Education and Information Technologies (2023) 28:12215–12242
https://doi.org/10.1007/s10639-022-11552-0

Parents' awareness of the conscious use of applications on smart devices: A scale development study

Gülcan Öztürk[1] · **Feyza Şahin Sarıtaş**[2]

Received: 11 May 2022 / Accepted: 22 December 2022 / Published online: 7 March 2023

Abstract

Children inevitably start using smart devices from the first year of their lives. Parents should have knowledge and awareness of the conscious use of applications on smart devices. For this reason, a scale to measure parents' knowledge and awareness of the conscious use of applications on smart devices has become necessary. Due to this necessity, we want to conduct this study. The research's problem was how parents' knowledge and awareness of the conscious use of applications on smart devices could be measured using a valid and reliable scale. We conducted the research in an exploratory sequential design with two stages one of the mixed methods research. We collected and analyzed qualitative data from 33 parents in the first stage, and we collected quantitative data from 602 parents and performed a quantitative analysis to evaluate the first stage's results in the second stage. After reviewing the literature, we concluded that the scale's dimensions as a theoretical model were (1) application, (2) benefit, (3) restriction, and (4) worry. We decided on the scale's items according to the theoretical model after analyzing the parents' opinions and obtaining experts' evaluations for the content validity of the scale items. We demonstrated that the theoretical model was supported by the analyses we performed using the data we collected. We learned how a valid and reliable scale could be used to measure the parents' knowledge and awareness of the conscious use of applications on smart devices, including current and future computer systems. The scale we developed had more specific dimensions compared to the scales in the literature about digital parenting.

✉ Gülcan Öztürk
ozturkg@balikesir.edu.tr

Feyza Şahin Sarıtaş
sahin.feyza@gmail.com

[1] Department of Computer Education and Instructional Technology, Necatibey Faculty of Education, Balıkesir University, Balıkesir, Turkey

[2] Edremit Uğur Schools, Balıkesir, Turkey

Keywords Smart devices · Applications · Conscious use · Awareness · Digital parenting · Scale development

1 Introduction

Developments in information and communication technologies in recent years have caused children to encounter touchscreen devices in the first years of their lives and start using these devices from the first year of their lives (Ahmadzadeh et al., 2020; Kabali et al., 2015). These devices, also called smart devices, offer users a lot of useful or not useful content. Children inevitably use smart devices and encounter this content (Mascheroni et al., 2018; Şahin & Öztürk, 2019). The concept of digital parenting has emerged as a result of children's use of smart devices and digital technologies (Rode, 2009; Sergi et al., 2017).

A parent is defined as a mother, father, or caregiver who is responsible for raising the individual biologically and for his/her emotional, social, and educational development (Kabakçı Yurdakul et al., 2013). Digital parenting is defined as parents being aware of the risks and opportunities in digital devices, being aware of their children's problematic use, controlling their children in digital environments, and being role models for them about digital technology use (Manap & Durmuş, 2020). According to Cao et al. (2022), parents' efforts and practices to understand, support, mediate and regulate children's digital technology use are digital parenting. On the other hand, Reginasari et al. (2021) determined that parents' mediation to control and limit their children's internet activities was digital parenting for parents. Reginasari et al. (2021) found that parents considered using the internet and social media to perform parenting practices as digital parenting. Digital parents need to have at least basic knowledge and awareness of digital technologies to protect their children from risks in digital environments (Huang et al., 2018). According to Lim (2018), parents who want to fulfill the requirements of digital parenting should demonstrate positive attitudes towards digital technologies, allow their children to access smart devices, monitor their children's digital activities, and create common use times with their children.

Kabakçı Yurdakul et al. (2013) stated that digital parenting has five dimensions. These are digital literacy, awareness, control, ethics, and innovation. Digital literacy refers to the ability to use technology at a basic level, overcome digital problems, follow innovations, and have knowledge about privacy policies. Awareness is noticing the opportunities, negativities, and risks in online environments, recognizing internet addiction, and distinguishing between what the child does on the computer and the internet. Control includes preparing a guide that includes rules about not leaving the child alone in the digital environment, keeping the devices used by children under control by using control software, and establishing rules about the child's use of the internet or digital devices. Ethics includes the concepts of privacy, accessibility, property, and accuracy. Innovativeness is being interested in innovations in digital technologies, being able to learn about innovations, and

being aware of the positive and negative aspects of innovations. Kabakçı Yurdakul et al. (2013) stated that digital parents should fulfill the characteristics specified in these dimensions.

1.1 Literature review

When we examined the literature, we saw that there were studies that examined parents' thoughts, opinions, perceptions, awareness, attitudes, competencies, and behaviors within the scope of digital parenting (Cao et al., 2022; Dedkova et al., 2022; Dishkova & Papancheva, 2019; Fidan et al., 2021; Gür & Türel, 2022; Huang et al., 2018; İnan-Kaya et al., 2018a; Lanina et al., 2021; Manap & Durmuş, 2020; Nayci, 2021; Papadakis et al., 2019, 2021, 2022; Reginasari et al., 2021; Rode, 2009; Şahin & Öztürk, 2019; Sergi et al., 2017; Tosun & Mihci, 2020; Türel & Gür, 2019; Wartella et al., 2014; Yaman et al., 2019). Wartella et al. (2014) found that parents used digital devices for their children's education and, in some cases, to keep their children busy, and they felt worried about their children's use of digital technologies. Sergi et al. (2017) investigated the perspectives of parents on their children's use of portable digital devices and concluded that parents thought that digital devices contributed to their children's education, they used digital devices as a reward or punishment for their children to do some activities, and they were worried that their children's use of digital devices may cause addiction. Huang et al. (2018) examined digital parenting competencies and found that parents' ability to take precautions to protect children from inappropriate content was moderate. İnan-Kaya et al. (2018a) examined parents' perceptions of digital risks and their competence in taking precautions against digital risks, they concluded that parents were aware of digital risks and the use of digital devices, and they wanted to learn how to protect their children from the digital risks of which they were not aware. Dishkova and Papancheva (2019) found that parents thought that their children use digital devices too much, limited their children's use of digital devices, and used digital devices as a reward or punishment for their children to do some activities. Şahin and Öztürk (2019) concluded that the parents were not aware of the content definition standards or age ratings of the applications on smart devices, they restricted their children's use of smart devices, they felt worried about their children's use of smart devices, and they found the educational applications on smart devices useful. Papadakis et al. (2019) aimed to explore parents' perceptions about smart devices and educational applications on smart devices in their study. The study's results demonstrated that most of the parents had positive attitudes toward the use of these technologies and they wanted to support their children's learning by creating an engaging environment at home. Türel and Gür (2019) developed a scale measuring parents' attitudes towards their children's use of information and communication technologies. On the other hand, Yaman et al. (2019) developed a scale within the framework of digital citizenship (Ribble & Bailey, 2007) to determine parents' digital parenting competencies and examined parents' digital parenting competencies in the dimensions of digital literacy, digital security, and

digital communication. In the study of Dedkova et al. (2022), most parents stated that they or their partners were responsible for installing security applications to ensure the safety of the smart devices their children use. Manap and Durmuş (2020) reported that the parents stated that they were careful to be with their children when they were playing digital games, they used smart devices for the education of their children, they put a time limit on their children's use of digital devices, and they used parental control applications. Tosun and Mihci (2020) determined that parents' awareness of content definition standards and age ratings was low, they were worried about their children playing digital games, and they were reluctant to participate in a digital parenting training program. Cao et al. (2022) reported that parents had positive and negative opinions about early digital device use, parents who had positive opinions found digital devices useful for learning and development, and parents who had negative opinions were concerned that digital devices would lead to addiction and negatively impact their children's health and learning. Dias and Brito (2021) investigated criteria used by children, parents, and industry stakeholders to assess applications for children. They concluded that children preferred entertainment, parents appreciated learning and safety, and stakeholders emphasized the importance of a positive user experience. Fidan et al. (2021) examined the digital parenting attitudes and behaviors of parents towards their children's digital game playing habits and determined that parents expressed positive and negative opinions about the benefits of digital games played by their children and put a time limit on digital game playing. Lanina et al. (2021) concluded that parents did not use parental control software much on the digital devices their children use, and they limited their children's use of devices. Nayci (2021) concluded that parents' awareness of digital parenting in the dimensions of beneficial use and protection from risks was high. Reginasari et al. (2021) reported that parents expressed their opinions about the benefits and risks of their children's use of digital media and the Internet, that they were worried about the risks, and that they imposed limitations on their children's use. Papadakis et al. (2021) and Papadakis et al. (2022), conducted survey studies aimed at examining parents' knowledge of applications, ownership of mobile devices, application purchasing habits, children's use of applications, and application usage contexts by parents and their children. They reported that parents of preschool children sought to support their children's learning at home through mobile devices, but they lacked knowledge about which applications were developmentally suitable and they needed further guidance. Gür and Türel (2022) found that parents were worried about the potential security threats and risks that their children would face in digital environments, and as a result, they take precautions to protect their children from such risks by controlling, informing, and restraining their children. Derix et al. (2022) asked to the parents reflect on how their experiences and relationships could be improved by four scenario-based storyboard proposals. They found that parents thought of three approaches to improving their experiences managing smart devices during family time: (1) fostering awareness between collocated family members, (2) encouraging proximity between collocated family members, and (3) supporting communication about technology use among family members. Melhuish and Pacheco (2022)

investigated digital parenting strategies and behaviors of parents about their children's internet use. They concluded that parents used enabling mediation and restrictive mediation as digital parenting strategies and behaviors.

We saw that most of the studies on digital parenting in the literature were in the survey model (Cao et al., 2022; Dedkova et al., 2022; Dishkova & Papancheva, 2019; Fidan et al., 2021; Gür & Türel, 2022; Huang et al., 2018; İnan-Kaya et al., 2018a; Lanina et al., 2021; Melhuish & Pacheco, 2022; Nayci, 2021; Papadakis et al., 2019, 2021, 2022; Reginasari et al., 2021; Tosun & Mihci, 2020; Wartella et al., 2014; Zhou et al., 2022). The studies in the survey model used questionnaires containing open-ended or closed-ended questions to determine the parents' thoughts, opinions, perceptions, or behaviors about their children's use of digital devices or technologies. Some of the studies on digital parenting were in the qualitative research model that includes interviews or observations (Derix et al., 2022; Dias & Brito, 2021; Şahin & Öztürk, 2019; Sergi et al., 2017; Tosun & Mihci, 2020). Like the studies in the survey model, studies in the qualitative research model also used interview or observation methods to determine the parents' thoughts, views, or behaviors about their children's use of digital devices or technologies. There were also scale development studies to measure parents' digital parenting awareness (Manap & Durmuş, 2020), digital parenting attitudes (İnan-Kaya et al., 2018b; Navarro, 2022), and digital parenting competencies (Yaman et al., 2019) in the literature. There was no study aimed at measuring parents' knowledge and awareness of the conscious use of applications on smart devices among these studies. In other words, these studies approached the concept of digital parenting from a general perspective.

1.2 Problem statement

We reviewed and classified the results involving the conscious use of applications on smart devices in the digital parenting studies in the literature: (1) knowing about applications, (2) beneficial use of applications, (3) limiting the use of applications, (4) feeling worried about the use of applications (Table 1). There were studies that related to more than one category as well as studies that only related to one in Table 1.

Children use smart devices starting from an early age (Taylor et al., 2018; Wartella et al., 2014) and they encounter much useful or not useful content through the applications on these devices (Mascheroni et al., 2018; Şahin & Öztürk, 2019). It is inevitable for children to use smart devices and preventing or prohibiting this use is not the right approach (Lim, 2018). Instead of preventing their children from using smart devices, parents should have knowledge and awareness of the conscious use of these devices (Manap & Durmuş, 2020; Şahin & Öztürk, 2019). There were scales on digital parenting in the literature (İnan-Kaya et al., 2018b; Manap & Durmuş, 2020; Navarro, 2022; Yaman et al., 2019), but they approached digital parenting from a general framework. Furthermore, the scales on digital parenting (İnan-Kaya et al., 2018b; Manap & Durmuş, 2020; Navarro, 2022; Yaman et al., 2019) did not aim to determine the parents' awareness of the conscious use of applications on smart devices. According to Modecki et al. (2022), it is particularly difficult to measure digital

Table 1 Classification of studies involving the conscious use of applications on smart devices

Category	Description	Study that includes
Application	Knowing about applications	İnan-Kaya et al. (2018a), Manap and Durmuş (2020), Nayci (2021), Papadakis et al., (2019, 2021, 2022), Şahin and Öztürk (2019), Tosun and Mihci (2020)
Benefit	Beneficial use of applications	Cao et al. (2022), Dias and Brito (2021), Dishkova and Papancheva (2019), Fidan et al. (2021), Gür and Türel (2022), Manap and Durmuş (2020), Nayci (2021), Papadakis et al. (2019), Reginasari et al. (2021), Sergi et al. (2017), Şahin and Öztürk (2019), Tosun and Mihci (2020), Türel and Gür (2019), Wartella et al. (2014)
Restriction	Limiting the use of applications	Cao et al. (2022), Dias and Brito (2021), Dishkova and Papancheva (2019), Dedkova et al. (2022), Fidan et al. (2021), Gür and Türel (2022), Hadad et al. (2020), İnan-Kaya et al. (2018a), Lanina et al. (2021), Manap and Durmuş (2020), Melhuish and Pacheco (2022), Nayci (2021), Reginasari et al. (2021), Rode (2009), Şahin and Öztürk (2019), Tosun and Mihci (2020), Türel and Gür (2019), Yaman et al. (2019), Zhou et al. (2022)
Worry	Feeling worried about the use of applications	Cao et al. (2022), Dias and Brito (2021), Dishkova and Papancheva (2019), Fidan et al. (2021), Gür and Türel (2022), Hadad et al. (2020), Huang et al. (2018), İnan-Kaya et al. (2018a), Reginasari et al. (2021), Rode, 2009, Şahin and Öztürk (2019), Sergi et al. (2017), Tosun and Mihci (2020), Türel and Gür (2019), Wartella et al. (2014), Yaman et al. (2019)

parenting in a valid and reliable manner. For all these reasons, the need to develop a scale has emerged to measure parents' knowledge and awareness of the conscious use of applications on smart devices. We decided to do this study because of this need. This research aimed to develop a valid and reliable scale to measure parents' knowledge and awareness of the conscious use of applications on smart devices, which was the unique aspect of the study. Filling the gap in the literature, this study revealed a scale that enabled to determine parents' knowledge and awareness of the conscious use of applications on smart devices. Thus, researchers and policymakers who want to research digital parenting will be able to determine parents' knowledge and awareness of the conscious use of applications on smart devices by using this scale.

We expressed the research problem of the study as follows: How could parents' knowledge and awareness of the conscious use of applications on smart devices be measured using a valid and reliable scale? We identified the following sub-problems to research problem:

1. What were the scale's items to measure parents' knowledge and awareness of the conscious use of applications on smart devices?
2. How valid and reliable was the scale used to measure parents' knowledge and awareness of the conscious use of applications on smart devices?

In the following section, we explained the method of the study.

2 Method

2.1 Research model

We conducted the research in an exploratory sequential design with two stages one of the mixed methods research. We collected and analyzed qualitative data in the first stage, and we collected quantitative data and performed a quantitative analysis to evaluate the first stage's results in the second stage (Creswell & Plano Clark, 2018). In the qualitative part, which was the first stage of the study, we conducted semi-structured interviews with the participants. We designed the first phase as a case study (Yin, 2009). We also reviewed the guidelines for the design, implementation, and reporting of qualitative research expressed by Twining et al. (2017). In the quantitative part, which was the second stage, we conducted a scale development study. We modeled the second stage in survey design (Fraenkel & Wallen, 2012).

2.2 Sample

We determined the sample with the criterion sampling method. The criterion of sampling was parents who have children between the ages of 0–16 and whose children use smart devices. We worked with three sample groups in the study. We

Table 2 Characteristics of the participants in the first group

		Mother	Father	Total
Educational attainment	Elementary or middle school	5	0	5
	High school	1	4	5
	Bachelor's degree	10	1	11
	Master's degree	1	1	2
	Doctoral degree	9	1	10
Age range	26–30	3	0	3
	31–35	4	2	6
	36–40	10	3	13
	41–45	6	1	7
	46–50	3	1	4
Number of children	1	12	3	15
	2	14	4	18
	Total	26	7	33

conducted semi-structured interviews with the first group, 33 parents, about the conscious use of applications on smart devices. We demonstrated the characteristics of the participants in the first group in Table 2.

We performed explanatory factor analysis (EFA) and confirmatory factor analysis (CFA) with the data we obtained from the participants in the second and third groups. Tabachnick and Fidell (2013) stated that at least 300 participants should be reached for factor analysis. We demonstrated the characteristics of the participants in the second and third groups in Table 3.

2.3 Data collection and analyses

Before collecting the data in the study, we applied to a university in Turkey for ethics committee approval and the ethics committee approved that there was no violation of research ethics with the ethics committee permission document dated 24.12.2020 and numbered E-19928322–302.08.01–2308.

We collected the data in two stages in the study. In the first stage, we interviewed 33 parents about the conscious use of applications on smart devices. We asked the participants questions to learn their opinions on knowing about applications on smart devices, the beneficial use of applications on smart devices, limiting their children's use of applications on smart devices, and worrying about their children's use of applications on smart devices in the semi-structured interviews. We scripted, coded, and categorized the participants' opinions. We used a data analysis strategy that "relies on theoretical propositions", one of Yin's (2009) four general data analysis strategies. We used the classification that we obtained from the literature as a theoretical proposition. The second researcher coded the interview data of four randomly selected participants to assess the coding in the analysis of the data for reliability and to determine whether the coding agreement ratio between the researchers was sufficient. The agreement ratio between the two

Table 3 Characteristics of the participants in the second and third groups

		EFA			CFA			All participant		
		Mother	Father	Total	Mother	Father	Total	Mother	Father	Total
Educational attainment	Elementary or middle school	26	1	27	13	1	14	39	2	41
	High school	41	8	49	48	4	52	90	12	101
	2-year college	30	7	37	30	4	34	60	11	71
	Bachelor's degree	73	46	119	100	40	140	173	86	259
	Master's degree	28	14	42	32	12	44	60	26	86
	Doctoral degree	16	11	27	10	7	17	26	18	44
Age range	21–25	2	1	3	2	0	2	4	1	5
	26–30	20	1	21	23	0	23	43	1	44
	31–35	69	17	86	68	11	79	137	28	165
	36–40	56	31	87	75	22	97	131	53	184
	41–45	49	23	72	52	19	71	101	42	143
	46–50	14	7	21	11	9	20	25	16	41
	51–55	4	7	11	2	7	9	6	14	20
Number of children	1	59	27	86	81	30	111	140	57	197
	2	134	49	183	129	36	165	263	85	348
	3	19	10	29	21	2	23	40	12	52
	4	2	1	3	1	0	1	3	1	4
	5	0	0	0	1	0	1	1	0	1
	Total	214	87	301	233	68	301	447	155	602

researchers was 0.84 with the formula "Reliability rate = (number of agreements)/(total number of agreements and disagreements)" (Miles & Huberman, 1994). Miles and Huberman (1994) stated that values greater than 0.70 were sufficient for intercoder reliability. We calculated Cohen's Kappa coefficient and found this value as 0.84 to support the accuracy of the intercoder agreement value. Values greater than 0.80 indicate a high level of reliability (Cohen, 1960; Graham et al., 2012). We interpreted that the coding of the data was reliable since the reliability values calculated with two different methods for the agreement between the coders were high.

We created an item pool by writing 53 scale items under four sub-dimensions by using the opinions we classified. We created an expert's evaluation form to get an expert's evaluation for the content validity of the scale items. We gave the expert's evaluation form to nine experts in the field of information technology education and asked them to evaluate the scale items as "essential", "essential but not sufficient" and "not essential" (Alpar, 2016; Zamanzadeh et al., 2015). While analyzing the evaluations of the experts, we calculated the content validity ratios (CVR) and content validity index (CVI). We used the formula CVR = [E/(N/2)]-1 to calculate the CVR for each item, where E is the number of experts who said "essential" and N is the total number of experts (Zamanzadeh et al., 2015). We compared the CVR values we calculated for the items with the 0.62 value, which is the table value determined according to the number of experts for the 0.05 significance level (Alpar, 2016). We decided to exclude items with a CVR value less than 0.62 from the scale. CVI is the average of the CVR values of the remaining items in the scale and should be greater than 0.67 (Alpar, 2016). As a result of the analysis of the evaluations of the experts, we decided to keep 44 items with CVI = 0.81 on the scale. We presented the findings we obtained from the first stage in the "Results" section.

We used a five-point Likert-type rating for participants to express their degree of agreement with the scale items: (1) strongly disagree, (2) disagree, (3) undecided whether agree or not, (4) agree, (5) completely agree. We reversed the scoring in the items with negative expressions on the scale at the data analysis stage. We also included the option "I don't know/have no idea about the things mentioned in the statement" so that the participants can mark if they do not have any knowledge or idea about the scale items, and those who mark this option have a score of zero (0).

In the second stage, where we collected quantitative data, we applied the draft scale consisting of 44 items to 602 parents using an online form. We performed EFA with the data we collected from 301 participants and obtained the Scale of the Conscious Use of Applications on Smart Devices (SCUASD) with 26 items consisting of four dimensions. We calculated the corrected item-total correlations for the items in the scale and the reliability coefficients for the sub-dimensions and the whole scale. We performed CFA with the data obtained from the other 301 participants in the sample and confirmed the factor structure of the scale. We used the classification we obtained from the literature as the theoretical model for the scale we wanted to develop for this purpose. We assessed the theoretical model's validity with CFA. We included the findings we obtained as a result of factor, item, and reliability analyses

in the "Results" section. We used statistical analysis packages (IBM SPSS 24 and AMOS 24) for the analyses.

We used the following scaling to evaluate the SCUASD scores found by dividing the total score by the number of items on the scale: 1.00–1.80: strongly disagree, 1.81–2.60: disagree, 2.61–3.40: undecided whether agree or not, 3.41–4.20: agree, 4.21–5.00 completely agree. Since the scale scores were between 1.00 and 5.00, we accepted that the participants' level of participation in the scale items was higher as the scores approached 5.00 and lower as they approached 1.00. There is no negative item in the final form of the scale.

3 Results

The study's first sub-problem was that "what were the scale's items to measure parents' knowledge and awareness of the conscious use of applications on smart devices?" We reported the results for the first sub-problem in the following sub-section.

3.1 Interview analysis

As a result of the analysis of the interviews we conducted with 33 parents, we wrote 53 scale items under four sub-dimensions. We decided to keep 44 items (Appendix Table 10) in the draft scale according to experts' evaluations. We demonstrated the sub-dimensions, explanations, codes, number of participants expressing the opinions, and number of written items for the coding, which we classified the opinions in Table 4.

We classified opinions into the following categories: (1) application: opinions on knowing about applications on smart devices, (2) benefit: opinions on the beneficial use of applications on smart devices, (3) restriction: Opinions on limiting the use of applications on smart devices, and (4) worry: opinions on worrying about the use of applications on smart devices (Table 4). We used the classifications we made as sub-dimensions of the scale we wanted to be developed.

The study's second sub-problem was "how valid and reliable was the scale used to measure parents' knowledge and awareness of the conscious use of applications on smart devices?" We presented the results for the second sub-problem in the following two sub-sections.

3.2 Exploratory factor analysis (EFA)

We applied the draft scale consisting of 44 items to 602 parents using an online form. We performed EFA with data collected from 301 participants. We performed the Kaiser Meyer Olkin (KMO) measure of sample adequacy and Bartlett's test of sphericity to decide the suitability of the data for EFA. We demonstrated the results of the tests in Table 5.

Table 4 Classification of the opinions

Sub-dimension	Explanation	Codes	The number of participants	The number of items
Application	Opinions on knowing about applications on smart devices	• Reviewing the features of the application, the comments about the application, and the ratings given to the applications before installing from application stores	4	3
		• Paying attention to the content definition standards or age ratings in application stores	6	1
		• Having information about the applications and games used by the child	5	3
		• Paying attention to the content and educational feature of the applications while installing them on smart devices	9	3
		• Paying attention to whether applications access personal information	2	1
		• Paying attention to being with the child while using applications	12	1
Benefit	Opinions on the beneficial use of applications on smart devices	• Thinking that smart devices contribute positively to the education of the child and that they are beneficial or harmful for the child's mental development	9	3
		• Thinking that educational applications contribute to the academic success of children and eliminate their inadequate learning	25	2
		• Thinking that smart devices are a part of life, they are a necessity, and they positively affect social relations	33	5
		• Using smart devices for her/his young child to do various activities	1	1

Table 4 (continued)

Sub-dimension	Explanation	Codes	The number of participants	The number of items
Restriction	Opinions on limiting the use of applications on smart devices	• Thinking that young children should not use smart devices	14	1
		• Make sure that the parental control, content restriction, age restriction, and password restriction features are active on the smart devices used by the child	26	5
		• Regularly checking the smart devices used by children and establishing rules about using smart devices	25	2
Worry	Opinions on worrying about the use of applications on smart devices	• Worrying about the child encountering inappropriate content and falling into fraud traps while using smart devices	2	4
		• Following developments and want to learn how to protect their child from the risks of smart devices	2	2
		• Thinking that children's frequent use of smart devices is addictive and may have negative effects on the child's education	8	3
		• Taking security measures on smart devices	29	4
			Total	44

Table 5 KMO and Bartlett's test

KMO Measure of Sampling Adequacy.		0,813
Bartlett's Test of Sphericity	Approx. Chi-Square	4652,003
	df	946
	p	0.0001

The KMO value was above.50 and Bartlett's sphericity test result was significant (Table 5). Accordingly, we decided that the data collected from 301 participants were suitable for EFA (Büyüköztürk, 2020). In addition, we examined the skewness and kurtosis values of the scores to decide whether the data collected for EFA met the assumption of normality. We found that the lowest skewness value was -2.395, the highest was 0.592, the lowest kurtosis value was -1,057 and the highest was 7.218. It is regarded as a problem in terms of normality, according to Aminu and Shariff (2014) and Kline (2016), if the absolute value of the skewness is larger than + 3 and the absolute value of the kurtosis is greater than + 10 in large samples (N > 200). Accordingly, we decided that the data met the normality assumption.

We used principal component analysis (PCA) and the varimax rotation method for EFA (Büyüköztürk, 2020; Tabachnick & Fidell, 2013). As a result of the first factor analysis without limiting the number of sub-dimensions of the scale, we reached the structure with 12 factors, which had an eigenvalue above one and explained 61.73% of the total variance. In this emerging structure, there were factors with less than three items and items with high loading on more than one factor (overlapping). We repeated the factor analysis by removing the items with a loading value below 0.45 in a factor and the items with a high loading in more than one factor and limiting the number of factors to four (Büyüköztürk, 2020; Tabachnick & Fidell, 2013). As a result of the analysis, we obtained the SCUASD consisting of 26 items that explain 49.637% of the total variance. We presented the factor structure of SCUASD in Table 6.

The loading values of the items remaining in the scale as a result of EFA on the factors are in the range of 0.457-0.829 (Table 6). There were (1) nine items explaining 21.697% of the total variance in the Application factor, (2) seven items explaining 12.146% of the total variance in the Benefit factor, (3) four items explaining 8.858% of the total variance in the Rectification factor, and (4) six items explaining 6.936% of the total variance in the Worry factor.

For the reliability analyses of SCUASD, which we obtained as a result of EFA, we calculated Cronbach's alpha reliability coefficients for the items in the factors and the whole scale. We gave the reliability coefficients in Table 7.

Cronbach's alpha reliability coefficient should be higher than 0.70 for scale reliability (Alpar, 2016; Büyüköztürk, 2020). According to Table 7, Cronbach's Alpha coefficient for all items in the scale was greater than 0.70 ($\alpha = 0.814$). Cronbach's Alpha coefficients for the factors met this condition, except for the fourth factor. Corrected item-total correlations values of scale items were (1) in the range of 0.441-0.729 for the Application factor, (2) in the range of 0.373-0.561 for the

Table 6 Factor structure of SCUASD

Items	x̄	SD	Communalities extraction	Factor loadings				Corrected item-total correlations
				Factor 1 Application	Factor 2 Benefit	Factor 3 Restriction	Factor 4 Worry	
1	3.97	1.184	0.697	0.829				0.729
2	4.00	1.131	0.671	0.818				0.693
3	3.86	1.221	0.659	0.809				0.686
4	3.57	1.566	0.431	0.626				0.541
5	4.26	1.032	0.461	0.610				0.585
6	4.26	1.006	0.481	0.584				0.578
7	4.15	0.913	0.505	0.570				0.604
8	4.05	1.041	0.460	0.541				0.544
9	3.45	1.206	0.344	0.525				0.441
10	3.35	1.081	0.514		0.694			0.561
11	2.88	1.162	0.535		0.688			0.545
12	3.46	1.078	0.515		0.671			0.517
13	3.92	0.889	0.444		0.630			0.477
14	3.25	1.039	0.423		0.593			0.426
15	4.18	0.927	0.405		0.552			0.393
16	4.02	0.936	0.398		0.547			0.373
17	3.45	1.539	0.653			0.758		0.727
18	3.65	1.433	0.646			0.736		0.751
19	3.72	1.392	0.576			0.704		0.679
20	3.15	1.577	0.451			0.620		0.539
21	4.22	1.052	0.623				0.771	0.573
22	4.32	0.889	0.546				0.725	0.543
23	3.75	1.268	0.524				0.686	0.469
24	3.61	1.199	0.271				0.515	0.313
25	4.44	0.813	0.356				0.512	0.351
26	4.22	0.965	0.318				0.457	0.296
Initial Eigenvalues				5.641	3.158	2.303	1.803	
Total Variance Explained (%)				21.697	12.146	8.858	6.936	49.637

x̄: mean; *SD* standard deviation

Table 7 Reliability statistics

	N	Cronbach's Alpha	Cronbach's Alpha based on standardized items	N of items
Factor 1 Application	301	0.862	0.868	9
Factor 2 Benefit	301	0.754	0.753	7
Factor 3 Restriction	301	0.838	0.841	4
Factor 4 Worry	301	0.685	0.693	6
All items in the scale	301	0.814	0.803	26

Benefit factor, (3) in the range of 0.539-0.727 for the Restriction factor, and (4) in the range of 0.296-0.573 for the Worry factor (Table 6). We grouped the scale items as odd or even numbers according to their sequence numbers (13 items in each group) to determine the split-half reliability of SCUASD and examined the correlation between the total scores of the items in the groups (Alpar, 2016; Büyüköztürk, 2020). As a result of the split-half analysis, we found that there was a significant relationship between the half of odd-numbered items ($\bar{x}=50.25$, SD = 6.764) and the half of even-numbered items ($\bar{x}=48.91$, SD = 6.605) (N:301, p = 0.0001, r = 0.785). We found the Guttman Split-Half Coefficient as 0.88. As a result of the analysis, we decided that SCUASD met the reliability condition (Alpar, 2016; Büyüköztürk, 2020).

3.3 Confirmatory factor analysis

We performed CFA with the data obtained from the other 301 participants in the sample to verify the factor structure of SCUASD consisting of 26 items and four factors (Gürbüz, 2021; Kline, 2016). We calculated the critical value of multivariate kurtosis to see if the data satisfied the assumption of multiple normality before performing CFA. We found the critical value of multivariate kurtosis to be 18,894. Multiple normality requires the critical value of multivariate kurtosis less than 20 (Gürbüz, 2021; Kline, 2016). Since the data we used for CFA provided the assumption of multivariate normality, we used the maximum likelihood calculation method.

We saw that the fit indices value we found as a result of CFA were not within an acceptable range. We drew covariance arrows between the variables related to error variances in the model in line with the covariance correction recommendations made by AMOS (Gürbüz, 2021) (Fig. 1). We made the corrections one by one within the framework of the acceptable corrections stated by Gürbüz (2021). We demonstrated the fit indices values we found as a result of the initial CFA and the corrected CFA in Table 8.

χ^2/df and SRMR values were in the acceptable fit range in the first CFA, but other fit indices values were not in the acceptable fit range according to Table 8. After covariance corrections, we found that χ^2/df, RMSEA, and CFI values were in the perfect fit range, and the SRMR value was in the acceptable fit range. The significance level for χ^2 was not greater than 0.05 in both CFAs ($p<0.05$). According to Gürbüz (2021), the χ^2 value is a fit value sensitive to sample size and tends to increase in large samples (N > 200). For this reason, we calculated χ^2/df by dividing the χ^2 value by the degree of freedom (df) to evaluate the goodness of fit of the model (Gürbüz, 2021). We demonstrated the CFA model of SCUASD in Fig. 1.

In the CFA model of SCUASD in Fig. 1, the factor loadings of the observed variables of the Application factor were in the range of 0.72–1.04, and the factor loadings of the observed variables of the Benefit factor were in the range of 0.45–1.02, the factor loadings of the observed variables in the Restriction factor were in the range of 0.72–1.00, and the factor loadings of the observed variables in the Worry factor were in the range of 0.65–1.11. The standardized coefficient values among the factors that were latent variables were in the range of -0.02–0.42. The SCUASD

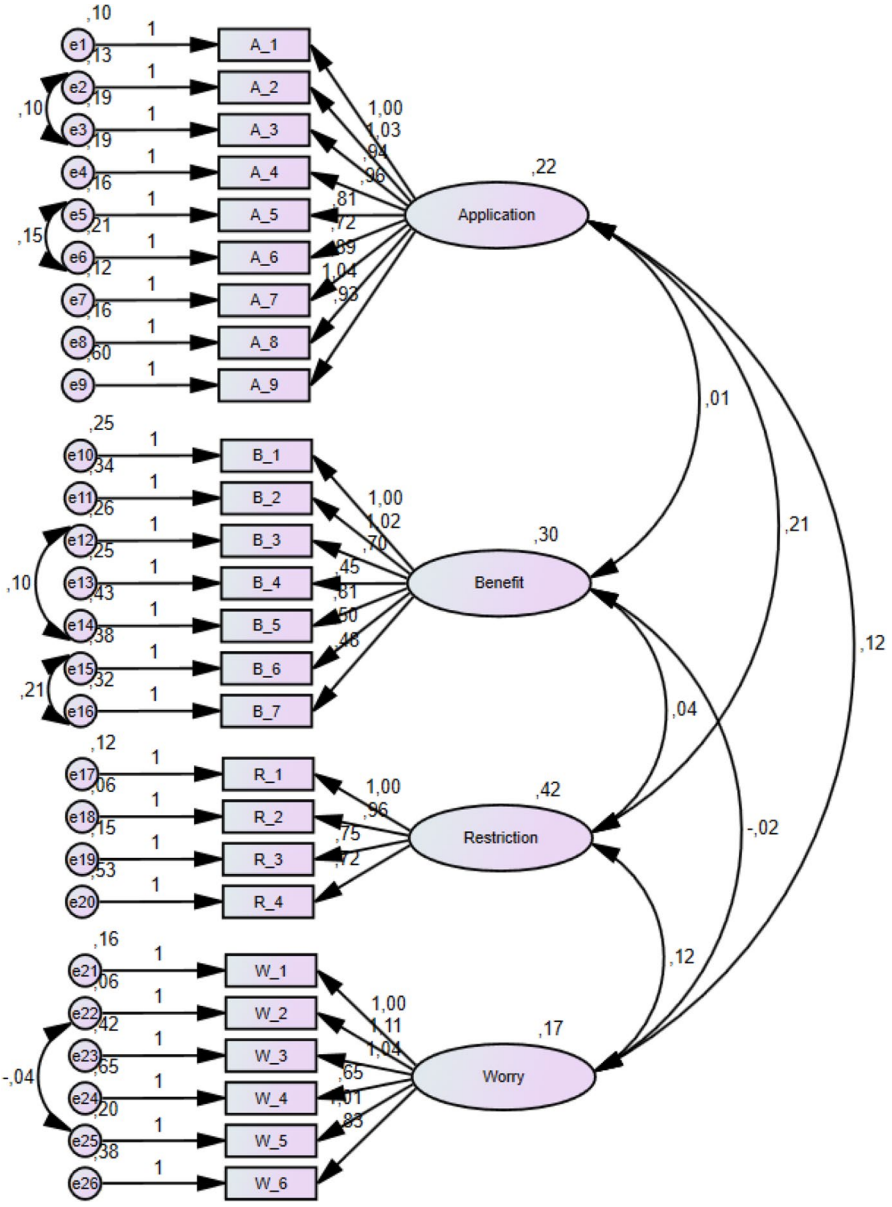

Fig. 1 CFA Model of SCUASD

consists of 26 items and four factors fitted to the model for all items included in the model as a result of the CFA's we conducted.

We calculated composite/construct reliability (CR), average variance extracted (AVE), maximum squared variance (MSV), and average shared square variance (ASV) values to determine the reliability, convergent validity, and

Table 8 Fit indices of SCUASD

Fit index	Perfect fit range	Acceptable fit range	Observed fit in first CFA	Observed fit in corrected CFA
χ^2/df	$0.00 \leq \chi^2/df \leq 3.00$	$3.00 < \chi^2/df \leq 5.00$	3.66*	1.73**
RMSEA	$0.00 \leq RMSEA \leq 0.05$	$0.05 < RMSEA \leq 0.08$	0.094	0.049**
SRMR	$0.00 \leq SRMR \leq 0.05$	$0.05 < SRMR \leq 0.08$	0.074*	0.065*
CFI	$0.95 \leq CFI \leq 1.00$	$0.90 \leq CFI < 0.95$	0.80	0.95**
χ^2	–	–	1073.396	497.106
df	–	–	293	288
N: 301; $\boldsymbol{p < 0.01}$				

χ^2 Chi-square statistic; *df* Degree of freedom; *RMSEA* Root Mean Square Error of Approximation; *SRMR* Standardized Root Mean Square Residual; *CFI* Comparative Fit Index. **Perfect Fit; *Acceptable Fit

discriminant validity of the factors of SCUASD (Gürbüz, 2021; Kline, 2016). CR considers the factor loadings and error variances of the items in a factor and CR is used for convergent validity due to the factor's construct reliability. Kline (2016) stated that CR is a more convenient reliability index than Cronbach's Alpha coefficient for CFA models. AVE is calculated by dividing the sum of the squares of the factor loadings of the items in a factor by the number of items, and AVE is the criterion of convergent validity between the items in a factor. "CR > 0.7", "AVE > 0.5" and "CR > AVE" must be to state that a CFA model has convergent validity (Gürbüz, 2021). The MSV value of a factor is the square of the highest correlation coefficient of that factor with other factors. ASV is the average of the squares of the correlation coefficients of a factor with other factors. MSV and ASV values are used for discriminant validity. "MSV < AVE", "ASV < AVE" and "$\sqrt{AVE}$ > correlation between factors" are required to say that a CFA model has discriminant validity. We gave the reliability, validity, and correlation values of the factors in Table 9.

CR values of all factors were greater than 0.7 (Table 9). We decided that construct reliability was provided for the factors based on this finding. CR values were higher than AVE values, but two AVE values did not meet the condition of being greater than 0.5. We decided that the convergent validity was achieved in part based on this finding. The conditions "MSV AVE", "ASV AVE", and "AVE > correlation between factors" were met so discriminant validity of the SCUASD factors was provided.

Table 9 Reliability, validity, and correlation values of the factors

Factors	CR	AVE	MSV	ASV	1	2	3	4
1. Application	0.90	0.51	0.47	0.28	(0.71)			
2. Benefit	0.76	0.32	0.01	0.01	0.04	(0.57)		
3. Restriction	0.87	0.64	0.47	0.23	0.68	0.10	(0.80)	
4. Worry	0.79	0.40	0.37	0.20	0.61	-0.10	0.46	(0.63)

CR Composite/Construct Reliability; *AVE* Average Variance Extracted; *MSV* Maximum Squared Variance; *ASV* Average Shared Square Variance. Numbers in parentheses indicate $\sqrt{AVE}$ scores

We can state that SCUASD is a valid and reliable scale and that SCUASD can be used to determine parents' knowledge and awareness of the conscious use of applications on smart devices, as a result of EFA and CFA, which we conducted by working on two separate sample groups.

4 Discussion

We aimed to develop a valid and reliable scale to measure parents' knowledge and awareness of the conscious use of applications on smart devices in this study. We concluded that the scale's dimensions as a theoretical model were (1) application, (2) benefit, (3) restriction, and (4) worry after reviewing the literature. We interviewed parents who have children between the ages of 0–16 and whose children use smart devices, about the conscious use of applications on smart devices. We classified the opinions obtained from the interviews. We wrote the scale items using the opinions we classified according to the theoretical model. We analyzed the evaluations of experts in the field of information technology education and created a draft scale. We applied the draft scale to the parents. We performed exploratory factor analysis with the data we obtained, and we obtained a scale consisting of 26 items and four factors. We performed item analyzes for the items in the scale and calculated the reliability coefficients. We performed confirmatory factor analysis with the data obtained from the other participant in the sample and confirmed the factor structure of the scale. We developed a valid and reliable scale to measure parents' knowledge and awareness of the conscious use of applications on smart devices at the end of the study.

The survey model was used in the majority of studies on digital parenting in the literature (Cao et al., 2022; Dedkova et al., 2022; Dishkova & Papancheva, 2019; Fidan et al., 2021; Gür & Türel, 2022; Huang et al., 2018; İnan-Kaya et al., 2018a; Lanina et al., 2021; Melhuish & Pacheco, 2022; Nayci, 2021; Papadakis et al., 2019, 2021, 2022; Reginasari et al., 2021; Tosun & Mihci, 2020; Wartella et al., 2014; Zhou et al., 2022). These studies used questionnaires including open-ended or closed-ended questions to determine the thoughts, opinions, perceptions, or behaviors of parents about their children's use of digital devices or technologies. There were also qualitative research models that include interviews or observations among the studies on digital parenting in the literature (Derix et al., 2022; Dias & Brito, 2021; Şahin & Öztürk, 2019; Sergi et al., 2017; Tosun & Mihci, 2020). Similar to the studies in the survey model, the studies in the qualitative research model were conducted by interview or observation methods to determine the opinions, perceptions, or behaviors of parents about their children's use of digital devices or technologies.

There were also scale development studies to determine parents' digital parenting attitudes (İnan-Kaya et al., 2018b; Navarro, 2022), parents' digital parenting competencies (Yaman et al., 2019), and parents' digital parenting awareness (Manap & Durmuş, 2020) in the literature. İnan-Kaya et al.'s (2018b) scale consisted of two dimensions to measure parents' digital parenting attitudes. These dimensions were (1) affirming the effective use of digital media and (2) protecting from digital media risks. Navarro's (2022) scale had four dimensions aimed to measure parents' attitudes toward digital parenting skills and strategies. The four dimensions were restrictive mediation and monitoring, discursive

mediation, mediation by modeling, and participatory mediation. Yaman et al.'s (2019) scale aimed to determine parents' digital parenting competencies within the framework of digital citizenship (Ribble & Bailey, 2007). Digital parenting competencies of parents were examined in (1) digital literacy, (2) digital security, and (3) digital communication dimensions on the scale. Manap and Durmuş's (2020) scale consisted of four dimensions that aim to measure parents' awareness of digital parenting. These dimensions were (1) efficient usage (2) protecting from risk (3) being a role model, and (4) digital negligence. Scales on digital parenting (İnan-Kaya et al., 2018b; Manap & Durmuş, 2020; Navarro, 2022; Yaman et al., 2019) approached digital parenting from a general framework. Modecki et al. (2022) stated that the reliable and valid measurement of digital parenting was especially troublesome, given that the area of digital parenting directly fed into recommendations to whole parents. The scales on digital parenting (İnan-Kaya et al., 2018b; Manap & Durmuş, 2020; Navarro, 2022; Yaman et al., 2019) did not aim to determine the parents' awareness of the conscious use of applications on smart devices.

When we reviewed the studies on digital parenting in the literature, we saw that there was no scale development study directly on the conscious use of applications on smart devices. We classified the results from the studies involving the conscious use of applications on smart devices. Our classification was (1) knowing about applications (İnan-Kaya et al., 2018a; Manap & Durmuş, 2020; Nayci, 2021; Papadakis et al., 2019, 2021, 2022; Şahin & Öztürk, 2019; Tosun & Mihci, 2020), (2) beneficial use of applications (Cao et al., 2022; Dias & Brito, 2021; Dishkova & Papancheva, 2019; Fidan et al., 2021; Gür & Türel, 2022; Manap & Durmuş, 2020; Nayci, 2021; Papadakis et al., 2019; Reginasari et al., 2021; Şahin & Öztürk, 2019; Sergi et al., 2017; Tosun & Mihci, 2020; Türel & Gür, 2019; Wartella et al., 2014), (3) limiting the use of applications (Cao et al., 2022; Dedkova et al., 2022; Dias & Brito, 2021; Dishkova & Papancheva, 2019; Fidan et al., 2021; Gür & Türel, 2022; Hadad et al., 2020; İnan-Kaya et al., 2018a; Lanina et al., 2021; Manap & Durmuş, 2020; Melhuish & Pacheco, 2022; Nayci, 2021; Reginasari et al., 2021; Rode, 2009; Şahin & Öztürk, 2019; Tosun & Mihci, 2020; Türel & Gür, 2019; Yaman et al., 2019; Zhou et al., 2022), (4) feeling worried about the use of applications (Cao et al., 2022; Dias & Brito, 2021; Dishkova & Papancheva, 2019; Fidan et al., 2021; Gür & Türel, 2022; Hadad et al., 2020; Huang et al., 2018; İnan-Kaya et al., 2018a; Reginasari et al., 2021; Rode, 2009; Şahin & Öztürk, 2019; Sergi et al., 2017; Tosun & Mihci, 2020; Türel & Gür, 2019; Wartella et al., 2014; Yaman et al., 2019). This classification served as the theoretical model for the scale we developed. We were able to validate the theoretical structure of our scale with the data we collected within the scope of this study. As a result, we provided a scale to the literature regarding parents' knowledge and awareness of the conscious use of applications on smart devices.

Considering that children use smart devices from an early age and encounter much useful or not useful content through the applications on these devices, parents' knowledge and awareness of the conscious use of applications on smart devices can be determined by using the scale developed within the scope of this study. It is inevitable for children to use smart devices, and it is not the right approach to prevent or prohibit this use (Lim, 2018). Instead of preventing their children from using smart devices, parents should have knowledge and awareness of the conscious use of these devices (Fidan et al., 2021; Gür & Türel, 2022; Huang et al., 2018; Manap & Durmuş, 2020). For this reason, this scale, which we developed to measure parents' knowledge and awareness of the

conscious use of applications on smart devices, fills the gap in the literature. Researchers and policymakers who want to research digital parenting can use this scale to measure parents' knowledge and awareness of the conscious use of applications on smart devices.

5 Conclusion, limitations, and future research

5.1 Conclusion

We learned how parents' knowledge and awareness of the conscious use of applications on smart devices could be measured using a valid and reliable scale as a conclusion of the study. We decided on the scale's items by analyzing the parents' opinions and got experts' evaluations for the content validity of the scale items. We decided that the scale's dimensions as a theoretical model were (1) application, (2) benefit, (3) restriction, and (4) worry by reviewing the literature. We demonstrated that the theoretical model was confirmed by the analyzes we made with the data we collected.

We concluded that our scale had more specific dimensions compared to the scales (İnan-Kaya et al., 2018b; Manap & Durmuş, 2020; Navarro, 2022; Yaman et al., 2019) in the literature about digital parenting. With the use of this scale, it will be possible to measure parents' knowledge and awareness of the conscious use of applications on smart devices including current and future computer systems. As a result, it can be ensured that children can use the current and future computer systems beneficially without being harmed by them.

5.2 Limitations and future research

We conducted this study with the participation of 635 parents who had children between the ages of 0–16 and whose children use smart devices. The study's limitations were the sample, the reviewed literature, and the performed analyses. A similar study can be conducted with a different sample, a different classification of the literature, and different analysis methods. Montazami et al. (2022) investigated teachers' methods for choosing and assessing educational applications from application stores using gaze data gathered from an eye tracker. Educators' version of the current study can be conducted, which is similar to the study of Montazami et al. (2022).

In future research, parents' knowledge and awareness of the conscious use of applications on smart devices will be able to be determined and it will be able to be examined according to various variables (gender, educational status, age, number of children, etc.) by using the scale. The scale will be able to be applied to parents who have children in a certain age range (for example, preschool, primary school, etc.) and parents' knowledge and awareness of the conscious use of applications on smart devices will be able to be examined in future research. In future research, course content will be able to be determined to increase parents' knowledge and awareness of the conscious use of applications on smart devices and a comparison will be able to be made by using the scale for the participants before and after the course.

Appendix

Table 10 Items in the scale

Sequence	Subscale	Items
1	Application	I examine the features of the application before installing it from application markets (App store, Google play, etc.)
2		I consider the comments about the application before installing it from application markets (App store, Google play, etc.)
3		I consider the scores given to the applications before installing them from application markets (App store, Google play, etc.)
4		I pay attention to content definition standards or age ratings (ESRB or PEGI) in app markets (App store, Google play, etc.)
5		I know which applications are on the smart devices my child uses
6		I know what games my child is playing on smart devices
7		I pay attention to the content of the application (non-violent, educational, etc.) when installing applications on smart devices
8		I pay attention to whether the applications on smart devices access personal information (photo, account, mail, message, etc.)
9		I pay attention to being with her/him when my child uses applications (to use them together) on smart devices
10	Benefit	I think that smart devices contribute positively to my child's education
11		I find smart devices useful for my child's mental development
12		I think that educational applications installed on smart devices contribute to my child's academic success
13		I think that life becomes easier thanks to applications that can be installed on smart devices
14		I think that educational applications installed on smart devices eliminate my child's inadequate learning
15		I see smart devices as a necessity
16		I think smart devices are a part of our lives

Table 10 (continued)

Sequence	Subscale	Items
17	Restriction	I use the parental control feature on the smart devices my child uses
18		I pay attention to that the content restriction feature is active on the smart devices my child uses
19		I pay attention to that the age restriction feature is active on the smart devices my child uses
20		I use the password restriction feature so that my child does not download harmful applications to the smart devices s/he uses
21	Worry	I feel worried when my child downloads/plays violent games on his smart device
22		I feel worried when my child encounters inappropriate content while using smart devices
23		I worry about my child falling into fraud traps when using smart devices
24		I would like to learn how to protect my child from the risks of smart devices
25		I think that children's intensive use of smart devices is a form of addiction
26		I think that the intensive use of smart devices can have negative effects on my child's education
27	Application	* I follow educational applications that can be installed on smart devices
28		* I pay attention that the applications my child downloads from the application markets (App store, Google play, etc.) are educational
29		*(-) I think that all the applications in the application markets (App store, Google play, etc.) are uploaded after being checked
30	Benefit	* I think that smart devices affect social relations positively
31		*(-) I find smart devices harmful to my child's mental development
32		* I am instantly informed about my child's activities at school (e-school, parent groups, etc.) through smart devices
33		*(-) I use smart devices for my young child to do various activities (eating, not crying, etc.)
34	Restriction	* I established rules for my child's use of smart devices
35		* I regularly follow the smart devices my child uses
36		* I prefer to create passwords for the smart devices my child uses
37		* I think that younger children (0–3 years old) should not use smart devices

Table 10 (continued)

Sequence	Subscale	Items
38	Worry	*(-) I think that antivirus applications for smart devices are unnecessary
39		* I do not use applications that want to reach my location on smart devices
40		* I find the security measures in smart devices useful
41		*(-) I think that my child is unable to put restrictions on her/himself when using smart devices
42		* I follow the developments to protect my child from the risks that smart devices may bring
43		*(-) I think that my child will not fall into fraud traps when using smart devices
44		*(-) I keep my credit card information registered in application markets (App store, Google play, etc.)

*The item removed from the draft scale after the exploratory factor analysis; (-) Item including negative expression

Authors' contribution Gülcan Öztürk: Conceptualization, Methodology, Validation, Quantitative data analysis, Writing, Review & Editing.

Feyza Şahin: Conceptualization, Data Collecting, Qualitative data analysis, Writing.

Data availability statement The data that support the findings of this study are available on request from the corresponding author [G. Ö.].

Declarations

Disclosure of potential conflicts of interest The study is a part of the research project numbered as 2019/095 supported by Balıkesir University Scientific Research Projects Unit. The university requires publication of articles within the scope of the project.

The study is an extended version of the oral presentation presented in the International Conference on Educational Technology and Online Learning (ICETOL) held on September 22–24, 2021, in Cunda, Ayvalik, Turkey.

The authors declare that they have no conflict of interest.

Research involving human participants and/or animals Before collecting the data in the study, we applied to Balıkesir University for ethics committee approval and the ethics committee approved that there was no violation of research ethics with the ethics committee permission document dated 24.12.2020 and numbered E-19928322–302.08.01–2308.

Informed consent Participants were informed about ethics committee approval, and informed consent was obtained from participants. Anonymity of the participants was provided in the reporting. In the study, no images were used by revealing the identity of the participants.

References

Ahmadzadeh, Y. I., Lester, K. J., Oliver, B. R., & McAdams, T. A. (2020). The parent play questionnaire: Development of a parent questionnaire to assess parent-child play and digital media use. *Social Development, 29*(4), 945–963. https://doi.org/10.1111/sode.12450

Alpar, R. (2016). *Spor, sağlık ve eğitim bilimlerinden örneklerle uygulamalı istatistik ve geçerlik-güvenirlik [Applied statistics and validity-reliability with examples from sports, health and educational sciences]* (4th ed.). Detay Yayıncılık.

Aminu, I. M., & Shariff, M. N. M. (2014). Strategic orientation, access to finance, business environment and SMEs performance in Nigeria: Data screening and preliminary analysis. *European Journal of Business and Management, 6*(35), 124–132. Retrieved November 24, 2019, from https://www.iiste.org/Journals/index.php/EJBM/article/view/17186/17977

Büyüköztürk, Ş. (2020). *Sosyal bilimler için veri analizi el kitabı: İstatistik, araştırma deseni SPSS uygulamaları ve yorum [Data analysis handbook for social sciences: Statistics, research design SPSS applications and interpretation]* (28th ed.). Pegem Akademi.

Cao, S., Dongi, C., & Li, H. (2022). Digital parenting during the COVID-19 lockdowns: How Chinese parents viewed and mediated young children's digital use. *Early Child Development and Care, 192*(15), 2401–2416. https://doi.org/10.1080/03004430.2021.2016732

Cohen, J. (1960). A coefficient of agreement for nominal scales. *Educational and Psychological Measurement, 20*, 37–46. https://doi.org/10.1177/001316446002000104

Creswell, J., & Plano Clark, V. (2018). *Designing and conducting mixed methods research*. SAGE.

Dedkova, L., Smahel, D., & Just, M. (2022). Digital security in families: The sources of information relate to the active mediation of internet safety and parental internet skills. *Behaviour & Information Technology, 41*(5), 1052–1064. https://doi.org/10.1080/0144929X.2020.1851769.

Derix, E. C., Leong, T. W., & Prior, J. (2022). "It's a drag": Exploring how to improve parents' experiences of managing mobile device use during family time. In *Proceedings of the 2022 CHI*

Conference on Human Factors in Computing Systems, 29 April 2022- 5 May 2022, 216, 1–20. New York: Association for Computing Machinery. https://doi.org/10.1145/3491102.3517501

Dias, P., & Brito, R. (2021). Criteria for selecting apps: Debating the perceptions of young children, parents and industry stakeholders. *Computers & Education, 165*, 104134. https://doi.org/10.1016/j.compedu.2021.104134

Dishkova, M., & Papancheva, R. (2019). Parents' opinion about cyber addiction of their children in primary school age. *Proceedings of ICERI2019 Conference*, 6132–6143. 12th annual International Conference of Education, Research and Innovation, 11th-13th November 2019, Seville, Spain. https://doi.org/10.21125/iceri.2019.1479

Fidan, A., Güneş, H., & Karakuş Yılmaz, T. (2021). Investigating the digital parenting behaviors of parents on children's digital game play. *Cukurova University Faculty of Education Journal, 50*(2), 833–857. https://doi.org/10.14812/cuefd.933215

Fraenkel, J. R., & Wallen, N. E. (2012). *How to design and evaluate research in education* (8th ed.). McGraw-Hill.

Graham, M., Milanowski, A., & Miller, J. (2012). *Measuring and promoting inter-rater agreement of teacher and principal performance ratings*. Center for Educator Compensation Reform. Retrieved February 13, 2018, from https://files.eric.ed.gov/fulltext/ED532068.pdf

Gür, D., & Türel, Y. K. (2022). Parenting in the digital age: Attitudes, controls and limitations regarding children's use of ICT. *Computers & Education, 183*, 1045054. https://doi.org/10.1016/j.compedu.2022.104504

Gürbüz, S. (2021). *AMOS ile yapısal eşitlik modellemesi [Structural equation modelling with AMOS]*. Seçkin Akademik ve Mesleki Yayınlar.

Hadad, S., Meishar-Tal, H., & Blau, I. (2020). The parents' tale: Why parents resist the educational use of smartphones at schools? *Computers & Education, 157*, 103984. https://doi.org/10.1016/j.compedu.2020.103984

Huang, G., Li, X., Chen, W., & Straubhaar, J. D. (2018). Fall-behind parents? The influential factors on digital parenting self-efficacy in disadvantaged communities. *American Behavioral Scientist, 62*(9), 1186–1206. https://doi.org/10.1177/0002764218773820

İnan-Kaya, G., Mutlu-Bayraktar, D., & Yılmaz, Ö. (2018). Digital parenting: perceptions on digital risks. *Kalem International Journal of Education and Human Sciences, 8*(1), 137–163. https://doi.org/10.23863/kalem.2018.96

İnan-Kaya, G., Mutlu-Bayraktar, D., & Yılmaz, Ö. (2018). Digital parenting attitude scale: Validity and reliability study. *Mehmet Akif Ersoy University Journal of Education Faculty, 46*, 149–173. https://doi.org/10.21764/maeuefd.390626

Kabakçı Yurdakul, I., Dönmez, O., Yaman, F., & Odabaşı, H. F. (2013). Digital parenting and changing Roles. *Gaziantep University Journal of Social Sciences, 12*(4), 883–896. Retrieved February 13, 2018, from https://dergipark.org.tr/tr/download/article-file/223235

Kabali, H. K., Irigoyen, M. M., Nunez-Davis, R., Budacki, J. G., Mohanty, S. H., Leister, K. P., & Bonner, R. L. (2015). Exposure and use of mobile media devices by young children. *Pediatrics, 136*(6), 1044–1050. https://doi.org/10.1542/peds.2015-2151

Kline, R. B. (2016). *Principles and practice of structural equation modeling* (4th ed.). The Guilford Press.

Lanina, E. V., Bochaver, A. A., & Antipkina, I. V. (2021). Izmerenie roditel'skogo kontrolya i ego svyaz' s kognitivnymi rezultatami uchashchikhsya mladshikh klassov [Measuring parental control and its relationship to cognitive abilities of early-grade students]. *Voprosy obrazovaniya/Educational Studies Moscow, 2*, 152–171. https://doi.org/10.17323/1814-9545-2021-2-152-171

Lim, S. S. (2018). Transcendent parenting in digitally connected families when the technological meets the social. In G. Mascheroni, C. Ponte, & A. Jorge (Eds.), *Digital parenting: The challenges for families in the digital age* (pp. 31–39). Nordicom University of Gothenburg.

Manap, A., & Durmuş, E. (2020). Development of digital parental awareness scale. *Inonu University Journal of the Faculty of Education, 21*(2), 978–993. https://doi.org/10.17679/inuefd.711101

Mascheroni, G., Ponte, C., & Jorge, A. (2018). Introduction. In G. Mascheroni, C. Ponte, & A. Jorge (Eds.), *Digital parenting: The challenges for families in the digital age* (pp. 9–16). Nordicom University of Gothenburg.

Melhuish, N., & Pacheco, E. (2022). *The digital parenting strategies and behaviours of New Zealand parents. Evidence from Nga taiohi matihiko o Aotearoa-New Zealand Kids Online*. OSF Preprints. https://doi.org/10.31219/osf.io/37295

Miles, M. B., & Huberman, A. M. (1994). *Qualitative data analysis*. Sage.

Modecki, K. L., Goldberg, R. E., Wisniewski, P., & Orben, A. (2022). What is digital parenting? A systematic review of past measurement and blueprint for the future. *Perspectives on Psychological Science*, *July 2022*, 1–19. https://doi.org/10.1177/17456916211072458

Montazami, A., Pearson, H. A., Dube, A. K., Kacmaz, G., Wen, R., & Alam, S. S. (2022). Why this app? How educators choose a good educational app. *Computers & Education, 184*, 104513. https://doi.org/10.1016/j.compedu.2022.104513

Navarro, J. L. (2022). *Laying the foundation for protective digital parenting: The development of a theoretical framework, a validated measure of digital parenting attitudes, and a person-centered analysis of digital parenting styles* (Unpublished doctoral dissertation). The University of North Carolina at Greensboro, USA.

Nayci, Ö. (2021). Examination of digital parenting awareness of the primary school students' parents during the COVID-19 pandemic. *Pegem Journal of Education and Instruction, 11*(2), 58–71. https://doi.org/10.14527/pegegog.2021.00

Papadakis, S., Zaranis, N., & Kalogiannakis, M. (2019). Parental involvement and attitudes towards young Greek children's mobile usage. *International Journal of Child-Computer Interaction, 22*, 100144. https://doi.org/10.1016/j.ijcci.2019.100144

Papadakis, S., Alexandraki, F., & Zaranis, N. (2021). Mobile device use among preschool-aged children in Greece. *Education and Information Technologies, 27*, 2717–2750. https://doi.org/10.1007/s10639-021-10718-6

Papadakis, S., Alexandraki, F., & Zaranis, N. (2022). Greek parents' app choices and young children's smart mobile usage at home. In M. E. Auer, & T. Tsiatsos (eds.) *New Realities, Mobile Systems and Applications: Proceedings of the 14th International Conference on Interactive Mobile Communication Technologies and Learning Conference (IMCL 2021)*. Part of the book series: Lecture Notes in Networks and Systems (LNNS, volume 411). https://doi.org/10.1007/978-3-030-96296-8_4

Reginasari, A., Afiatin, T., Subandi, S., Patria, B., & Muchlisah, M. (2021). Adaptation for harmony: A thematic analysis study of Internet parental monitoring strategy in Indonesian context. *The Qualitative Report, 26*(10), 3234–3261. https://doi.org/10.46743/2160-3715/2021.4979

Ribble, M., & Bailey, G. (2007). *Digital citizenship in schools*. International Society for Technology in Education.

Rode, J. A. (2009). Digital parenting: Designing children's safety. *Proceedings of the 23rd British HCI Group Annual Conference on People and Computers: Celebrating People and Technology* (pp. 244–251). Cambridge, United Kingdom. Retrieved February 21, 2022, from http://portal.acm.org/citation.cfm?id=1671011.1671041.

Şahin, F., & Öztürk, G. (2019). Investigation of the parents' awareness about the content identification standards on smart devices. *Gazi University Journal of Gazi Educational Faculty (GUJGEF), 39*(1), 297–322. https://doi.org/10.17152/gefad.410349

Sergi, K., Gatewood, R., Jr., Elder, A., & Xu, J. (2017). Parental perspectives on children's use of portable digital devices. *Behaviour & Information Technology, 36*(11), 1148–1161. https://doi.org/10.1080/0144929X.2017.1360941

Tabachnick, B. G., & Fidell, L. S. (2013). *Using multivariate statistics*. Pearson Publication.

Taylor, G., Monaghan, P., & Westermann, G. (2018). Investigating the association between children's screen media exposure and vocabulary size in the UK. *Journal of Children and Media, 12*(1), 51–65. https://doi.org/10.1080/17482798.2017.1365737

Tosun, N., & Mihci, C. (2020). An examination of digital parenting behavior in parents with preschool children in the context of lifelong learning. *Sustainability, 12*(18), 7654. https://doi.org/10.3390/su12187654

Türel, Y. K., & Gür, D. (2019). A scale development study on parents' attitudes towards the use of information and communication technologies of their children. *Journal of Uludag University Faculty of Education, 32*(1), 145–165. https://doi.org/10.19171/uefad.455888

Twining, P., Heller, R. S., Nussbaum, M., & Tsai, C. C. (2017). Some guidance on conducting and reporting qualitative studies. *Computers & Education, 106*, A1–A9. https://doi.org/10.1016/j.compedu.2016.12.002

Wartella, E., Rideout, V., Lauricella, A. R., & Connell, S. L. (2014). *Parenting in the age of digital technology: A national survey*. Center on Media and Human Development, School of Communication. Retrieved February 20, 2022, from https://cmhd.northwestern.edu/wp-content/uploads/2015/06/ParentingAgeDigitalTechnology.REVISED.FINAL_.2014.pdf

Yaman, F., Dönmez, O., Akbulut, Y., KabakçıYurdakul, I., Çoklar, A. N., & Guyer, T. (2019). Exploration of parents' digital parenting efficacy through several demographic variables. *Education and Science, 44*(199), 149–172. https://doi.org/10.15390/EB.2019.7897

Yin, R. K. (2009). *Case study research, design and methods* (4th ed.). Sage Publications.

Zamanzadeh, V., Ghahramanian, A., Rassouli, M., Abbaszadeh, A., Alavi-Majd, H., & Nikanfar, A. R. (2015). Design and implementation content validity study: Development of an instrument for measuring patient-centered communication. *Journal of caring sciences, 4*(2), 165–178. https://doi.org/10.15171/jcs.2015.017

Zhou, N., Liang, Y., Cao, H., Song, K., Chen, Y., Hao, R., & Zhang, J. (2022). Chinese adolescents' problematic cellphone use: Exploring the implications of configuration profiles of cellphone-specific parenting behaviors. *Computers in Human Behavior, 137*(2022), 107408. https://doi.org/10.1016/j.chb.2022.107408