

HACETTEPE UNIVERSITY BIOLOGY TEACHER CANDIDATES' SMARTPHONE USAGE IN EDUCATION

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Abstract: In recent years, smartphone usage has grown regularly and become widely used in everyday life. The main aim of the emergence of the Internet is to facilitate easy, quick, safe access to information. Smartphones can perform not only features of ordinary mobile phones but also most operations that computers can conduct. Smartphones are indispensable part of both business life and everyday life. The aim of this study is to determine Hacettepe University Biology Teacher Candidates' smartphone addiction and their ideas for smartphone usage in education. The study sample consists of 91 students out of a total of 138 students attending the Department of Biology Education in Hacettepe University. With a view to measure smartphone Addictions, Smartphone Addiction Scale adopted into Turkish and validity and reliability of which was analyzed by Demirci *et al* (2014) was used. In addition, within the scope of the research, teacher candidates' views towards smartphone usage in education were detected.

Keywords: Smartphone usage in education, smartphone addiction, teacher candidates.

INTRODUCTION

The term smartphone is used to define mobile devices that can connect to Internet and support certain applications downloaded and installed by users (Hinton and Hjorth, 2013).

The inventor of the first mobile devices initially called the speech device is Martin Cooper. Cooper developed a prototype and made the first call over portable mobile phones in April 1973. However, this invention was not used for a commercial purpose not until 80s. After 80s, only the rich and businessmen began to own these devices by paying huge amounts of money. The first generation (1G) of these mobile devices entered into markets is used to define telephones applied with analogue technology. These phones are based on establishment of a cellular phone network containing various stations and they allow mobile usage of land phones conversations. At the end of 1980s, together with digital systems gaining more value, mobile phones were combined with digital technologies and adopted into these technologies. This case led to the development of the second generation (2G) of mobile telephones. 2G technology is based on global system for mobile telecommunication (GSM) and provides a variety of benefits to the user. Third generation (3G) phones began to be used at the beginning of 2000s. 3G telephones also defined as the first version of smartphones allow an increase in data capacity and speed. In addition, they allow usage of the different services such as digital photos, mp3 files, and multi-media messages. Called as the Fourth Generation (4G), smartphones have added a very distinct dimension to cellular phone usage by providing easy and fast Internet access and providing services such as video streaming (Siapera, 2012).

Smartphones are mobile phones that have higher levels of computing capability and connectivity compared to ordinary mobile phones. In addition to allowing users to make phone calls, these phones add various features found in PDAs, computers (receiving and sending e-mail, editing office documents, etc.). In addition, they can be used to create content regardless of its type (video, audio or text) (Phillips *et al*, 2011).

Smartphones bring a new dimension to the practical use of social media from the point of allowing continuous connection (Hinton and Hjorth, 2013: 123). As a result of supporting

various applications, people are always able to engage with social media everywhere. With location based services included in social networks such as Facebook Places and Foursquare, smartphones are used for the purpose of entertainment/games, also create a feeling of safety through informing family and friends by bringing far places closer (Hinton and Hjorth, 2013). Smartphones have now become indistinguishable from a computer, and they are increasingly used to conduct various activities by businesses of every scale.

The benefits of smartphones to businesses can be summarized as follows;

- It is easy to access e-mail accounts via smartphones, this decreases costs and increases productivity.
- Thanks to remote access to systems within the business, smartphones reduce phone calls and unnecessary visits.
- Thanks to navigation capability of smartphones, it is possible to reach desired locations with time and cost savings.
- With the GPS function, location sharing and tracking of employees can be achieved.
- High-resolution cameras allow collaboration and document sharing.
- Thanks to Wi-Fi feature, free internet access can be provided and the internet costs can be reduced during travels.
- It is possible to conduct data sharing and transfer from outside through systems within the organization (Ada, S., Tatlı, H.S., 2013).

The aim of this study is to determine Hacettepe University Biology Teacher Candidates' smartphone addiction and their ideas for smartphone usage in education.

METHOD

Research Model:

The research is in screening model that aims to describe an existing situation.

Study Group of the Research:

The study sample consists of 91 students out of a total of 138 students attending the Department of Biology Education in Hacettepe University.

Data Collection Tools

In the research, Smartphone Addiction Scale adopted into Turkish and validity and reliability of which was analyzed by Demirci *et al* (2014) was used. The research is a Likert-type scale consisting of 33 items. Cronbach alpha internal consistency coefficient is 0.947 (Demirci *et al*, 2014).

Within the scope of the research, teacher candidates were asked three open-ended questions to determine their opinions about positive and negative effects of smartphone usage in education.

Data Analysis

Quantitative and qualitative analysis techniques were employed. The analysis was conducted through quantitative analysis techniques using SPSS package software with a view to detect teacher candidates' smartphone addiction.

Processes of coding, classification and table creation for biology teacher candidates' opinions on positive and negative roles of smartphones in education were carried out with the MAXQ software.

FINDINGS

1. Teacher Candidates' Smartphone Addictions

Arithmetic mean and standard deviation of teacher candidates' scores obtained from Smartphone Addiction Scale are given in Table 1.

Table 1. Teacher Candidates' Scores from Smartphone Addiction Scale

N	X	Ss
91	2.92	.76

According to Table, average of the scores obtained by teacher candidates is 2.92 and standard deviation is 0.76. The highest score that can be obtained from the scale is 6. Accordingly, it can be inserted that teacher candidates' smartphone addiction is moderate.

4. Biology teacher candidates' opinions on smartphones

Within the scope of the research, post-encoding classification of biology teacher candidates' opinions on positive and negative effects of smartphone usage in education is as follows:

4.1. Teacher Candidates' Opinions on the Role of Smartphones

Table 2 Biology teacher candidates' opinions on the role of smartphones

	Frequency	Percentage
Necessity	46	36
occupies a large part of our daily lives	1	0.80
being assistant in researches	4	3.20
getting information required	1	0.80
required	2	1.60
making life easier	21	16.80
the most important development in human life	2	1.60
an indispensable object	4	3.20
a technological tool that provides benefits	4	3.20
useful	4	3.20
very useful	1	0.80
learning	1	0.80
Saving Time	14	11.20
instant access to information	1	0.80
instantly being informed of all	3	2.40
reducing the time to access information	7	5.60
life accelerating	1	0.80
saves time with useful applications	2	1.60
Loss of Time	9	7.20
a tool preventing people from fun activities in the outside world	2	1.60
negatively affecting development	1	0.80
causing disruptions in life	1	0.80
taking with social media applications	5	4.00
Interaction	12	9.60
effective	1	0.80
contact	7	5.60
allowing to communicate with people	4	3.20

Positive Effects	5	4
enjoyable	1	0.80
the right to use if required	1	0.80
savior	1	0.80
practical	2	1.60
Negative Effects	25	20
unnecessary	1	0.80
certainly harms human relationships	1	0.80
making people asocial	6	4.80
pushing people completely to virtuality	2	1.60
making people dependent on them	3	2.40
dangerous for health	1	0.80
accelerates the perception of consuming	1	0.80
harmful	4	3.20
restrictive of people's relationships with each other	6	4.80
Those Not Responding	14	11.20
Total	125	100.00

The generated codes are interpreted as a total of 38 different codes including 27 positive, 10 negative, 1 non-answering. Through these assessments, considering biology teacher candidates' perceptions towards "the role of smartphones" as a whole, it has become possible to evaluate these perceptions from the point of 7 different categories from their function and concept aspects:

Need: 36% of valid codes generated by biology teacher candidates are evaluated under this category. Among codings evaluated in this category, opinions of 16.80% of biology teacher candidates regarding the fact that smartphone usage is "life facilitator" have come to the forefront.

Saving Time: 11.20% of valid codes generated by biology teacher candidates are evaluated under this category. Among codings evaluated in this category, opinions of 5.60% of biology teacher candidates regarding the fact that smartphone usage "decreases the duration to access information" have come to the forefront.

Loss of Time: 7.20% of valid codes generated by biology teacher candidates were evaluated under this category. Among codings evaluated in this category, opinions of 4.00% of biology teacher candidates regarding the fact that smartphone usage "takes time with social media applications" have come to the forefront.

Interaction: 9.60% of valid codes generated by biology teacher candidates are evaluated under this category. Among codings evaluated in this category, opinions of 5.60% of biology teacher candidates regarding the fact that smartphone usage is about "communication" have come to the forefront.

Positive Effects: 4% of valid codes generated by biology teacher candidates are evaluated under this category. Among codings evaluated in this category, opinions of 5.60% of biology teacher candidates regarding the fact that smartphone usage is "practical" have come to the forefront.

Negative Effects: 20% of valid codes generated by biology teacher candidates are evaluated under this category. Among codings evaluated in this category, opinions of 4.80% of biology teacher candidates regarding the fact that smartphone usage is "restrictive of people's relationships with each other" have come to the forefront.

Those Not Responding: 11.20% of valid codes generated by biology teacher candidates are evaluated under this category.

4.2. Biology teacher candidates' opinions regarding the positive effects of smartphone usage on education

Table 3. Biology teacher candidates' opinions regarding the positive effects of smartphone usage on education

	Frequency	Percentage
Saving Time	38	41.84
convenience of instant information acquisition	12	11.65
quick and easy access to notes on course as well	24	23.30
saving time	2	1.94
Loss of Time	1	0.97
problematic in terms of time management	1	0.97
Those Having No idea	1	0.97
no connection between the lessons and the use of smartphones	1	0.97
Positive Effects	46	44.67
allowing easy access to information	9	8.74
having positive effects on research	19	18.45
allowing converting information visually and vocally	1	0.97
being portable	1	0.97
providing convenience with applications	8	7.77
ability to translate	8	7.77
Negative Effects	16	15.53
adverse effect in courses	1	0.97
negative impact	1	0.97
Those Not Responding	14	13.59
Total	103	100.00

The generated codes are interpreted as a total of 16 different codes including 11 positive, 3 negative, 1 non-answering and 1 considering no connection between smartphone usage and courses. Through these assessments, considering biology teacher candidates' perceptions towards "the positive effects of smartphones on courses" as a whole, it has become possible to evaluate these perceptions from the point of 6 different categories from their function and concept aspects:

Saving Time: 41.84% of valid codes generated by biology teacher candidates are evaluated under this category. Among codings evaluated in this category, positive opinions of 23.30% of biology teacher candidates stating that smartphone usage offers "quick and easy access to course notes" have come to the forefront.

Loss of Time: 0.97% of valid codes generated by biology teacher candidates are evaluated under this category. The only coding evaluated under this category is positive opinions of

0.97% of biology teacher candidates considering smartphone usage as "problematic in terms of time management".

Those Having No Idea: 0.97% of valid codes generated by biology teacher candidates are evaluated under this category. The only coding evaluated under this category is positive opinions of 0.97% of biology teacher candidates considering smartphone usage as "no connection between the lessons and the use of smartphones".

Positive Effects: 44.67% of valid codes generated by biology teacher candidates are evaluated under this category. Among codings evaluated in this category, positive opinions of 18.45% of biology teacher candidates considering smartphone usage as "having positive effects on research" have come to the forefront.

Negative Effects: 15.53% of valid codes generated by biology teacher candidates are evaluated under this category. Among codings evaluated in this category, positive opinions of 0.97% of biology teacher candidates considering smartphone usage as "negative influence in courses and "negative effects" have come to the forefront.

Those Not Responding: 13.59% of valid codes generated by biology teacher candidates are evaluated under this category.

4.3. Biology teacher candidates' opinions on negative effects of smartphone usage on education

Table 4. Biology teacher candidates' opinions on negative effects of smartphone usage on education

	Frequency	Percentage
Those Having No idea	2	2.04
no connection with courses	1	1.02
I have no idea	1	1.02
Positive Effects	13	13.26
spending time when bored in class	3	3.06
no adverse effects when used correctly	7	7.14
no adverse effects	3	3.06
Negative Effects	51	55.1
not to use books for research	1	1.02
getting wrong information while doing research	2	2.04
quickly forgetting things learned while doing research	2	2.04
spend much time on Internet while doing research	1	1.02
creating addiction	3	3.06
a tool hindering listening courses and studying	13	13.27
causing distraction	17	17.35
being always accessible is dangerous	1	1.02
easy to obtain, becoming unappreciative	2	2.04
adversely affecting motivation	10	10.20
lowering grades	1	1.02
negative	1	1.02
Those Not Responding	17	17.35
Total	98	100.00

The generated codes are interpreted as a total of 19 different codes including 17 positive, 1 negative, 1 non-answering and 1 considering no adverse effects. Through these assessments, considering biology teacher candidates' perceptions towards "the negative effects of smartphones on courses" as a whole, it has become possible to evaluate these perceptions from the point of 4 different categories from their function and concept aspects:

Those Having No Idea: 2.04% of valid codes generated by biology teacher candidates are evaluated under this category. Among codings evaluated in this category, negative opinions of 1.02% of biology teacher candidates considering smartphone usage in courses as "no connection with courses" and "I have no idea" have come to the forefront.

Positive Effects: 13.26% of valid codes generated by biology teacher candidates are evaluated under this category. Among codings evaluated in this category, negative opinions of 7.14% of biology teacher candidates considering smartphone usage in courses as "no negative effect when use correctly" have come to the forefront.

Negative Effects: 55.1% of valid codes generated by biology teacher candidates are evaluated under this category. Among codings evaluated in this category, negative opinions of 17.35% of biology teacher candidates considering smartphone usage in courses as "distracting" have come to the forefront.

Those Not Responding: 17.35% of valid codes generated by biology teacher candidates are evaluated under this category.

CONCLUSIONS and RECOMMENDATIONS

Gaining a seat in our lives more and more day by day, smartphones can be used as an effective and efficient learning tool in education. In this period when informal education is discussed, and as stated by teacher candidates, smartphones are important in terms of providing quick and easy access to knowledge that we need everywhere, and providing permanent information as ready-to-use information. In addition, smartphones are the easiest tools in users' hands to access social sharing tools. In our age when communication is crucial, they are important in terms of effective usage by teachers and teacher candidates in education. However, when not used as per their purpose, they bring along many adverse effects. As specified by teacher candidates, examples of such effects can be given such as distraction, creating negative motivation and addiction to smartphones.

Rapid spread of smartphones has begun to lead to pathological excessive use and smartphones addiction which can be defined as a new kind of addiction. Smartphone addiction problem in Turkey is seen more among young people and children who are more prone to this technology.

Addiction emerges as a function of the nervous system and connection to certain substance biologically such as alcohol and drugs. However, some researchers argue that there may exist behavioral addictions just like biological addictions such as alcohol and drug addiction (Comings, 1995; Stein, Hollander, & Cohen, 1994).

According to Hollender (1993), mobile phone addiction is expressed as a disorder, similar to obsessive-compulsive disorders, that causes compulsive behavior to to eliminate anxiety or a motive. However, there are no differences between these two behaviors. Accordingly, while

obsessive-compulsive behavior is conducted more to relieve anxiety, behaviors such as mobile and Internet usage are conducted for pleasure (Şar, A., H., Işıklar, A., 2012).

According to Griffiths (2003), anything that causes excitement creates addiction. Considering from this perspective, the use of mobile phone creates addiction since it provides excitement for an individual. Another approach that we can use to explain the mobile phone addiction is the behavioral learning theory. According to the behavioral approach, if a behavior is followed by saturation and pleasing situation (positive reinforcement) or a behavior assists in getting rid of a negative behavior such as tension and boredom (negative reinforcement), then this behavior increases and individual continues to conduct that behavior to take pleasure or get rid of negativity (Cüceloğlu, 1993). Considering mobile phone addiction from this perspective, mobile phone usage not only give pleasure to users but also relieves them from oppression or anxiety. Such a reinforcement is thought to cause addiction towards mobile phone (Şar, A., H., Işıklar, A., 2012).

Another approach that can be used to describe the mobile phone addiction is addiction general theory developed by Jacobs (1988). According to Jacobs, lower or higher stimulations, lower self-respect and negative early childhood experiences cause negative emotions and they disrupt homeostatic balance of individual. Therefore, individuals are inclined towards addictive behaviors to achieve escape from these negative feelings and redress homeostatic balance (Jacobs, 1988). It has been observed that individuals using mobile phones on high level have low level of self-respect and these individuals use mobile phone frequently to increase their self-respect (Phillips, and Ogeil and Blaszczynski, 2011).

It is seen that studies related to mobile phone addiction rely on Internet addiction researches. In these studies, low self-respect and social skill problems are considered as main problems emerging in Internet and mobile phone addiction (Kring, Davison, Neale and Johnson, 2007).

As a result of the study conducted, a pathological addiction among biology teacher candidates towards smartphone usage is not present. Accordingly, in the knowledge-based society evolving continuously, it is necessary for teachers to become individuals who can effectively use technology in education and who can continuously benefit from technology in development process and adapt themselves. Consequently, the task of teachers training institutions is to educate teachers who can apprehend the importance of technology in life and necessity in educational process, who have also ability and self-confidence to effectively use technology in education process.

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