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AUTHORS: Süleyman Burak TOZKOPARAN,Ferhan ODABASI

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Examination of Pre-Service Teachers' Safety Expectations in The Design of Smartphones in Terms of Various Variables

Süleyman Burak Tozkoparan[*]
Department of Computer Technologies, Vocational School of Higher Education, OSTİM Technical University, Ankara, Türkiye
ORCID: 0000-0001-8157-8346

Hatice Ferhan Odabaşı
Department of Computer Education and Instructional Technologies, Faculty of Education, Anadolu University, Eskişehir, Türkiye
ORCID: 0000-0003-4362-4609

In this research, it is aimed to reveal safety expectations of pre-service teachers in the design of smartphones and to examine them in terms of 8 variables as follows: gender, generation (Y-Z), department/branch group, main purpose of smartphone use, operating system, number of smartphones used, smartphone replacement frequency and smartphone segment preference. Quantitative research method was adopted, and the relational survey model was used. For the collection of data, Safety Expectations in the Design of Smartphones Scale (SEitDoSS) -which was developed as part of the first author's Ph.D. thesis- consisting of 21 items and 5 factors (user-specific expectations, device-specific expectations, integration expectations, health-specific expectations and support expectations) and a Personal Information Form created to collect participants' information about the variables. Anadolu and Osmangazi Universities (universities in Eskişehir province of Türkiye) were selected to obtain data. The application was carried out online in the spring semester of the 2020-2021 Academic Year, and a total of 252 participants were reached during the 8-week application. According to the results, pre-service teachers' safety expectations in the design of smartphones are generally high. There was a significant difference in at least one dimension in terms of 7 variables: gender, generation, department/branch group, main purpose of smartphone use, operating system, smartphone replacement frequency and smartphone segment preference. According to the "number of smartphones used", there was no significant difference in terms of safety expectations of smartphones in design. The implications of the results are discussed with the support of the studies in the literature.

Introduction

Smartphones can be defined as "the general name given to mobile phones running Windows, Android, IOS, Blackberry or Palm operating systems that offer PC-like functionality, customization, and advanced capabilities such as the ability to download/run applications" (Heimerl, Menon, Hasan, Ali, Brewer & Parikh, 2015). Over the years, safety problems have

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[*] Correspondency: buraktozkoparan@gmail.com, suleymanburak.tozkoparan@ostimteknik.edu.tr

been encountered in many tangible and intangible aspects in the usage of smart phones by masses, although they have brought great convenience to human life and changed our habits in a short time since the day they entered our lives. With such examples being seen in all regions of the world, the issue of increasing the safety of smartphones has started to be a subject that is frequently discussed and researched by scientists.

Studies in the literature on safety of smartphones have focused on privacy of smartphone usage, confidentiality of personal information, software development, detection, and protection of malicious applications. improving individual and public safety with the help of the features and sensors of the devices (BinDhim & Trevena, 2015a; BinDhim & Trevena, 2015b; Corti, Manzoni, Savaresi, Santucci & Di Tanna, 2012; Karaarslan, Demir & Fetah, 2016; Talan, Aktürk, Korkmaz & Gülseçen 2015; Whipple, Arensman & Boler, 2009). At this point, it would not be wrong to say that the biggest responsibility for increasing the safety of smartphones lies with the manufacturers and developers. Because while transferring high-end technologies to their newly developing products, they also have a responsibility to make the world a safer place. They should also take into account the concerns and expectations of the users and the society regarding the safety of high-tech products to be developed. It is known that people are concerned about their own safety while adapting to the services provided by technology (Rajabalinejad, Bonnema & van Houten, 2015).

Mylonas, Kastania, and Gritzalis (2013) conducted a study on the security awareness of smartphone users. According to the results of the study, the use of safety applications on users' smartphones is about 25% and it is seen that it is not adopted sufficiently. About 35% of users do not consider it important to use security applications. Many of the users turn off the safety measures offered on the device (message encryption, phone lock, remote phone finder, etc.) for various reasons such as speeding up the phone. Most of them think that downloading apps from app stores is not a risky situation. Users trust the applications in these application stores and do not pay attention to safety elements and application permissions.

Since manufacturers and developers are responsible for safety-related issues, their awareness of the basic needs and expectations for safe products is considered very important and carrying out studies to increase their awareness will make a great impact and difference. Therefore, it is claimed in the literature that safety should start from the design (Serksnis, (2019), for this reason, it is thought that safety-related improvement studies starting from the design processes will be valuable. This situation, which is emphasized in studies dealing with the issue of safe design in the literature, reveals the importance and potential contribution of examining the opinions and expectations of potential user groups of various products or systems to the design and development processes. In this context, it can be predicted that conducting scientific research that addresses user expectations on safety will contribute to the literature in terms of creating an in-depth understanding of the subject. In addition, it can be said that considering the Safety by Design approach will benefit all stakeholders. Safety by Design can be explained as a framework approach that identifies risky situations such as structural errors and dysfunctions in the development process of products or systems and aims to overcome situations where misuse causes damage to people, the environment or property (Rajabalinejad, 2019). The main objective of the Safety by Design approach is to prioritize the safety of users during the design, development, and implementation of online products and services in particular (Harris, 2021).

When the studies in the literature are examined, it is seen that there are limited studies that directly or indirectly involve potential users' expectations in the development of safe products,

especially there are very few studies that directly address the issue of safety of smartphones. Furthermore, in a study investigating the safe use of smartphones among teenagers, it has been revealed that they know daily excessive smartphone usage leads to certain physical and mental issues (such as eye fatigue, laziness, addiction, etc.) (Fitryasari, Tristiana & Yusuf, 2021). In this regard, pre-service teachers are the most frequent users of smart phone technologies both today and in the future in terms of age groups and they will be among the individuals who can be role models for their environment. Within this context, the aim of this research is to examine pre-service teachers' safety expectations of smartphones in terms of various variables. It is planned to seek answers to the following sub-problems for this purpose:

- Do pre-service teachers' safety expectations in the design of smartphones differ according to following variables:

  - gender,
  - generation (Y, Z),
  - department/branch group (categorized as: Quantitative, Verbal, Linguistic),
  - main purpose of smartphone use (Entertainment, Communication, Socializing)
  operating system of the smartphone used (Android, iOS, Other),
  - number of smartphones used (1-2, 3-4, 5 and above),
  - smartphone replacement frequency (Less than 1 year, From 1 year to 3 years, From 3 years to 5 years, 5 years and above),
  - smartphone segment preference (Entry level, Mid-range (price/performance), Flagship)

Research Methodology

In this research, which is planned to examine the opinions and expectations of pre-service teachers about the issue of safety in the design of smartphones, the quantitative method was adopted. Among the survey models, the relational survey model was used. In the relational survey model, the existence and degree of co-variance between two or more variables is investigated. (Cemaloğlu & Şahin, 2007).

Universe and Study Group

The universe of the research consists of pre-service teachers who continue their education at universities in Turkey in the 2020-2021 academic years. Since there are difficulties in collecting data from the entire universe in many respects, convenience sampling was used in the selection of the sample. Convenience sampling is one of the most widely used sampling techniques, and the sample that is easy to access and economical in terms of time and cost is reached from the population (Yağar & Dökme, 2018). It is mostly used in the exploration phase of a research project and is stated to be one of the best ways to collect some key data quickly and efficiently (Sekaran, 2003).

In this context, the sample in which the data collection activities will be carried out has been selected according to accessibility and the participants consist of pre-service teachers who continue their education at the two universities (Anadolu and Osmangazi) in Eskişehir province of Turkey. There are a total of 12 different undergraduate programs in faculties of education of these universities, 11 at Anadolu University (German Teaching, Computer Education and Instructional Technologies, Science Teaching, French Teaching, English Language Teaching,

Elementary Mathematics Teaching, Special Education, Guidance and Psychological Counseling, Art Teaching, Elementary School Teaching, Social Studies Teaching, Pre-School Teaching) and 8 at Eskişehir Osmangazi University (Computer Education and Instructional Technologies, Science Teaching, Elementary Mathematics Teaching, English Language Teaching, Pre-School Teaching, Special Education, Elementary School Teaching, Social Studies Teaching).

The study group consists of pre-service teachers who continue their education in the Education Faculties of Anadolu and Osmangazi Universities, randomly and voluntarily responding to the measurement tool. The measurement tool and the Personal Information Form were prepared online (Google Forms) and delivered to the teacher candidates. The data of the pre-service teachers answered the questions in the link were included in the analysis. This data collection application was carried out in the 2020-2021 academic year, lasted 8 weeks, and a total of 252 participants were reached. The demographic information of the participants is given in Table 1.

Table 1. Demographic Information of Participants

	n		*f*	**%**
Gender	Female		174	69
	Male		77	30.6
	Other (I don't want to choose)		1	.4
University	Anadolu University		134	53.2
	Eskişehir Osmangazi University		118	46.8
Department	Quantitative Group	Computer Ed. and Instruct. Tech.	3	
		Science Teaching	7	32	12.7
		Elementary Mathematics Teaching	22	
	Verbal Group	Pre-School Teaching	22	
		Special Education	60	
		Guid. and Psychological Counsel.	23	134	53.2
		Art Teaching	3	
		Elementary School Teaching	26	
	Linguistic Group	German Teaching	9	
		French Teaching	12	86	34.1
		English Teaching	65	
Grade	1. Grade		85	33.7
	2. Grade		48	19
	3. Grade		59	23.4
	4. Grade		60	23.8
Generation	Generation Y		132	52.4
	Generation Z		120	47.6
Main Purpose of Smartphone Use	Entertainment		43	17.1
	Communication		158	62.7
	Socialization		51	20.2
Operating System	iOS		78	31
	Android		172	68.3
	Other		2	.8
Number of Smartphones Used	1-2		97	38.5
	3-4		125	49.6
	5 and above		30	11.9
Smartphone Replacement Frequency	Less than 1 year		1	.4
	From 1 year to 3 years		60	23.8
	From 3 years to 5 years		163	64.7
	5 years and above		28	11.1
Smartphone Segment Preference	Entry Level		5	2
	Mid-range		189	75
	Flagship		58	23
	Total:		**252**	**100**

When Table 1 is examined, it is seen that 174 (69%) of the 252 participants were female and 77 (30.6%) were male, one participant (0.4%) did not specify their gender preference. This gender ratio is similar to the gender ratio of the student population of Anadolu and Eskişehir Osmangazi Universities' Faculties of Education. There are 134 (53.2%) participants from Anadolu University and 118 (46.8%) from Eskişehir Osmangazi University, and it can be said that the faculties constitute the universe are represented in a balanced way. 12 departments in two faculties were grouped as "Quantitative", "Verbal" and "Linguistic" branches, and the department variable was evaluated under these groups. It is seen that there are participants from 11 of 12 departments, 32 (12.7%) participants from quantitative branches, 134 (53.2%) participants from verbal branches and 86 (34.1%) participants from linguistic branches. It can be said that these rates are directly proportional to the departments and the number of students in the faculties. About the grade information of the participants, although first graders are predominant (f=85, 33.7%), it is seen that there are similar numbers and sufficient participants from second (f=48, 19%), third (f=59, 23.4%), and fourth grades (f=60, 23.8%). On the other hand, 132 (52.4%) of the participants in the application are from the Y generation, while 120 (47.6%) are from the Z generation. The number of participants whose main purpose of use is "entertainment" is 43 (17.1%), "communication" is 158 (62.7%) and "socialization" is 51 (20.2%). The operating system of 78 (31%) participants is iOS, and 172 (68.3%) of them Android. Two participants (0.8%) reported that their smartphone's operating system was different from these two operating systems. 97 of the participants (38.5%) used one or two different smartphones, 125 (49.6%) used 3 or 4 smartphones, and 30 (11.9%) used five or more smartphones. Regarding the frequency of smartphone replacement, only one (0.4%) of the respondents reported that they had replaced their smartphone in less than a year. The frequency of replacing their smartphones for 60 participants (23.8%) was from one year to three years, for 163 participants (64.7%) from three to five years, and for 28 participants (11.1%) five years or longer. Finally, the participants were asked about their smartphone segment preferences. Only five (2%) preferred "entry level" smartphones, 189 (75%) participants preferred "mid-range" smartphones and 58 (23%) participants preferred "flagship" smartphones. According to all these demographic information, it can be interpreted that the sample will adequately represent the population.

Data Collection Tools

In order to examine safety expectations of the participants in the design of smartphones in terms of a total of 8 variables: gender, generation, department/branch group, main purpose of smartphone use, operating system, number of smartphones used, smartphone replacement frequency and smartphone segment preference, it was planned to apply Safety Expectations in the Design of Smartphones Scale (SEitDoSS) which was developed in the first author's doctoral thesis titled "Investigation of Safety Expectations of Smartphones in the Context of Safety by Design", and the "Personal Information Form", which was created to get the information of the participants about the variables.

SEitDoSS is a 5-point Likert-type scale consisting of 21 items and 5 factors, scored from "less important (1)" to "very important (5)". The scale's factors are user-specific expectations, device-specific expectations, integration expectations, health-specific expectations and support expectations. The Cronbach's Alpha reliability coefficient of the scale is .85. The total variance explanation rate of the scale is 65.38%. The Cronbach's Alpha reliability coefficients of the scale factors are as follows: user-specific expectations, .78 for device-specific expectations, .76 for .81 for integration expectations, .78 for health-specific expectations and .79 for support expectations.

Data Collection

The data of the research were collected online through Google Forms in the 2020-2021 academic year. The link of the form containing Personal Information Form and the SEitDoSS (https://docs.google.com/forms/d/e/1FAIpQLSd81N_C55AmSU-- UHnIIMyUoayrH6GMXbjhqQMwwFIOA_qBBA/viewform) was sent to the faculty members of the Education Faculties of both universities, and they were asked to forward it to their students. In addition, it was directed to pre-service teachers forming the universe through social media groups such as WhatsApp, Facebook and Instagram. Answering the form takes 3-5 minutes on average.

Data Analysis

On the data collected within the scope of the study, Independent Samples T-test and One-Way ANOVA from parametric tests were performed and IBM SPSS 24 program was used for this purpose.

Results

The Independent Samples T-test was used to examine whether the expectations of the participants regarding the safety of smartphones in design differed significantly by gender. The data of a participant who did not have a gender preference was excluded from this test. The T-test results are given in Table 2.

Table 2. Comparison of participants' expectations regarding the safety of smartphones in design by gender variable

Factor	Gender	N	$\overline{X}$	SD	df	t	p
User-specific Expectations	Female	174	22.89	2.76	249	3.42	.001
	Male	77	21.29	4.57			
Device-specific Expectations	Female	174	23.94	1.6	249	2.869	.004
	Male	77	23.23	2.2			
Integration Expectations	Female	174	15.56	3.62	249	2.949	.003
	Male	77	13.99	4.49			
Health-specific Expectations	Female	174	18.6	2.45	249	3.198	.002
	Male	77	17.4	3.31			
Support Expectations	Female	174	14.31	1.2	249	2.922	.004
	Male	77	13.7	2.08			
SEitDoSS	Female	174	95.31	7.57	249	4.763	.000
	Male	77	89.61	10.93			

When Table 2 is examined, it is seen that the scores of the participants in the SEitDoSS and all its factors differentiated significantly in favor of females (p≤.05). Accordingly, it can be said that females have higher expectations regarding the safety of smartphones in design. Likewise, regarding safety in design, females' user-specific, device-specific and health-specific expectations, as well as integration and support expectations are higher than males. Based on this finding, it can be interpreted that females' awareness of the importance of safety in smartphones is higher than that of males.

Safety expectations of the participants in the design of smartphones were grouped according to their departments as "Quantitative", "Verbal" and "Linguistic" branches. Whether the expectations of prospective teachers in these branch groups differed significantly or not was examined with One-Way ANOVA. The findings are given in Table 3.

Table 3. Comparison of participants' expectations regarding the safety of smartphones in design by branch groups

Factor	Source of Variance	SS	df	MS	F	p	Significant Difference*
user-specific expectations	Between Groups	355.962	2	177.981	16.452	.000	2>1, 2>3
	Within Groups	2693.701	249	10.818			
	Total	3049.663	251				
device-specific expectations	Between Groups	.266	2	.133	.038	.963	-
	Within Groups	870.412	249	3.496			
	Total	870.679	251				
integration expectations	Between Groups	145.864	2	72.932	4.752	.009	2>1, 3>1
	Within Groups	3821.358	249	15.347			
	Total	3967.222	251				
health-specific expectations	Between Groups	93.950	2	31.975	4.159	.017	2>3
	Within Groups	1914.478	249	7.689			
	Total	1978.429	251				
support expectations	Between Groups	1.623	2	.812	.33	.719	-
	Within Groups	612.484	249	2.460			
	Total	614.107	251				
SEitDoSS	Between Groups	1142.169	2	571.084	7.060	.001	2>1, 2>3
	Within Groups	20140.510	249	80.886			
	Total	21282.679	251				

* 1= Quantitative Branches, 2= Verbal Branches, 3= Linguistic Branches

According to Table 3, "user-specific expectations", "integration expectations", "health-specific expectations" dimensions and SEitDoSS scores differed significantly in terms of branch groups (p≤.05). On the other hand, it is seen there is no significant difference in terms of "device-specific expectations" and "support expectations" dimensions. It has been revealed that the expectations of the pre-service teachers in the verbal departments (Pre-School Teaching, Special Education, Guidance and Psychological Counseling, Art and Business Teaching, Elementary School Teaching, Social Studies Teaching) about the safety of smartphones are higher than the pre-service teachers in the quantitative (Computer Ed. and Instructional Tech., Science Teaching, Elementary Mathematics Teaching) and linguistic departments (English Teaching, French Teaching, German Teaching). Likewise, the expectations of the pre-service teachers in the verbal departments in the dimension of "user-specific expectations" differ significantly from the expectations of the pre-service teachers in both the quantitative and linguistic departments. In addition, these pre-service teachers differ significantly from those in the numerical departments in terms of "integration expectations" and from the pre-service teachers in language departments in terms of "health-specific expectations". In addition, these pre-service teachers differ significantly from those in the quantitative departments in terms of "integration expectations" and from the pre-service teachers in linguistic departments in terms of "health-specific expectations". Therefore, it is seen that the "integration expectations" of the pre-service teachers in the linguistic departments regarding the safety in smartphones are significantly higher than the expectations of the pre-service teachers in the quantitative departments.

The Independent Samples T-test was used to determine whether the expectations of the participants regarding the safety of smartphones differed significantly according to their generations (Y, Z). Test results are given in Table 4.

Table 4. Comparison of the participants' expectations about the safety of smartphones in design according to the generation variable

Factor	Generation	N	$\overline{X}$	S	df	t	p
User-specific Expectations	Gen. Y	132	22.56	3.52	250	.839	.402
	Gen. Z	120	22.2	3.46			
Device-specific Expectations	Gen. Y	132	23.96	1.47	250	2.273	.024
	Gen. Z	120	23.43	2.19			
Integration Expectations	Gen. Y	132	14.74	4.5	250	1.345	.180
	Gen. Z	120	15.41	3.29			
Health-specific Expectations	Gen. Y	132	18.55	2.52	250	1.975	.049
	Gen. Z	120	17.85	3.06			
Support Expectations	Gen. Y	132	14.41	1.28	250	3.276	.001
	Gen. Z	120	13.78	1.78			
SEitDoSS	Gen. Y	132	94.21	9.25	250	1.341	.181
	Gen. Z	120	92.65	9.14			

When Table 4 is examined, it is seen that there is no significant difference in terms of SEitDoSS total score and the two generations. The scores of the participants from the Y and Z generations from the scale dimensions "user-specific expectations" and "integration expectations" do not show a significant difference (p>.05). It has been found that there is a significant difference in favor of the Y generation in terms of "device-specific expectations", "health-specific expectations" and "support expectations" dimensions (p≤.05). It can be commented that the pre-service teachers from Y-generation are more conscious and have higher expectations than the pre-service teachers from Z-generation about the durability, lifetime, effects on health and nature, and after-sales manufacturer support of smartphones.

The main purposes of using the smartphones of the participants were categorized under the headings of "entertainment", "communication" and "socialization". Whether the safety expectations in the design of smartphones differ significantly in terms of the main use of the smartphone was examined with One-way ANOVA.

Table 5. Comparison of the participants' expectations regarding the safety of smartphones in design according to the main purpose of use.

Factor	Source of Variance	SS	df	MS	F	p	Significant Difference*
user-specific expectations	Between Groups	19.789	2	9.894	.813	.445	-
	Within Groups	3029.874	249	12.168			
	Total	3049.663	251				
device-specific expectations	Between Groups	17.013	2	8.506	2.481	.086	-
	Within Groups	853.666	249	3.428			
	Total	870.679	251				
integration expectations	Between Groups	17.11	2	8.555	.539	.584	-
	Within Groups	3950.112	249	15.864			
	Toplam	3967.222	251				
health-specific expectations	Between Groups	60.092	2	30.046	3.9	.021	2>1
	Within Groups	1918.337	249	7.704			
	Total	1978.429	251				
support expectations	Between Groups	12.694	2	6.347	2.628	.074	-
	Within Groups	601.413	249	2.415			
	Total	614.107	251				
SEitDoSS	Between Groups	141.217	2	70.609	.832	.437	-
	Within Groups	21141.461	249	84.905			
	Total	21282.679	251				

* 1= Entertainment, 2= Communication, 3= Socialization

When Table 5 is examined, it is seen that as the result of the One-Way ANOVA, there is a significant difference only in the dimension of "health-specific expectations" in terms of the

main usage purpose of smart phone (p≤.05). The "health-specific expectations" of the pre-service teachers who use the smartphone mostly for "communication" purposes are higher than those who use the smartphone primarily for "entertainment".

The Independent Samples T-test was used to determine whether the expectations of the participants regarding the safety of their smartphones differed significantly according to the operating system (iOS, Android) of the smartphone they used. The data of two participants whose operating systems are different from iOS and Android (who ticked "Other") were not included in this test, and the test was carried out with 250 data. Test results are given in Table 6.

Table 6. Comparison of the participants' expectations about the safety of smartphones in design according to the operating system variable

Factor	Op. System	N	$\overline{X}$	S	df	t	p
User-specific Expectations	iOS	78	21.92	3.99	248	1.422	.156
	Android	172	22.6	3.23			
Device-specific Expectations	iOS	78	23.78	1.93	248	.49	.625
	Android	172	23.66	1.84			
Integration Expectations	iOS	78	15.83	3.5	248	2.172	.031
	Android	172	14.66	4.14			
Health-specific Expectations	iOS	78	18.14	2.54	248	.238	.812
	Android	172	18.23	2.94			
Support Expectations	iOS	78	13.95	1.83	248	1.054	.293
	Android	172	14.17	1.44			
SEitDoSS	iOS	78	93.63	9.51	248	.24	.810
	Android	172	93.33	9.11			

78 of the participants use an iOS and 172 Android operating system. When Table 6 is examined; it is seen that there is a significant difference in terms of the "integration expectations" dimension (p≤.05), but there is no significant difference in terms of other dimensions and the overall scale (p>.05). According to these findings, it can be said that iOS users have higher expectations for the safety of smartphones in terms of integration with other devices and technologies than Android users.

The safety expectations of the participants in the design of smartphones were grouped as "1-2", "3-4" and "5 and above" according to the number of smartphones they used. Whether the expectations of the prospective teachers in these groups differed significantly or not was examined with One-Way ANOVA. The findings are given in Table 7.

Table 7. Comparison of the participants' expectations regarding the safety of smartphones in design by the number of smartphones they use

Factor	Source of Variance	SS	df	MS	F	p	Significant Difference*
user-specific expectations	Between Groups	63.756	2	31.878	2.658	.072	-
	Within Groups	2985.907	249	11.992			
	Total	3049.663	251				
device-specific expectations	Between Groups	.079	2	.04	.011	.989	-
	Within Groups	870.599	249	3.496			
	Total	870.679	251				
integration expectations	Between Groups	37.893	2	18.947	1.201	.303	-
	Within Groups	3929.329	249	15.78			
	Total	3967.222	251				
health-specific expectations	Between Groups	31.337	2	15.668	2.004	.137	-
	Within Groups	1947.092	249	7.82			
	Total	1978.429	251				
	Between Groups	7.415	2	3.707	1.522	.22	-

Factor	Source of Variance	SS	df	MS	F	p	Significant Difference*
support expectations	Within Groups	606.692	249	2.437			
	Total	614.107	251				
SEitDoSS	Between Groups	80.174	2	40.087	.471	.625	-
	Within Groups	21202.504	249	85.151			
	Total	21282.679	251				

* 1= 1-2, 2= 3-4, 3= 5 and above

When Table 7 is examined, it is seen that the safety expectations of the participants in the design of smartphones do not differ significantly according to the number of smartphones they use (p>.05). Pre-service teachers' expectations about the safety of smartphones in design do not change according to the number of smartphones they use. Based on this finding, it can be deduced that using and experiencing different smartphones has no effect on the safety expectations.

The safety expectations of the participants in the design of smartphones were discussed by grouping the frequency of smartphone replacement as "less than 1 year", "from 1 year to 3 years", "from 3 years to 5 years" and "5 years and above". Whether the expectations of the prospective teachers in these groups differed significantly or not was examined with One-Way ANOVA. It was observed that there was only one participant who stated the frequency of smartphone replacement as "less than 1 year", and this data was excluded from the analysis. The fact that this period is almost never preferred by the pre-service teachers shows that the pre-service teachers do not change their smartphones very often and buy them for long-term use. Test findings are given in Table 8.

Table 8. One-way ANOVA results of participants' expectations regarding the safety of smartphones in design according to the frequency of smartphone replacement.

Factor	Source of Variance	SS	df	MS	F	p	Significant Difference*
user-specific expectations	Between Groups	42.741	2	21.371	1.767	.173	-
	Within Groups	3000.056	248	12.097			
	Total	3042.797	250				
device-specific expectations	Between Groups	26.707	2	13.354	3.932	.021	3>1
	Within Groups	842.281	248	3.396			
	Total	868.988	250				
integration expectations	Between Groups	13.880	2	6.940	.435	.647	-
	Within Groups	3952.447	248	15.937			
	Total	3966.327	250				
health-specific expectations	Between Groups	70.318	2	35.159	4.571	.011	3>2, 3>1
	Within Groups	1907.491	248	7.691			
	Total	1977.809	250				
support expectations	Between Groups	5.102	2	2.551	1.040	.355	-
	Within Groups	608.205	248	2.452			
	Total	613.307	250				
SEitDoSS	Between Groups	287.354	2	143.677	1.071	.185	-
	Within Groups	20952.439	248	84.486			
	Total	21239.793	250				

* 1= from 1 year to 3 years, 2= from 3 years to 5 years, 3= 5 years and above

When Table 8 is examined, it is seen that the scores of the participants show a significant difference in the dimensions of "device-specific expectations" and "health-specific expectations" in terms of smartphone replacement frequency (p≤.05). It is seen that there is no significant difference in terms of other dimensions and the overall scale (p>.05). Pre-service teachers who use their smartphones for 5 years or more have higher device-specific expectations about safety than pre-service teachers who use one to three years. Therefore, the

health-specific expectations of these pre-service teachers are significantly higher than the pre-service teachers who use their smartphone from one to three years and from three to five years.

In the last sub-problem of the research, the expectations of the participants regarding the safety of smartphones were examined according to the smartphone segment (Entry Level, Mid-Range, Flagship) they would prefer. Considering the preferences of the participants, it was seen that the number of participants who stated that they would prefer "entry level" smartphones was only 5. Based on this information, it can be interpreted that pre-service teachers tend to buy entry-level smartphones mostly due to their conditions (purchasing power and alike) rather than preference. For this reason, when evaluating this variable, the two options as Mid-Range and Flagship were considered. Independent Samples T-test was performed with the data of 247 participants. Test results are given in Table 9.

Table 9. Comparison of the participants' expectations regarding the safety of smartphones in design according to the smartphone segment preference variable

Factor	Segment Preference	N	$\bar{X}$	S	df	t	p
User-specific Expectations	Mid-range	189	22.37	3.63	245	.495	.621
	Flagship	58	22.62	2.7			
Device-specific Expectations	Mid-range	189	23.78	1.74	245	1.058	.291
	Flagship	58	23.48	2.2			
Integration Expectations	Mid-range	189	14.76	4	245	2.574	.011
	Flagship	58	16.26	3.42			
Health-specific Expectations	Mid-range	189	18.36	2.69	245	1.211	.227
	Flagship	58	17.85	3.17			
Support Expectations	Mid-range	189	14.18	1.47	245	.995	.321
	Flagship	58	13.95	1.78			
SEitDoSS	Mid-range	189	93.44	9.08	245	.529	.597
	Flagship	58	94.16	8.79			

When Table 9 is examined, it is seen that the "integration expectations" dimension of the participants regarding the safety of smartphones differs significantly according to the smartphone segment preference (p≤.05). It is understood that there is no significant difference in terms of other dimensions and the overall scale (p>.05). It has been revealed that pre-service teachers who prefer to buy high-end smartphones have higher expectations about the safety of smartphones in terms of integration with other technologies and devices, rather than those who prefer mid-range smartphones.

4. Discussion

In this study, safety expectations of pre-service teachers on smartphones were determined and examined in terms of 8 variables as gender, generation (y,z), department/branch group, main purpose of smartphone use, operating system, number of smartphones used, smartphone replacement frequency and smartphone segment preference.

According to the results of the research, the scores of the pre-service teachers in terms of gender in the SeitDoSS and all its dimensions differ significantly in favor of females. It can be said that female pre-service teachers have higher expectations regarding the safety of smartphones in design. Likewise, females' user-specific, device-specific and health-specific expectations, integration and support expectations regarding smartphones' safety in design are higher than those of men. When the literature is examined, it is seen that there is no study that directly deals with the safety expectations in the design of smartphones and examines them in terms of gender. In this respect, the result reached in this study can be seen as important. Based on this result, it can be interpreted that females' awareness of the importance of safety in smartphones is higher

than males'. With the knowledge that males are generally more prone to technology acceptance (Goswami & Dutta, 2015) and smartphone adoption (Ameen & Willis, 2018) than females; it can be inferred that males have a higher tendency to accept and use technology products such as smartphones as they are, and females may have higher expectations and a critical perspective on this issue. In addition, it is known that males are more loyal to the brand about smartphones than females (Hew, Badaruddin ve Moorthy, 2017). It can be said that this commitment of males can also reduce their safety expectations, and researching this subject will contribute to the literature.

A study conducted in 2019 revealed that female high school students use their smartphones for an average of 10 hours a day (Deyan, 2019). The fact that females whose ages are close to the age groups in our study have such a high level of smartphone usage may have increased their expectations for safety improvements that can prevent negative situations that may arise as a result of long use. In a study in which various statistics on the use of smartphones by young people were presented, it was stated that males generally use smartphones more effectively than females (Livingstone, Haddon, Vincent, Mascheroni & Ólafsson, 2014). It can also be thought that this information may be one of the reasons that lowers the safety expectations of males in smartphones and increases the expectations of females.

In terms of branch groups, it was revealed that the expectations of pre-service teachers in the verbal departments (Pre-School Teaching, Special Education, Guidance and Psychological Counseling, Art and Business Teaching, Elementary School Teaching, Social Studies Teaching) about the safety of smartphones were higher than the pre-service teachers in the quantitative (Computer Ed. And Instructional Tech., Science Teaching, Elementary Mathematics Teaching) and linguistic departments (English Teaching, French Teaching, German Teaching). Likewise, the expectations of the pre-service teachers in the verbal departments in the dimension of "user-specific expectations" differ significantly from the expectations of the pre-service teachers in both the quantitative and linguistic departments. In addition, these pre-service teachers differ significantly from those in the quantitative departments in terms of "integration expectations" and from the pre-service teachers in linguistic departments in terms of "health-specific expectations". Therefore, it is seen that the "integration expectations" of the pre-service teachers in the linguistic departments regarding the safety in smartphones are significantly higher than the expectations of the pre-service teachers in the linguistic departments. In the literature, there is no study directly addresses the branches/departments of pre-service teachers on safety expectations in design of smartphones. In the meantime, it is possible to associate these departments or branch groups with intelligence fields (Marenus, 2020) and to make inferences about the safety expectations in the design of smartphones (eg: quantitative branches → logical-mathematical intelligence, verbal branches → social intelligence, linguistic branches → linguistic intelligence). The accuracy of these inferences can be confirmed by research on the intelligence fields of the users and the safety expectations in the design of smartphones. In the study of Koyuncu and Pusatlı (2019), in which the security awareness of users about smartphones is discussed, they concluded that security awareness on smartphones increases at undergraduate and higher education levels, in other words, security awareness increases with the level of education. In our study, it was concluded that the mean scores of the pre-service teachers studying at the undergraduate level in terms of safety expectations in the design of smartphones from SeitDoSS were also high. It can be said that high safety awareness about smartphones may have an effect on these high scores. In another study, Balce and Yardımoğlu (2016) concluded that the students in the quantitative departments give more importance to the "brand" than the students in the verbal departments, while the students in the verbal departments attach more importance to the "price" than the

students in the quantitative departments. In addition, those in the quantitative departments pay more attention to the technical features when choosing a smartphone. It can be said that these results in terms of department type on smartphone preference will also affect safety expectations in design.

Considering the results in terms of generations, it was concluded that there was a significant difference in favor of the generation Y in terms of "device-specific expectations", "health-specific expectations" and "support expectations" dimensions. It can be commented that the generation Y pre-service teachers are more conscious and have higher expectations than the generation Z pre-service teachers about the durability of smartphones, their lifespan, their effects on health and nature, and after-sales manufacturer support. In a way, it can be said that the expectations of pre-service teachers aged 21 and under are lower than those of older students. According to the study of Koyuncu and Pusatlı (2019), as the age groups with the lowest security awareness in smartphones, the age group of 21 and below comes second after the age group of 50 and above. In this study, the result reached regarding the safety expectations of the generation Z in the design of smartphones is in line with the result of Koyuncu and Pusatlı (2019) regarding security awareness. It can be deduced that individuals with low security awareness about smartphones will also have low safety expectations in design. In addition, it is known that as the age of the users decreases, their commitment to their smartphones increases (Kuyucu, 2017), and it can be said that this dependency or addiction may have pushed the safety expectations into the background.

Considering the main purpose of smartphone use in terms of safety expectations in design, it was concluded that there was a significant difference only in the dimension of "health-specific expectations". There was no significant difference in terms of other dimensions and the overall scale. The "health-specific expectations" of the pre-service teachers who use the smartphone mostly for communication purposes are higher than those who use the smartphone primarily for entertainment. It can be interpreted that the pre-service teachers, who use their smartphones mostly for communication purposes are more conscious and aware of the effects of smartphones on health and nature, and they have higher expectations for development and improvement in this context. When the literature examined, it is seen that the studies on the usage purposes of smartphones are very limited. Stachl et al. (2017) concluded that the frequency of use of mobile applications, which fall into the categories of entertainment, communication and socialization on smartphones, varies according to the personal characteristics of the users. According to this information, extrovert users use their smartphones more than introverts for communication and socialization. Based on this result, it can be said that personality traits will affect the main usage purposes of smartphones. While evaluating the safety expectations in the design of smartphones according to the intended use, it will be beneficial to take into account the personality traits, and also to conduct studies on personality traits and safety expectations in design.

Another variable of the research is the operating system used. It was concluded that there was a significant difference only in terms of the "integration expectations" dimension. Accordingly, it can be said that iOS users have higher expectations for the safety of smartphones in terms of integration with other devices and technologies than Android users. There is no significant difference in terms of the remaining dimensions and the scores obtained from the overall scale. The expectations of pre-service teachers using Android and iOS on safety are similar. When the literature is examined, it is seen that there is no study that deals with the safety expectations in the design of smartphones in the context of the operating system. Benenson, Gassmann, and Reinfelder (2013) concluded that Android users have higher security awareness than iOS users. However, the fact that the safety expectations of pre-service teachers in the design of

smartphones according to the operating system do not differ and are at a similar level except for the integration expectations, can be explained by the high security awareness of Android users and the trust of iOS users to the brand and ecosystem they use. Although the studies of Al-Qershi, Al-Qurishi, Rahman and Al-Amri (2014) and Mohamed and Patel (2015) show that the security approach of the iOS platform is more secure in general, it is known that the security issue on smartphones is still common for both operating systems and this situation indicates it will be an issue to focus on for the brands and developers in the future.

The fact that the safety expectations of pre-service teachers in the design of smartphones did not differ significantly according to the number of smartphones they used is another important result of this research. In essence, it would not be wrong to predict that users will have more detailed information about these devices in many respects by using and experiencing different smartphone models. However, it is seen that the expectations of pre-service teachers about the safety of smartphones in design do not differ significantly according to the number of smartphones they use. Based on this result, it can be deduced that using and experiencing different smartphones has no significant effect on safety expectations. This issue can be examined on different researches and user groups. There is no study in the literature that directly addresses this issue. In their research, Rojas-Osorio and Alvarez-Risco (2019) concluded that the average age of owning a smartphone is 15, most of university students used and experienced 3-4 smartphones, so they change a smartphone every two years on average. Based on this information, it can be said that university students generally have similar smartphone usage experiences, and therefore, their safety expectations in design may not differ. In their research, the Technology Acceptance Model (TAM) and smartphone use were also examined together, and it was concluded that a university student's thought about the usefulness of the smartphone is a more important factor than the perceived ease of use variable in determining the attitude of continuing to use a smartphone. It can be examined whether safety expectations in design differ in terms of these variables by conducting research that deals with the safety expectations of smartphones in design and TAM together.

When the smartphone replacement frequency variable is examined, it is concluded that there is a significant difference in the dimensions of "device-specific expectations" and "health-specific expectations". Pre-service teachers whose smartphone replacement time is five years or more have higher device-specific expectations about safety than pre-service teachers with the replacement time of from one year to three years. Besides, the health-specific expectations of these pre-service teachers are higher than the pre-service teachers with the replacement time from one to three years and from three to five years. In addition, it was observed that pre-service teachers generally do not change their smartphones very often, buy them for long-term use. In Hindioğlu (2019)'s study, it has been found out that the reasons for university students to change their smartphones are mostly caused by subjects as follows; "disfunction", "camera resolution", "memory capacity" and "speed of running". Addition to these subjects, "after sales support", "color of the smartphone" and "dual SIM" are also slightly effective. At this point, it can be said that most of the topics mentioned about device replacement can be evaluated under the dimension of "device-specific expectations" in this research. The relatively understated "after sales support" is also under the "support expectations" dimension in this research. It can be thought that there may be a link between the reasons for buying a new smartphone and safety expectations. Again, according to Hindioğlu (2019)'s research; as technology acceptance increases, smartphone replacement time decreases. The information of those with longer smartphone replacement times have higher safety expectations resulted in our research, indicates that there may be a relationship between technology acceptance and TAM and safety expectations in the design of smartphones. This issue can be explored in future research.

Therefore, an important result of our research on the frequency of smartphone replacement; pre-service teachers often replace their smartphones within a period of three to five years (N=163/%64,7). In a study conducted in Peru, it was concluded that the frequency of replacing smartphones among university students is two years on average (Rojas-Osorio & Alvarez-Risco, 2019). Based on the results of this study, it can be deduced that the duration of using the smartphone purchased by university students in Turkey is longer than students in Peru. This situation can be investigated in different universities and more generalizable and definite results can be reached. In addition, the replacement frequency of smartphones of individuals of different ages and occupations in different countries can be revealed and the results can be compared.

In the last variable of the study, it was reached that the "integration expectations" dimension of the participants regarding the safety of smartphones differed significantly according to the smartphone segment preference. It has been revealed that pre-service teachers who prefer to buy high-end (flagship) smartphones have higher safety expectations about smartphones' integration with other technologies and devices than those who prefer mid-range smartphones. The conclusion reached in this study that the integration expectations of iOS users is higher than Android users may have an effect on this result since the majority of smartphones using the iOS operating system are in the flagship smartphone segment. Therefore, it was seen that the number of participants who stated that they would prefer "entry-level" smartphones was very low (N=5/%2). It can be interpreted that pre-service teachers tend to buy entry-level smartphones mostly due to their conditions rather than preference. It's known that factors affect users' smartphone preferences are "product's features", "brand", "price", "social factors", and "advertising efforts" (Çakır & Demir, 2014). As a result of the fact that so few of the pre-service teachers stated that they preferred entry-level phones; it can be deduced that the price factor prevails over all other factors in choosing entry-level phones, in other words, the consumer's budget is the most determining factor. In addition, it is stated in the literature that there is a relationship between smartphone segment preference and smartphone addiction, high-level smartphone users are more addicted (Kuyucu, 2017). Research can be conducted on whether negative situations experienced by users using smartphones such as smartphone addiction, nomophobia, fear of missing out (FoMO) affect safety expectations in design.

Talan, Aktürk, Korkmaz and Gülseçen (2015), on the other hand, have been studied the security awareness of teacher candidates in using smartphones. It has been revealed that although about 75% of them are aware of security applications on smartphones, 59% of them use security applications. Moreover, most users are unaware of the security features and options their smartphones offer or have disabled these features. These people may be disabling these features to make the phone run faster. At the end of the study, it has been stated that pre-service teachers are generally aware of security risks and threats in using smartphones, but they do not take adequate precautions in this regard. The fact that the results obtained in our research regarding the safety expectations in design were generally at a high level also support this situation. In addition to the benefits provided by smart phones, it has been suggested that there are some threats to security, safety and privacy, and studies should be carried out to raise awareness of users about the precautions they can take against these threats.

Yıldırım and Varol (2016), in their research on the perception of security in social networks, concluded that users find laptops and desktops more secure than smartphones when it comes to using social networks. The fact that users generally find smartphones unsafe can also be counted as one of the reasons leading to the high safety expectations of the pre-service teachers reached as a result in our study. They also added that people use smartphones to connect to social

networks even though they do not feel safe, and this may be due to the fact that they do not know what to do about smartphone security.

Büyükgöze (2019) has been examined smartphone operating systems and application stores in terms of security and it has been said that it may be beneficial for manufacturers to launch their smartphones with protection and firewall like applications installed by default. In a broader context, it is recommended to make a series of improvements in products and services related to smartphones, from providing user-friendly filtering solutions (applications that contain some personal default features according to the user's age and individual characteristics, etc.) to a wide-ranging perspective change in terms of safety by design (Livingstone, Haddon, Vincent, Mascheroni & Ólafsson, 2014). The results obtained in this study may be helpful in this respect.

Conclusion

It is thought that the results obtained in this study will contribute to future studies on the safety of smartphones. In addition, it creates an opportunity for smartphone manufacturers and designers to learn about user expectations, take them into account and act accordingly. The results of this study may enable the issue to be handled more effectively in research, development and innovation studies, and thus, the outputs may be positively affected in many different ways. In this study, safety expectations of pre-service teachers from the y and z generations, which are known to have high smartphone usage levels, were determined and examined in terms of various variables. In order to enrich the literature on this subject and to create a deep understanding; research can be conducted to determine safety expectations of individuals from different age, income and occupational groups on smartphones and to examine them in terms of various variables.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to affect the research reported in this paper.

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References

Al-Qershi, F., Al-Qurishi, M., Rahman, S. M. M., & Al-Amri, A. (2014, January). Android vs. iOS: The security battle. In *2014 World Congress on Computer Applications and Information Systems (WCCAIS)* (pp. 1-8). IEEE.

Ameen, N. & Willis, R. (2018). Towards closing the gender gap in Iraq: understanding gender differences in smartphone adoption and use. *Information Technology for Development,* 1-26. doi: https://doi.org/10.1080/02681102.2018.1454877.

Balce, A. O., & Yardımoğlu, P. B. (2016). Investigating of college students' smartphone preferences. *Pamukkale Journal of Eurasian Socioeconomic Studies, 3*(1), 8-26.

Benenson, Z., Gassmann, F. & Reinfelder, L. (2013). Android and iOS users' differences concerning security and privacy. In *CHI'13 Extended Abstracts on Human Factors in Computing Systems* (pp. 817-822).

BinDhim, N. F. & Trevena, L. (2015a). Health-related smartphone apps: regulations, safety, privacy and quality. *BMJ Innov*, *1*(2), 43-45.

BinDhim, N. F. & Trevena, L. (2015b). There's an app for that: a guide for healthcare practitioners and researchers on smartphone technology. *Online journal of public health informatics*, *7*(2), 1-12. DOI: 10.5210/ojphi.v7i2.5522.

Büyükgöze, S. (2019). Security model investigations of mobile application markets. *TBV Journal of Computer Science and Engineering, 12*(1), 9-18.

Cemaloğlu, N. & Şahin, D. E. (2007). A study of the teacher's burnout level according to various variables. *Kastamonu Education Journal, 15*(2), 465-484.

Corti, A., Manzoni, V., Savaresi, S. M., Santucci, M. D. & Di Tanna, O. (2012). A centralized real-time driver assistance system for road safety based on smartphone. In *Advanced Microsystems for Automotive Applications 2012* (pp. 221-230). Springer, Berlin, Heidelberg.

Çakır, F. & Demir, N. (2014). A study on determining preferences of university students' purchasing smartphone. *Dokuz Eylül University Faculty of Economics and Administrative Sciences Journa], 29*(1), 213-243.

Deyan, G. (2019). *61+ Revealing Smartphone Statistics For 2019*. Techjury. Retrieved September 9, 2021from https://techjury.net/stats-about/smartphone-usage/#gref.

Fitryasari, R., Tristiana, R., D., & Yusuf, A. (2021). Teenagers' Safety Smartphone Use Model Based on Health Promotion Theory. Jurnal Ners, 16(2). 148-154. DOI: http://dx.doi.org/10.20473/jn.v16i2.29650.

Goswami, A. and Dutta, S. (2015). Gender differences in technology usage - A literature review. *Open Journal of Business and Management*, *4*(1), 51-59.

Harris, B. (2021), 'Technology-Enabled Abuse: How 'safety by design' Can Reduce Stalking and Domestic Violence'. *The Conversation*, November 11. Retrieved May 14, 2023 https://theconversation.com/technology-enabled-abuse-how-safety-by-design-can-reduce-stalking-and-domestic-violence-170636.

Heimerl, K., Menon, A., Hasan, S., Ali, K., Brewer, E. & Parikh, T. (2015, May). Analysis of smartphone adoption and usage in a rural community cellular network. In *Proceedings of the Seventh International Conference on Information and Communication Technologies and Development* (p. 40). ACM.

Hindioğlu, B. (2019). The determinants of usage and changing frecuency of smartphone among the students of Bilecik Şeyh Edebali University. *Unpublished master's thesis*, Bilecik Şeyh Edebali University, Institute of Social Sciences, Bilecik/Turkey.

Karaarslan, E., Demir, M., & Fetah, V. (2016). Privacy and secrecy in smart phones: a case study and recommendations. *Academic Informatics Conference*, 81-88. Available at SSRN: https://ssrn.com/abstract=4184876 or http://dx.doi.org/10.2139/ssrn.4184876.

Koyuncu, M. ve Pusatli, T. (2019). Security awareness level of smartphone users: An exploratory case study. *Mobile Information Systems*, 1-11. DOI: https://doi.org/10.1155/2019/2786913.

Kuyucu, M. (2017). Use of smart phone and problematic of smart phone addiction in young people: "Smart Phone (Colic)" university youth. *Global Media Journal TR Edition, 7*(14), 328-359.

Livingstone, S., Haddon, L., Vincent, J., Mascheroni, G. & Ólafsson, K. (2014). *Net Children Go Mobile: The UK Report: a comparative report with findings from the UK 2010 survey by EU Kids Online*. London: London School of Economics and Political Science. Retrieved June 25, 2021 from http://eprints.lse.ac.uk/57598/.

Marenus, M. (2020, 9 June). Gardner's Theory of Multiple Intelligences. *Simply Psychology*. Retrieved September 7, 2021 from https://www.simplypsychology.org/multiple-intelligences.html.

Mohamed, I. & Patel, D. (2015, April). Android vs iOS security: A comparative study. In *2015 12th International Conference on Information Technology-New Generations* (pp. 725-730). IEEE.

Mylonas, A., Kastania, A. and Gritzalis, D. (2013). Delegate the smartphone user? Security awareness in smartphone platforms. *Computers & Security, 34*, 47-66.

Özen, Y. & Gül, A. (2007). Population-sampling issue on social and educational research studies *Journal of Kazım Karabekir Education Faculty, 15*, 394-422.

Rajabalinejad, M. (2019). *Paradigm of Safety by Design*. In MATEC Web of Conferences (Vol. 273, p. 01006). EDP Sciences.

Rajabalinejad, M., Bonnema, G. M. and van Houten, F. J. A. M. (2015). An integral safety approach for design of high risk products and systems. In L. Podofilini, B. Sudret, B. Stojadinovic, E. Zio, & W. Kröger (Eds.), *Safety and Reliability of Complex Engineered Systems: ESREL 2015* (pp. 3953-3959). Switzerland: CRC Press. DOI: https://doi.org/10.1201/b19094-518.

Rojas-Osorio, M. & Alvarez-Risco, A. (2019). Intention to Use Smartphones among Peruvian University Students. *International Association of Online Engineering, 13*(3), 40-52. DOI: https://doi.org/10.3991/ijim.v13i03.9356 Retrieved September 13, 2021 from https://www.learntechlib.org/p/208271/.

Sekaran, U. (2003). *Research methods for business: A skill building approach* (Fourth Edition. NY: John Wiley & Sons.

Serksnis T. (2019) Safety by Design. In *Designing Electronic Product Enclosures* (pp. 181-186). Springer, Cham.

Stachl, C., Hilbert, S., Au, J. Q., Buschek, D., De Luca, A., Bischl, B., … Bühner, M. (2017). Personality Traits Predict Smartphone Usage. *European Journal of Personality, 31*(6), 701-722. doi:10.1002/per.2113.

Talan, T., Aktürk, C., Korkmaz, A. & Gülseçen, S. (2015). Üniversite öğrencilerinin akıllı telefon kullanımında güvenlik farkındalığı [Security awareness of university students' smartphone use]. *Istanbul Journal of Open and Distance Education, 1*(2), 61-75.

Whipple, J., Arensman, W. & Boler, M. S. (2009, October). A public safety application of GPS-enabled smartphones and the android operating system. In *2009 IEEE International Conference on Systems, Man and Cybernetics* (pp. 2059-2061). IEEE.

Yağar, F. & Dökme, S. (2018). Planning of qualitative researches: research questions, samples, validity and reliability *Gazi Journal of Health Sciences, 3*(3), 1-9.

Yıldırım, N. & Varol, A. (2016). Security on social network: A case study done at Bitlis Eren and Fırat Universities. *TBV Journal of Computer Science and Engineering, 6*(1). Retrieved June 24, 2021 from https://dergipark.org.tr/en/pub/tbbmd/issue/22246/238802.