views about the use of technology by the special education students in their learning process.

Keywords: Special education, teacher candidates, digital technology, attitudes.

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1. Introduction

Technology can be defined as the product or process minimizing the difficulties faced through science in human life. Parallel to the rapid development of information and communication technology, the demand for its use in schools and classroom is increasing (Tugun, 2016). Many researchers state that technology is used both in everyday life and educational environments (Akdeniz, Bicer & Parmaksiz, 2015; Hursen & Fasli, 2017; Kanbul & Uzunboylu, 2017). While digital technologies are used for fun and communication, they are also used in education and provide a learning process for both teachers and students. The use of Information and Communication Technologies is not a newly adapted application in Special Education process (Moreno & Saldano, 2005). Physically, mentally, and emotionally handicapped individuals, who need special education, are likely to need more help compared to normally grown individuals (Ninlawan, 2015). Meanwhile, individuals needing special education may have different skills, thus teachers should aim to motivate such individuals. In the studies conducted by Tsang, Lee, Yeung, Siu & Lam (2007), it was stated that once the mentally handicapped are educated in Information and Communication Technology, they become able to benefit from such technologies effectively. The use of technology in special education, adds to the efforts of teachers as supportive technologies for the individuals in need of special education (Haksız, 2014). Nieves (2016) shared experiences in a study and emphasized that the biggest problem of the students who need special education was self-esteem. According to Nieves, lack of self-esteem, after years of disappointment in their academic experiences they feel demotivated and lose their self-confidence. The researcher pointed out that integrating technology in the learning process to help such individual become self-confident and motivated would bring about successful outcome. There are several technological instruments to use in special education classes and standard technological tools could be modified and used in such classes. Chris (2013) argued that various different technologies lead to positive outcomes from the special education students who had different characteristics.

Ninlawan (2015) stated that teachers and educators had a great role in supporting and motivating students. In addition, Ninlawan pointed out those teachers had to develop themselves in their fields to have a vision and be multi-directional. In order to have an effective class-management, teachers should have the skills in organizing ICT based classrooms through being open to new developments and learning techniques. Many researchers agree that teachers' positive attitudes towards technology and improving their technological sufficiency during their learning processes will successfully integrate technology (Archambault and Crippes, 2009; Koehler and Mishra, 2008). There are sample researches which will lead the use of supportive technology such as tablets, smart boards, laptops, cloud technology applications, and teaching robots in special education (Arpacik, 2014; Aziz et al., 2012; Liu et al., 2013; Soykan & Ozdamli, 2017; Tapus et al., 2012). In a study by Williamson-Henriques (2013) among secondary education teachers, it was stated that although the teachers were aware of the importance of technology use, they were not, yet, ready to use the technology because of lack of sources, technical support, and the teachers' not being ready due to their insufficiency in putting technology into operation. Campigotto, McEwen and Epp (2013) revealed that the students of special education admitted that electronic tools such as tablets and others could be easily used in their education. Lin et al., (2016) developed crossword games through Augmented Reality and applied it to special education students. According to the results of the study, the tasks carried out through augmented reality applications helped students carry out their tasks independently in a shorter period of time compared to traditional ways and they had higher motivation.

Special education teachers receive special training while studying for this profession (Haksiz, 2014). When the characteristics of the individuals in need of special education are observed, it is revealed that their needs and characteristics differ to a great extent (Cavkaytar, 2008). Soykan and Ozdamli (2016) state that, primarily, the teachers should be very good at these technologies and should follow all the professional developments in order to provide the students in special education to make maximum use of digital technologies. Odabasi and Kabakci (2007) argue that the teachers' aim is not to use the newest technologies, but rather to use the technology to meet their requirements and aims. When technology is at stake, firstly teachers' (positive or negative) attitudes towards technology should be determined. Then, technological sufficiency should be defined and programs should be designed. Teachers' use of technology is divided into four stages (Mandinach &

Cline, 1992; Odabasi & Kabakci, 2007). They are; the adaptation step, the comprehension stage, the affecting stage, and the renewal stage. Buabeng and Andoh (2012) explain that once teachers have a positive attitude towards the use of technology, then they can adapt and integrate it into their teaching. Cabi (2016) defines the concept of attitude as an individual's inclination to react to a thing or fact around. Inceoglu (2010) on the other hand, explains the same issue as the expected behavior of an individual towards an event or situation or a fact. Ugras et al. (2012) argues that attitudes form an emotional and intellectual tone both of which cause decision making and evaluation. Such decisions and evaluations may lead the individual to specify priorities and come up with different preferences. Therefore, the Educational Faculties educating teachers for the future are responsible for raising students' levels of Technological Pedagogical Content Knowledge (TPCK) as well as their attitude towards technology (Mishra & Koehler, 2006). The results of studies conducted showed that candidate teacher attitudes towards technology are positive and significant differences were observed among sex, class, and department variables towards technology (Birkollu, Yucesoy, Baglama & Kanbul, 2017). However, when the results of the same research were examined, it was observed that there were differences in attitudes related to departments and that the candidate special education teachers exhibited even more negative attitudes compared to many other departments. In this context, the purpose of this study is to determine the attitudes and views of students who will be special education teachers in the future regarding digital technology on the use in education.

2. Methodology

A mixed method, qualitative and quantitative, was used to collect data. Attitude Scale for Digital Technology was used as a quantitative data collection tool and a semi-structured interview form was used to collect qualitative data. While a quantitative research tries to reach to generalizable results supported with numbers about various problems stated in the research, a qualitative research focuses on explaining a phenomenon in depth within its own environment and limitations. Both forms of research have significant advantages in the education field and these methods cannot be used interchangeably. Even so, both methods can be used together to support each other (Yıldırım, 1999). Mujs (2004) argues that making use of a mixed method through combining quantitative and qualitative tools is one of the most useful methods in research.

2.1. Participants

A total of 275 students studying at Special Education Teaching department of Near East University participated in this study. The average age of the participants was 22, the youngest 18 and the oldest 42 years old. A total of %48 of them was female and %52 was male students.

Table 1. Features of participants		f	%
Gender	Female	132	48
	Male	143	52
Nationality	Turkish Cypriot	34	12.4
	Turkish	241	87.6
Daily internet usage	Less than an hour	12	4.4
	2-3 hours	32	11.6
	4-5 hours	100	36.4
	5-6 hours	59	21.5
	7 hours and above	72	26.2

As it can be seen in the above Table 1, a big majority of the students, (%88), use the internet actively more than 4 hours a day, which indicates that the students are active internet users.

2.2. Data Collection Tools

The Attitude Scale for Digital Technology consisting of 39 items and eight factors, developed by Cabi (2016), was used to determine student attitudes towards technology. The scale consisted of 34 positive and 5 negative items. The reliability coefficiency of the measuring tool was calculated by Cronbach alpha method and the reliability coefficiency of the test was found as 0.93. Every item in the Attitude Towards Digital Scale was evaluated in 5 item Likert-type from 5 points corresponding to "Strongly Agree" to 1 point corresponding to "Strongly Disagree".

A semi-structured interview form, developed by the researchers, was used to specify student opinions about the use of digital technology in special education. Face-to-face interviews were conducted with 16 volunteer students. Simsek and Yildirim (2013) claim that interviewing is a strong method to specify students' opinions, experiences, emotions, and collect the necessary data. In order to prevent any loss of data, the interviews were recorded on mobile phones and then transcribed.

2.3. The Attitudes of Candidate Special Education Teachers Towards Digital Technology

The findings in the attitudes of Special Education candidate teachers' perception in technology is shown in the Table below (Table 3).

Table 2. Attitudes of special education teacher candidates regarding technology competencies

	Min	Max	Mean	Std. Deviation
It's enough for me to learn how to use the new digital technology once	1.00	5.00	3.8800	.98351
I'm sure I will even use the most difficult digital technology	1.00	5.00	3.5527	1.07728
I have confidence in solving the problem I encountered when using a new digital technology	1.00	5.00	3.7564	.90553
I have enough skills to use digital technology	2.00	5.00	3.9164	.83508
I can do it quickly and practically when using digital technologies	1.00	5.00	3.8291	.89803
I am a leader in using digital technology effectively	1.00	5.00	3.2909	1.13138
I can access all kinds of information through the internet	1.00	5.00	4.2000	.90012
I can produce ideas on how technology should be used by people	2.00	5.00	4.0073	.83269
I can think creatively when using digital technologies	2.00	5.00	3.9018	.90083
I can use an application that I know in different digital technologies	1.00	5.00	3.8909	.99033
Technological competencies	1.90	5.00	3.8225	.64304

When the subject question above is examined, it was observed that the candidate teachers have a positive attitude. They can particularly use technology through the internet and reach the information they need, they can suggest ideas on how to use the technology and have the ability and information in how to use digital technology. Meanwhile, it was revealed that they were indecisive in the use of digital technology effectively to become leaders. Table 3 presents all the findings related with the aims and general use of social network sites.

Table 3.Attitudes towards the use of social networks

Social Networks	Min	Max	Mean	Std. Deviation
Using social networks (facebook, twitter, etc.) is one of the best advantages of digital technology.	1.00	5.00	3.8291	1.02339
Benefit from digital technologies to use more social networks (facebook, twitter, etc.)	1.00	5.00	3.9709	.98486
I can use social networks (facebook, twitter, etc.) effectively	1.00	5.00	3.9309	.92745
I can express myself more easily in social networks (facebook, twitter, etc.)	1.00	5.00	3.4291	1.22827
General attitudes regarding social networks	1.00	5.00	3.7900	.82570

As it can be noted in the above table, candidate teachers make use of digital technologies when they use the social network sites effectively. The findings obtained from the analyses related to the candidate teachers' attitudes about using technology in education are presented in Table 4.

Table 4.Technology usage in courses

Technology usage in courses	Min	Max	Mean	Std. Deviation
I would like to have more classes in technology at school	1.00	5.00	3.6473	1.15067
The use of digital technology in my courses increases my interest in lessons	1.00	5.00	3.7236	1.01628
Using digital technologies in my courses allows me to succeed	1.00	5.00	3.7200	1.08648
Studying with digital materials in computer-assisted environments increases the interest in the course	1.00	5.00	3.7891	1.06669
General attitudes regarding technology usage in courses	1.25	5.00	3.7200	.92080

The findings indicate that candidate teachers have positive attitudes in general towards the use of technology in education. They particularly stated that studying through digital materials increased interest in the subject. The findings obtained from the analyses related to candidate teachers' interest in technology are provided in the Table below.

Table 5. Interest in technology

	Min	Max	Mean	Std. Deviation
I am eager to learn a new digital technology	1.00	5.00	3.9273	1.04383
Digital technology goes well with my daily life to use	1.00	5.00	4.0185	.88800
I enjoy learning new information in the field of digital technology	1.00	5.00	4.1382	.89351
I am curious to investigate new products in stores selling digital products	1.00	5.00	3.7091	1.17257
News about digital technology gets attention	1.00	5.00	3.7527	1.04844
Interest in technology	1.80	5.00	3.9098	.77566

It was noted that candidate the teachers have a positive interest in technology. They expressed their satisfaction in learning new things and applying them in their daily lives. The findings obtained from the data analyses related to the candidate teachers' understanding of technology are shown in Table 6.

Table 6. Technology for teacher candidates

	Min	Max	Mean	Std. Deviation
I can easily use any digital technology	2.00	5.00	3.8582	.96936
I would like to be able to use technology efficiently in useful jobs	2.00	5.00	4.2873	.81569
I believe digital technologies have improved me	1.00	5.00	3.9382	.88777
In order to use a digital technology, it must have enough skill besides the information	2.00	5.00	4.2664	.74014
Technology for me	2.00	5.00	4.0867	.68149

Table 7. Disadvantages of technology

	Min	Max	Mean	Std. Deviation
It's boring to use digital technology	1.00	5.00	3.4218	1.24846
I spend a lot of time in the digital environment	1.00	5.00	2.7455	1.22650
Working as an expert in the field of digital technology is boring	1.00	5.00	3.2145	1.25614
Time spent in the digital technology environment is wasted	1.00	5.00	3.3709	1.20547
Getting access to ready resources from the internet prevents my creativity	1.00	5.00	2.7745	1.24400
Disadvantages of technology	1.40	5.00	3.1055	.93548

The teachers expressed that they were indecisive about the negative sides of technology, but they disagreed with the idea that the internet tires them because it hinders creativity and causes loss of time. When the candidate teachers' attitudes towards the use of technology for entertainment are observed, the findings in Table 8 were obtained.

Table 8. Entertainment use of technology

	Min	Max	Mean	Std. Deviation
I like to spend most of my time using digital technology	1.00	5.00	3.1964	1.18906
Benefit from digital technology to play more games	1.00	5.00	2.9200	1.30446
Enjoy computer games more than street games	1.00	5.00	2.6691	1.29976
Use digital technology more as a means of entertainment	1.00	5.00	3.1673	1.28765
Entertainment use of technology	1.00	5.00	2.9882	1.01633

The teachers generally exhibited uncertainty in terms of the use of technology for entertainment. They had negative attitudes towards the belief that they enjoy computer games more than the games played in the street, but they were indecisive about the use of digital technology for fun and for playing games. The candidate teachers 'attitudes towards conscious use of technology are as seen in the Table below (Table 9).

Table 9. Conscious Use

	Min	Max	Mean	Std. Deviation
Digital technologies should be used for useful purposes	1.00	5.00	4.1600	.91412
Use digital technology effectively to make life easier	1.00	5.00	3.9636	.87470
I can distinguish which information is useful for me on the internet	1.00	5.00	3.9891	1.08904
General for conscious use	1.67	5.00	4.0376	.81438

The candidate teachers had positive attitudes towards conscious use of technology, and they particularly emphasized that technology should be used for useful aims and they added that they had the ability to distinguish important information.

2.4. Opinions of Candidate Teachers Regarding the Use of Technology in Special Education

A total of 16 volunteer students were asked questions in face-to-face interviews related to the use of technology in special education. The question was, "Which are the technologies that can be used in special education?" The themes obtained from the interviews are presented in the following table.

Devices	f
Tablet PC	12
Interactive Board	10
Phone	8
Computer	5

The students ranked the most suitable technologies as tablets, interactive boards, telephones and computer. Some of the statements by the students are as follows: (S= Student)

S1: **"***After specifying student characteristics, necessary technologies should be decided on*. *Technologies for the blind and for the mentally handicapped differ. Therefore, the interactive board is the tool responding to every student"*.

S5: **"***The learning process can be accelerated by using tablets which are easy to use"*

These findings indicate that, as the candidate teachers stated, for the individuals in need of special education, tablet and interactive boards were suitable in the learning process. The question, "How can tablet and mobile applications be used in the process of learning in special education?" was asked to the candidate teachers. The themes obtained are as in the Table below.

Theme	f
Strengthening	13
Award	7
With parental supervision	4

As it can be understood from the themes above, the big majority of the candidate teachers stated that tablet could be used for consolidation. On the other hand, some teacher candidates argued that tablet could be offered to be used as a award after the learning process and some candidate teachers suggested tablets to be used at home under the supervision of parents. Candidate teachers' views about this issue are as follows; (T=Teacher)

T7 "Tablets *and mobile applications can be used for consolidation after the learning process. Learning can be consolidated particularly through visuals*".

T12: "*If the students' characteristics are suitable in terms of the subject taught in class, they can be asked to explain the topic by drawing pictures on the tablet, which shows how much the student has learned. This can also be done with the students who can't use a pencil, but can do it with their fingers*".

T9: "*If the students have successfully completed all the given tasks, they can be offered educational games as prize*".

T13: *"Students can watch on videos or tablets the events or objects they can't bring to class".*

T1: "*Several applications suitable for the students' levels can be picked and used for consolidation. For example, partnership applications can be offered to be played as a prize which helps consolidation".*

T15: "*Tablets can be used at home under parent supervision to consolidate class work".*

The findings obtained show that teachers recommend tablets and mobile applications to be used rather for consolidation. In order to specify the benefits and negativity of digital technologies for individuals needing special education, the special education candidate teachers were asked the following question, "What are the good and bad sides of using digital technologies in the process of learning?" The following themes were formed according to the responses received.

	Theme	f
	Attention	13
	Concretization	11
Advantages	Encourage	6
	Motivation	5
	Instant learning	2
Disadvantages	Dependence risk	7

Deviation from purpose	4	
Malicious use	3	
Asociality	3	
Distraction	2	

As can be seen in the themes in the Table, a big majority of the candidate teachers advocated the advantages of digital technology in terms of attracting interest and concretizing the topics during learning process. Some of the statements by the candidate teachers in this issue are as follows;

T7: "*The use of digital technology facilitates student concentration on the topic through tablets and mobile applications. Activities can be done and showed to students in class to facilitate explanations of events and things that cannot be brought into classroom.*"

T12: "*The use of digital technology during learning process raises student motivation and thus encourages the learners to learn*".

T14: "*Particularly tablets with internet connection or mobile phones provide learning opportunities on the spot in need of learning*".

It has been stated that, the negativity created by digital technologies in the learning process causes addiction, deviation from aims, abusing the use of technology, keeping away from socialization and distracting attention among students.

T4: "*Excess use of digital technology causes addiction. Whereas, the risk of addiction can be minimized if it is used as a supportive tool*".

T9: "*Learners should use digital technology as a tool in learning process. Measures should be taken to prevent students' misuse of digital technology*".

T11: "In *long-term use of digital technology, students may lose self-confidence in social environments. Digital environments keep students away from socialization*".

According to the views by candidate teachers, the use of digital technologies in special education attracts students' attention, encourages them, raises motivation and concretizes the topics.

3. Discussion and Conclusion

This study, aiming to determine the attitudes and views of Special Education candidate teachers of the future towards digital technologies, was conducted with 275 students from the Department of Special Education of Near East University in 2017-2018 academic year. Firstly, their attitudes towards digital technologies were specified and then their views about the use of the technologies for the students with special needs were analyzed. This process was conducted with volunteer candidate teachers through interviews.

The findings indicated that the candidate teachers had a positive attitude towards the use of technologies. They stated that they felt confident in reaching information on the internet and that they could forward ideas to do with the issue. This indicates that the candidate teachers can reach any correct information the may need in their future professional life. Interestingly, the candidate teachers admitted that they preferred the internet to access social web-sites. They also added that the integration of technology into learning processes raised their motivation and interest in the subject. Similarly, many researchers expressed that integrating technology into learning process increased motivation and the length of attention (Tekbiyik & Akdeniz, 2010; Serio et al., 2013). A satisfying finding was that the candidate teachers did not prefer technology for fun and games.

The findings obtained from the qualitative dimensions of the study showed that the candidate teachers had positive views about the use of technology by the special education students in their learning process. The candidate teachers preferred tablets and mobile applications to consolidate learning and to award. Elicin and Tunali (2016) drew attention to the fact that, the use of tablets by autistic students in need of special education, had positive outcomes in their learning process.

Another finding pointed to the risk that, although digital technology can be used in special education to attract attention and raise motivation, there is the risk of creating addiction if misused. Haksiz (2015) supported the idea that the use of tablets attracted attention and supported visuals.

As in every research, there were some limitations in this research as well. The data collection procedure was carried out only with the candidate teachers. Therefore, in future studies, both teacher and student views about and attitudes towards digital technologies and their use in education can be investigated.

References

Akdemir, O., Bicer, D., & Parmaksiz, R. (2015). Prospective teachers' information and communication technology metaphors. *World Journal on Educational Technology: Current Issues, 7*(1), 09-21. doi:10.18844/wjet.v7i1.19

Archambault L.M. & Crippen K.J. (2009) K-12 Distance educators at work: Who's teaching online across the United States. *Journal of Research on Technology in Education, 41,* 363–391.

Birkollu, S.S., Yucesoy, Y., Baglama, B., & Kanbul, S. (2017). Investigating the attitudes of pre-service teachers towards technology based on various variables. *TEM Journal, 6*(3), 578-583.

Buabeng-Andoh, C. (2012). Factors influencing teachers' adoption and integration of information and communication technology into teaching: A review of the literature. *International Journal of Education and Development using Information and Communication Technology*, *8*(1), 136.

Cabi, E. (2016). Attitude scale for digital technology. *Kastamonu Egitim Dergisi*, *24*(3), 1229-1244.

Campigotto, R., McEwen, R., & Epp, C. D. (2013). Especially social: Exploring the use of an IOS application in special needs classrooms. *Computers & Education*, *60*, 74–86

Cavkaytar, A. (2008). Özel egitime gereksinimi olan ögrenciler ve özel egitim [Students with special education needs and special education]. In I.H. Diken (Ed.), *Ozel Egitime Gereksinimi Olan Ogrenciler ve Ozel Egitim* (pp. 1-28). Ankara: Apegem Akademi Yayinlari.

Chris, O. (2013). Technology benefits special education classrooms – and beyond. Retrieved on 23 September 2017 from;https://www.speechbuddy.com/blog/iep/technology-benefits-special-education-classrooms-and-beyond/

Elicin, O., & Tunali, V., (2016). Otizmli cocuklara asamali yardimla cizelge kullanim becerilerinin kazandirilmasinda tablet bilgisayar cizelge programinin etkililigi, *Egitim ve Bilim, 41*(183), 29 - 46.

Haksiz, M. (2014). Investigation of tablet computer use in special education teachers' courses. Procedia- *Social and Behavioral Sciences, 141 (2014), 1392 – 1399.*

Hursen, C., & Gezer Fasli, F. (2017). Investigating the efficiency of scenario based learning and reflective learning approaches in teacher education. *European Journal of Contemporary Education, 6*(2), 264-279.

Inceoglu, M. (2010). *Tutum algi iletisim*. Ankara: Beyken Universitesi Yayinevi.

Kanbul, S., & Uzunboylu, H. (2017). Importance of coding education and robotic applications for achieving 21st-century skills in North Cyprus. *International Journal of Emerging Technologies in Learning,12 (1) 130-140.*

Koehler, M.J. & Mishra, P. (2008) Introducing TPCK. In *The Handbook of Technological Pedagogical Content Knowl- edge (TPCK) for Educators* (ed. AACTE Committee on Innovation and Technology), pp. 3–29. Lawrence Erlbaum Associates, Mahwah, NJ.

Lin, Y.C., Chai, C.H., Wang, J., Chen, J.C., Liu, Y.H., Chen, C.W., Lin, C.W., & Huang, Y. M. (2016). Augmented reality in educational activities for children with disabilities. *Displays*, *42,* 51-54.

Mandinach, E., & Cline, H. (1992). *The impact of technological curriculum innovation on teaching and learning activities.* Paper presented at the Annual Conference of the American Educational Research Association, San Francisco, California. (ERIC Document Reproduction Service No. ED 345 717)

Mishra, P., & Koehler, M.J. (2006). Technological pedagogical content knowledge: A framework for teacher knowledge. Teachers College Record, *108*(6), 1017–1054.

Ozdamli, F. (2017). Attitudes and opinions of special education candidate teachers regarding digital technology. *World Journal on Educational Technology: Current Issues. 9(*4), 191-200.

Moreno, J. & Saldana, D. (2005). Use of a computer-assisted program to improve metacognition in persons with severe intellectual disabilities. Research in Developmental Disabilities, *26*, 341-357.

Muijs, D. (2004). *Doing quantitative research in education with SPSS*. London: Sage Publications.

Nieves, K. (2016). Using technology to empower students with special needs. Retrieved on 23 September 2017 from: https://www.edutopia.org/article/empowering-special-education-students-technology-kathryn-nieves

Ninlawan, G. (2015). Factors which affect teachers' professional development in teaching innovation and educational technology in the 21.Century under the Bureau of Special Education, Office of the Basic Education Commission . *Procedia - Social and Behavioral Sciences, 197, 1732 – 1735.*

Odabasi, H. F., & Kabakci, I. (2007). *Ögretmenlerin mesleki gelisimlerinde bilgi ve iletisim teknolojileri*. Uluslararası Öğretmen Yetistirme Politikaları ve Sorunları Sempozyumunda sunulan bildiri, Azerbaycan: Bakü,12–14 Mayıs 2007.

Serio, Á. Di, Ibáñez, M. B., & Kloos, C. D. (2013). Impact of an augmented reality system on students' motivation for a visual art course. http://doi.org/10.1016/j.compedu.2012.03.002

Soykan, E. & Ozdamli, F. (2017). Evaluation of the android software for special needs children. *Eurasia Journal of Mathematics, Science & Technology Education, 13*(6), 2683–2699.

Soykan, E., & Ozdamli, F. (2016). The impact of m-learning activities on the IT success and m-learning capabilities of the special education teacher candidates. *World Journal on Educational Technology: Current Issues, 8*(3), 267-276. doi:10.18844/wjet.v8i3.1019

Tekbiyik, A., & Akdeniz, A.R. (2010). An investigation on the comparison of context based and traditional physics problems. *Necatibey Faculty of Education Electronic Journal of Science and Mathematics Education, 4*(1), 123-140.

Tsang,L.P.W.C., Lee,F.Y.M., Yeung,S.S.S., Siu, H.M.A., & Lam, S.C. (2007). A 6-month follow-up of the effects of an information and communication technology (ICT) training programme on people with intellectual disabilities. *Research in Developmental Disabilities, 28,* 559–566.

Tugun, V. (2016). Validity and reliability dissertation of the scale used for determination of perceptions and attitudes of teacher's proficiency in tablet PC-supported education. *Cypriot Journal of Educational Sciences, 11*(2), 51-57. doi:10.18844/cjes.v11i2.617

Williamson-Henriques, K. M. (2013). Secondary teachers' perceptions of assistive technology use for students with learning disabilities. *ProQuest.*

Yildirim, A. (1999). Qualitative research methods. *Education and Science, 23*(112) 7-17.