

# The parents' tale: Why parents resist the educational use of smartphones at schools?

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## **Abstract**

This study examined the level of parental resistance to the use of smartphones in schools, as well as the predictors and the factors underlying parental resistance. Data was collected from a sample of 220 parents of elementary and secondary school students who completed an online questionnaire. The participants ranked four different factors for resisting and rejecting the use of smartphones in schools: social, environmental, economic and pedagogical. Parents' actual resistance level was also measured, from "no resistance", through "passive resistance", to "active resistance". Furthermore, the study examined the association between parental resistance and four parenting styles: authoritarian, authoritative, permissive, and uninvolved, as well as associations with demographic and socioeconomic variables. About two-thirds of the parents expressed resistance toward the use of smartphones in school, and more than half of them expressed active resistance to such use. Social and economic factors were reported to underlie resistance to the use of smartphones in school to a great extent, whereas pedagogical resistance factor was reported to a low extent in all parental resistance levels. Nevertheless, pedagogical and social resistance factors predicted a high level of parental resistance. Authoritative parenting style was found to be a negative predictor of parental resistance. Implications of the findings are discussed in relation to educational theory and the challenges of policy-makers who cope with parental resistance towards the integration of smartphones in school learning.

**Keywords:** learning with smartphones, parental resistance, resistance factors, parenting style.

## 1. Introduction

Parental involvement in schools is generally perceived as a very positive and fruitful phenomenon (Hwang, Choi, Yum & Jeong 2017; Pavalache-Ilie & Țirdia, 2015; Porumbu & Necșoi, 2013). However, in some cases it can also be an obstacle to the implementation of innovative pedagogies and new technologies in learning (Sincar, 2013). One such case is parental resistance to mobile learning (m-learning) in schools, despite mobile learning via smartphones having been proven successful in creating a positive learning experience, and increasing motivation and enjoyment in learning (Daltio et al., 2018; Medzini, Meishar-Tal & Sneh., 2015).

The rapid technological advances, the expansion of online media use and the declining cost of mobile technology around the world, led to the very high smartphone penetration rate among teenagers (Anderson & Jiang, 2018; Gallup, Ray & Bennett, 2019). According to the Pew Research Center report, in 2018, 88% of the population in Israel were using smartphones. The smartphone use among younger people is even higher - according to the Israel National Council for the Child (NCC, 2019), 95% of Israeli adolescents (ages 13-17) own a smartphone and are active on social networks.

Since 2010, the Israeli Ministry of Education (MoE) has embraced a Bring Your Own Device (BYOD) approach in education. This approach enables students to bring personal mobile devices to school and use them for learning purposes (Kiger & Herro, 2015). In 2012, parents and organizations opposing the use of smartphones in schools appealed to the Supreme Court and asked to ban them, claiming that by using smartphones in classroom, students are exposed to unhealthy non-ionizing radiation. The final verdict was given in 2016. The Court dismissed the parents' petition and stipulated that there is no reason to interfere with the Ministry of Education's policy. The issue is clearly a question of professional expertise, and it is not reasonable to ask for the Court's intervention (Israeli Supreme Court, 2016). The Ministry of Education published new instructions regarding smartphone use in schools and stated that in cases where devices are used in schools, the school will not be responsible for any damage, loss or theft to the device (MoE CEO's circular, 2015). Additionally, the MoE's CEO instructed schools to limit the amount of mobile-enhanced educational activities, and did not approve pedagogical use of smartphones in schools (MoE CEO's circular, 2016). The policy on this issue is still controversial and has provoked many debates between advocates and opponents of smartphone usage in schools.

This study investigated parents' resistance to smartphone use in schools. Specifically, this study investigated the predictors of parental resistance, in terms of resistance factors, parenting styles and socio-demographic variables.

## 2. Literature review

### *2.1. The pedagogical potential of using smartphones for learning purposes*

The use of smartphones in schools has prominent pedagogical potential (Daltio, Gama, França, Prata & Veloso, 2018; Parsons, 2014; Shin, Shin, Choo & Beom, 2011). Smartphones enable Internet access, which facilitates the use of a wide range of applications for pedagogical purposes (Crompton, Burke & Gregory, 2017; Jurkovič, 2019; Sung, Chang & Liu, 2016). Smartphones have a wide range of features, among others: a camera, an audio recorder, and

various sensors, such as position sensors, distance sensors, and noise sensors, which can be used for various pedagogical uses. For example, cameras can enable augmented reality by scanning QR codes (Hsin-Chih et al., 2013; Kuo & Kuo, 2015; Thomas, O'Bannon & Bolton, 2013), location sensors (GPS) can be used for location-based learning (Meishar-Tal & Kurtz, 2014), and smartphones with VR glasses can be used for learning in VR environments (Jimeno-Morenilla, Sánchez-Romero, Mora-Mora, & Coll-Miralles, 2016).

Taxonomies of the pedagogical potential of smartphones have identified three main categories of smartphone use for learning (Medzini, Meishar-Tal & Sneh., 2015):

- *Information consumption* - Students consume information by accessing online resources for learning purposes independently and without mediation. The mobile devices provide easy access to a variety of online content, information and social networks (Ally, & Prieto-Blázquez, 2014; Sarker & Salah, 2019). Teaching materials are perceived as more relevant, attractive, and interactive when using mobile devices (Budiman, Haeruddin, Hairah, & Alameka, 2018; Crompton et al., 2017).
- *The creation of information and knowledge by learners* – The use of various applications and features enables learners to use mobile devices for collecting, processing, and presenting information and constructing knowledge in- and out-of-school (Alsadoon, 2018; Sung et al., 2016).
- *Communication between learners and teachers* - Smartphones enable remote inter-personal and group communication (Heflin, Shewmaker & Nguyen, 2017). For example, educational use of the WhatsApp application can improve communication between learners and teachers (Bouhnik, Deshen & Gan, 2014). In addition, learning management applications via mobile devices enable users (teachers, students, and parents) to monitor students'/children's achievement and behavior (Blau & Hameiri 2017).

The research literature has reported a variety of strategies for the educational use of smartphones. Smartphones can be used for *drill & practice* strategies through applications designed for practicing and providing automatic feedback (Bijlsma, Visscher, Dobbelaer & Veldkamp, 2019; Crompton et al., 2017; Klimova, 2018). Using smartphones in learning enables *experiential and active learning* through applications such as Socrative and Kahoot, for in-class and out-of-class activities, to increase student engagement and enhance motivation (Coca & Sliško, 2017; Dakka, 2015; Dellos, 2015; Domingo & Gargante, 2016). Additionally, learning via smartphones can promote *self-directed learning*, offering access to information at any place and time, thus enabling situated and ubiquitous learning (Kukulska-Hulme & Traxler, 2013, Kohen-Vacs, Milrad, Ronen & Jansen, 2016; Narayan & Herrington, 2014).

## **2.2 Resistance to children's use of technology and smartphones**

Resistance to technology is often perceived as lack of acceptance. Several frameworks explain the lack of acceptance as a result of personal characteristics, technology characteristics and user experience (e.g. Davis, 1989; Roger, 1995; Venkatesh et al., 2003). Nevertheless, such theories do not reveal the rejection factors underlying the *resistance to technology* (Rama Murthy & Mani, 2013). The "Three Pillars of Technological Rejection" model, by Rama Murthy and Mani, refers to resistance to technology as an independent phenomenon. Their model, based on the "Three Pillars of Sustainability" (WCED, 1987), is a tool for examining why particular cultures/groups reject certain technologies. The model contains three types of

reasons for rejecting technologies: social, economic and environmental. Social rejection refers to rejection based on the perceived harmful social-emotional outcomes of using new technologies; economic rejection refers to concerns about the costs of using the technology, and environmental rejection refers to rejection based on health issues and other environmental risks that technology may elicit. Identifying and understanding the causes of rejection is essential to the reduction of resistance to change (Oreg, 2006).

Despite the advantages gained by the use of smartphones for learning purposes, smartphones have been banned for usage in many schools around the world (Haddon, 2017; Thomas et al., 2013; Wiederhold, 2019). The resistance factors to the use of smartphones in schools can be categorized into four central aspects - social, environmental, economic and pedagogical aspects:

*Social resistance* relates mainly to parents' concern regarding children's exposure to Internet applications in terms of the amount of time spent on the Internet and the content consumed. Studies show that parents are concerned about excessive use of smartphones that may lead to loneliness, social segregation, insufficient social competence, and poor communication skills (Bian & Leung, 2015; Ebbeck et al., 2016). Livingstone and Haddon (2009) reported four main risks of Internet exposure: commercial software may track and obtain personal information about the user; exposure to violent, aggressive and hateful content and/or bullying / harassment; exposure to pornographic and harmful sexual content; harm to the child's values, for example, encouragement of suicide/pro-anorexia. The above social risks may be amplified by using smartphones for learning purposes at school due to the difficulty teachers may have in monitoring the materials which children are exposed to (Genc, 2014; Haddon, 2017).

*Environmental resistance* refers to health and other physical risks: visual impairment, inactive lifestyle, and exposure to radiation (Ebbeck et al., 2016; Genc, 2014). The more time that children spend in front of screens, the more they suffer from headaches, neck and shoulder pain, and poor posture (Meegan, 2013). Children who are addicted to smartphones have a higher risk of having problems in mental development such as emotional instability, attention deficit disorder, depression, anger, and lack of control (Park & Park, 2014). Moreover, technology in general, and smartphones in particular, contribute to the adolescent obesity epidemic (Kenney & Gortmaker, 2017).

*Economic resistance* – Smartphones are expensive personal devices and a symbol of social status for adolescents (Blair & Fletcher, 2011). Parents are afraid that these expensive, small and fragile devices will be damaged, lost, or stolen (Blair & Fletcher, 2011; Ebbeck et al., 2016; Haddon, 2017; Genc, 2014; Kolb, 2011).

*Pedagogical resistance* – although mobile devices have various distinctive features that may be able to enhance certain pedagogies, these affordances do not always produce positive learning effects. The educational system lacks instructional strategies that have been shown to be important for effective learning with digital technologies (Lan, 2014, Lan, Sung, Cheng, & Chang, 2015). According to Sung and his colleagues (2016), in some cases there is no connection between the characteristics of the mobile technology (hardware and software), educational context and mission (e.g., learning and teaching processes in different settings), and educational usage of the devices by users (teachers and students). Nevertheless, the main pedagogical concern of educators and parents is distraction. When students are learning with

mobile devices, they can be easily distracted and it is more difficult to control student attention in digital learning comparing to traditional face-to-face learning (Courage, 2019; Green, 2019; Heflin, Shewmaker, & Nguyen, 2017). Students' access to social media, texting and gaming in the classroom reduces their concentration on the learning content and processes (Craig & Van Lom, 2009; Lenhart, 2012). Moreover, students believe that they can handle multitasking on mobile devices, while in fact, they are distracted and also distract peers who are seated nearby (Sana, Weston & Cepeda, 2013).

### ***2.3 Parenting style and children's use of smartphones***

The changes that have taken place in all aspects of life as a result of advancement in the area of digital technologies have impacted family interactions, as well as parental dilemmas and reactions to their children's behavior (Huisman, Edwards & Catapano, 2012; Jang & Ryu, 2016; Sharaievska & Stodolska, 2017). *Parenting styles* refer to patterns of parental authority in relation to the child, which create the emotional context for the parent-child relationship (Leung & Tsang Kit Man, 2014; Darling & Steinberg, 1993). The parenting styles that children are exposed to affect their emotional, social and cognitive functioning (Mikeska, Harrison & Carlson, 2016; Spera, 2005). Over the years, relationships between parenting styles and various aspects of child functioning have been explored, mostly based on Baumrind's typology of parenting styles (Baumrind, 1971). This typology distinguishes between three parenting styles: authoritarian, authoritative and permissive parenting styles, as described below. Another parenting style, added later by Maccoby and Martin (1982), is the uninvolved style. The parenting styles typology has been found in many studies as a predictor of the child's welfare in the social, scholastic, behavioral and psychosocial spheres (Baumrind, 1991; Johnsen, Bjørknes, Iversen., & Sandbæk, 2018; Miller et al., 1993, Querido, Warner & Eyberg, 2002; Weiss & Schwarz, 1996). Moreover, recent studies have demonstrated the impact of parenting styles on parents' reactions to their children's use of smartphones (Hwang et al., 2017; Jang & Ryu, 2016):

The *authoritarian parenting style* refers to parents who demand blind obedience from their children on the one hand, and tend to be unresponsive to their children's needs on the other hand. Their children have good academic abilities and have no behavior problems, but their self-esteem and social skills are poor (Baumrind, 1971; Kimble et al. 2015; Robinson et al., 2001). Studies, which have examined children's home Internet access, found that the lowest level of use is observed when parents adopt an authoritarian parenting style. Furthermore, findings indicate that authoritarian parents are more likely to engage in time restrictions and technological monitoring than parents with other parenting styles (Eastin, Greenberg & Hofschire, 2006; Uhls & Robb, 2017; Valcke et al., 2010).

The *authoritative parenting style* refers to parents who have high expectations from their children for achievement and maturity, but are also warm, responsive and support their children, helping them to develop skills such as independence, self-control, and self-regulation (Reitman et al., 2002; Querido et al., 2002; Weiss & Schwarz, 1996). Hwang, Choi, Yum & Jeong (2017) found a positive relationship between an authoritative parenting style and the ability of parents to cope with/prevent their child's addiction to a smartphone. Furthermore, findings indicate that authoritative parents are more likely to engage in interpretive mediation and content restrictions through democratic methods (Eastin et al., 2006; Uhls & Robb, 2017).

The *permissive parenting style* describes parents who set very few rules and boundaries, and are warm and indulgent. Their children are more likely to be involved in problematic behavior and their performance at school is often mediocre, but they have high self-esteem and good social skills (Baumrind, 1971, 1991; Kimble, 2014; Kimble et al. 2015). Permissive parents do not believe that they have the ability to regulate their child's use of the smartphone (Hwang et al., 2017). Park and Park (2014) found that parents with a permissive parenting style have positive attitudes towards smartphone use, and their children have a greater tendency to be addicted to smartphones.

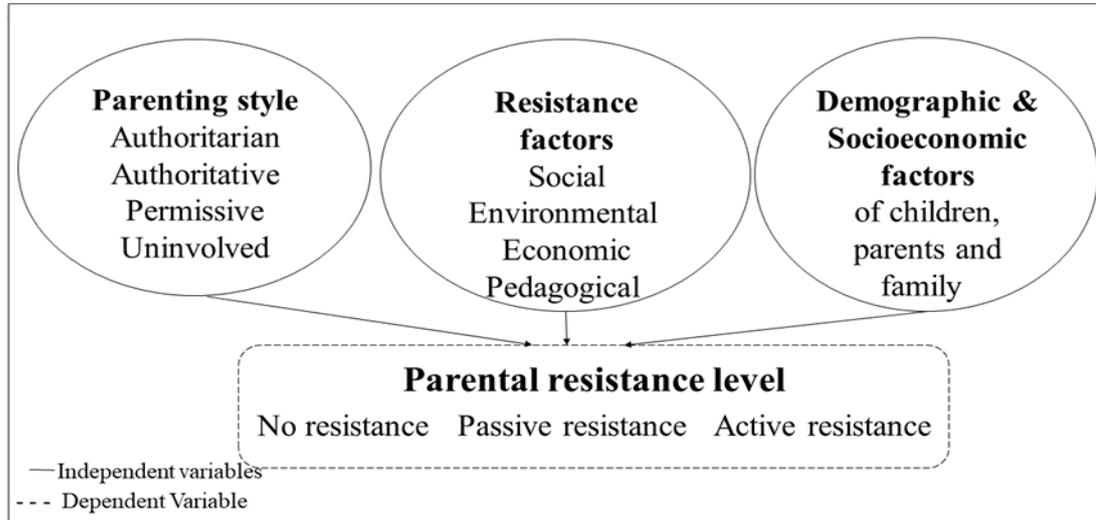
The *uninvolved parenting style* refers to parents who do not set high standards for their children, are indifferent to their children's needs, and are uninvolved in their lives. Their children are usually low-achievers, have communication problems (as a results of lacking belief in themselves and others) and behavioral problems, and tend to be involved in risk behaviors (Maccoby & Martin, 1982; Johnsen al., 2018; Querido et al., 2002; Weiss & Schwarz, 1996). Regarding technology use, uninvolved parents do not mediate their children's media consumption (Uhls & Robb, 2017).

Parenting style has also been associated with parental involvement in school. For instance, studies have found that authoritative parents are characterized by high and clear expectations and aspirations for the progress of their children in school, and speak with their children about their school activities. Moreover, authoritative parents communicate effectively with teachers regarding their child's progress or difficulties, in contrast to parents with the authoritarian or permissive parenting styles (Kimble, 2014; Porumbu & Necşoi, 2013). Although parental involvement and monitoring behaviors are predictors of children's and adolescents' achievement (Pavalache-Ilie & Țîrdia, 2015), educators also consider parental involvement to be a significant factor which is responsible for problems in contemporary education (Porumbu & Necşoi, 2013). For instance, parents can interfere with the teacher's work and resist innovative pedagogies or/and integration of new technologies in learning (Sincar, 2013).

In addition to the resistance factors and the parenting styles, studies found several demographic variables that could explain the variance in parents' resistance to educational use of smartphone in schools. The parents' gender was found to be a powerful predictor of their attitude regarding their children's smartphone use (Blau & Hameiri, 2017), in addition to the child's age (Courage, 2019). According to the Pew Research Center report (Silver, 2019), people with higher educational levels and with higher incomes are more likely to own smartphones, access the Internet and use social media. These characteristics may affect parents' attitudes to the use of smartphones in schools.

## 2.4 Research aims, research model and questions

This study examines parental resistance to children's use of smartphones at school for learning purposes, the factors underlying their resistance, and the association between parenting style and resistance to smartphone use at school. Figure 1 presents the research model:



**Figure 1.** The research model

The research questions were:

- Q1: What is the level of actual **parental resistance** to the educational use of smartphones in schools?
- Q2: What are the dominant **resistance factors** (social, environmental, economic or pedagogical) at each **parental resistance level** (no resistance, passive resistance, active resistance)?
- Q3: What are the difference between parents with different **parenting styles** in the **resistance factors** to the educational use of smartphones in schools?
- Q4: What is the association between **parenting style** and the level of **parental resistance**?
- Q5: Which of the factors examined (parenting style & demographic variables) predict the **level of parental resistance**, and how do the **resistance factors** contribute to this prediction?

## 3. Method

### 3.1. Participants

Data collection was conducted during 2018 through online questionnaires distributed among parent Facebook groups. The participants were 220 parents of school-aged children studying in more than 200 schools geographically dispersed in a variety of regions in Central, Northern and Southern districts of Israel. Participation was voluntary. The demographic and socioeconomic characteristics of the participants are presented in Table 1.

**Table 1:** Demographic and socioeconomic characteristics of the participants (n = 220)

Variable	Values and codes	N	(%)
Gender (parent)	(1) Female	196	89.09%
	(2) Male	24	10.91%
Smartphone ownership (child)	(1) Yes	169	76.8%
	(2) No	51	23.2%
Education stage (child)	(1) Elementary school	47	21.4%
	(2) Middle school	121	55%
	(3) High school	52	23.6%
Educational level (parent)	(1) High School	29	13.2%
	(2) Further Education	41	18.6%
	(3) Bachelor degree	98	44.5%
	(4) Master degree and above	52	23.6%
Income level (family)	(1) Significantly below average	15	6.8%
	(2) Below average	49	22.3%
	(3) Average	78	35.5%
	(4) Above average	73	33.2%
	(5) Significantly above average	5	2.3%

*Note:* Income level (per family): categorized based on the national income levels reported by the Israel Central Bureau of Statistics.

### 3.2 Instruments and procedure

The research was conducted within the quantitative paradigm through online questionnaires. Approval was obtained from the institutional Ethic Committee. The questionnaire was distributed among groups of parents via social networks. The questionnaire included the following measures:

**The Level of Parental Resistance** Index included three levels of parental resistance to the use of smartphones in school learning, based on previous studies of resistance to change in general, and parental involvement in schools in particular (Fisher, 2009; Oreg, 2006). The participants were asked about their resistance level: *no resistance* (e.g., "I am not opposed to my child's using smartphones in school for educational purposes"), *passive resistance* (e.g., "I am opposed to my child's using smartphones in school for educational purposes, but I do not intend to interfere with the decisions of the school or the Ministry of Education"), or active resistance. This classification provided three levels of resistance. In addition, the category *active resistance* was sub-categorized according to the type of parental resistance. All these levels were coded as a discrete variable: 1=no resistance, 2=passive resistance, 3= active resistance- complaints to other parents, 4=active resistance- complaints to teachers, 4=active resistance- complaints to school management, 5=active resistance-complaints to Ministry of Education and/or a court (which was considered the highest level of active resistance). Figure 2 in the Results section shows the distribution of parental resistance level percentages. If the parent selected several options, the option that was rated highest was selected for analysis.

**The Resistance Factors Questionnaire** was measured according to four factors: three of them - social, environmental, economic factors - were based on the Three Pillars of Technological Rejection Model (Rama Murthy & Mani, 2013), and the fourth, the pedagogical

factor, was inspired by Domingo and Gargante's (2016) Mobile Impact Perception Questionnaire, as well as studies on children's use of mobile technologies (Livingstone & Haddon, 2009; Genc, 2014). The questionnaire included 17 multiple-choice items on a scale ranging from 1 to 5 (ranging from "strongly disagree" to "strongly agree"). Exploratory factor analysis identified indices consistent with the literature, with the factor loadings for all the questionnaire's items higher than 0.4. The items were grouped in four scales as detailed below. Table 2 present factor loadings, Cronbach's alpha reliability tests and descriptive statistics for the questionnaires' scales and items:

**Table 2.** Factor analysis, reliability and descriptive statistics for the resistance factor scales and items: *The Resistance Factors Questionnaire* (n=220)

Items	Factor loadings	M (SD)	Median	Skewness (SD)	Range	Cronbach's alpha
<b>1) Social Resistance</b>		<b>3.57</b> (1.11)	<b>3.75</b>	<b>-.489</b> (.164)	<b>1.00-5.00</b>	<b><math>\alpha=.87</math></b>
02. The use of smartphones in school encourages a preference for screens over friends, and therefore leads to the seclusion of children	.91					
12. Using smartphones at school comes at the expense of developing social skills	.88					
04. Smartphones at school can be used to harm other children (boycott, cyberbullying, etc.)	.84					
17. Using smartphones exposes children to strangers with malicious intentions on the Internet	.75					
<b>Eigenvalue</b>	2.86					
<b>% of variance explained</b>	71.6					
<b>2) Economic Resistance</b>		<b>3.45</b> (1.13)	<b>3.50</b>	<b>-.257</b> (.164)	<b>1.00-5.00</b>	<b><math>\alpha=.83</math></b>
16. Smartphones are expensive devices and risk being stolen at school	.87					
08. Smartphones can be broken or damaged at school, resulting in high costs	.86					
11. Smartphone is a status symbol and its use in school emphasizes the lack of equality among children	.80					
15. Smartphones are expensive devices, so you cannot be required to equip children with these devices for use at school	.71					
<b>Eigenvalue</b>	2.65					
<b>% of variance explained</b>	66.2					

<b>3) Environmental Resistance</b>		<b>3.23</b>	<b>3.25</b>	<b>-.168</b>	<b>1.00-</b>	<b><math>\alpha=.88</math></b>
		<b>(1.16)</b>		<b>(.164)</b>	<b>5.00</b>	
03. When learning with smartphones, children may be exposed to inappropriate content for their age, which can be harmful to their mental health	.90					
06. Learning with smartphones increases exposure to radiation	.86					
09. Using the smartphone as a learning tool may harm the student's health, caused by the effort involved in reading from a small screen	.85					
14. Learning with smartphones can have a negative impact on the child's mental development	.84					
<b>Eigenvalue</b>	2.97					
<b>% of variance explained</b>	74.2					
<b>4) Pedagogical Resistance</b>		<b>2.83</b>	<b>2.80</b>	<b>.159</b>	<b>1.00-</b>	<b><math>\alpha=.84</math></b>
		<b>(1.12)</b>		<b>(.164)</b>	<b>5.00</b>	
01. Access to multiple sources of information on the Internet may confuse children	.87					
05. Using smartphones in the classroom can harm children's learning achievements	.83					
07. Learning with smartphones will reduce the child's interest in the subject content	.83					
10. When learning with smartphones, teachers will experience difficulties monitoring the children's learning progress	.82					
13. When learning with smartphones, children will be distracted by texting and/or gaming	.54					
<b>Eigenvalue</b>	3.07					
<b>% of variance explained</b>	61.4					

As Table 2 shows, factor analysis with Varimax rotation revealed four factors consistent with the conceptual framework: social, economic, environmental and pedagogical resistance. All factor loadings were  $>.54$  and consequently, all items were included in the indices, which were normally distributed. Cronbach's alpha ranging from 0.83 to 0.88 indicates good reliability of the indices.

*The Parenting Style Questionnaire* measured four parenting styles: authoritarian, authoritative, permissive, and uninvolved styles. We used Kimble's (2014) and Kimble et al.'s (2015) parenting style questionnaire, which is an extension of PSDQ (Parenting Styles and Dimensions Questionnaire, PSDQ) by Robinson, Mandleco, Olsen & Hart, (2001). The questionnaire included multiple-choice items, rated on a scale ranging from 1 to 5 ("never" to "always"). Confirmatory factor analysis with Varimax rotation was conducted to the 32 original questionnaire items. The item "I punish the child by confiscating luxuries without explaining/ a brief explanation" with a factor loading less than 0.4, was omitted. Table 3 presents descriptive statistics for the parenting style indices:

**Table 3.** Descriptive statistics for the parenting style questionnaire (n=220)

Index	Mean (SD)	Median	Skewness (SD)	Range	Cronbach's Alpha
Authoritarian style	2.05 (.50)	2.00	-.592 (.164)	1.00-3.63	$\alpha=.75$
Authoritative style	3.99 (.69)	4.08	-.751 (.164)	2.00-5.00	$\alpha=.92$
Permissive style	3.04 (.71)	3.00	-.219 (.164)	1.60-5.00	$\alpha=.73$
Uninvolved style	1.93 (.69)	1.83	.844 (.164)	1.00-4.33	$\alpha=.83$

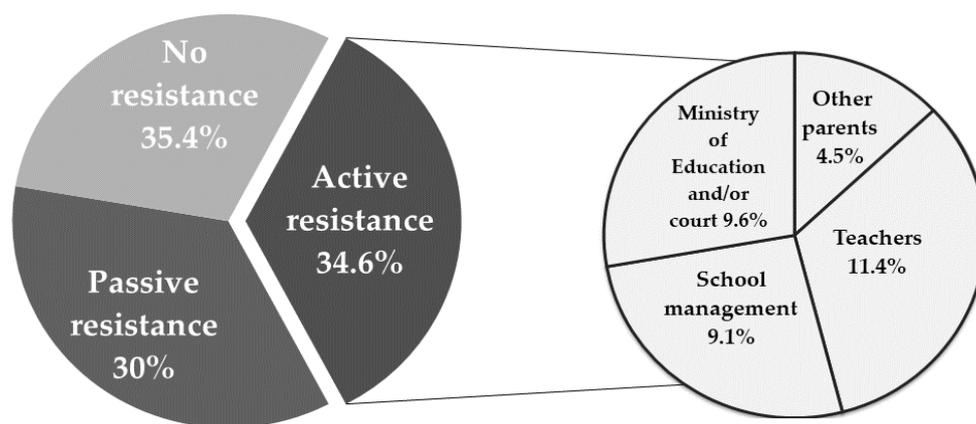
In addition to the four parenting style indices detailed above, parents were also classified on one salient parenting style variable, according to the classification in the previous studies (Kimble, 2014; Kimble et al., 2015): as either authoritarian, authoritative, permissive or uninvolved. First, the averages on each scale were converted to z-scores; following that, the gap between all the scales was calculated. Parents were assigned to a parenting category when the standard score on that category was at least .25 higher from the next z-score category. This categorization revealed that 23% (n=50) of the participants parenting styles were categorized as authoritarian, 29% (n=65) as authoritative, 21% (n=46) as permissive, and 27% (n=59) as uninvolved.

#### 4. Results

##### 4.1 Parental resistance to the educational use of smartphones in schools and the resistance factors underlying their resistance

*Q1: Level of actual parental resistance:*

The level of resistance to the use of smartphones at schools was categorized into three parental resistance levels: non-resistance, passive and active resistance. Active resistance was further divided into several resistance levels. Figure 2 shows the distribution of the level of parental resistance in percentages.



**Figure 2.** Distribution of parental resistance to educational use of smartphones (n = 220)

As can be seen, 35.4% of the parents did not resist their children's use of smartphones in learning. Compared to them, 64.6% of parents resisted their children's use of smartphones, 30% of them expressed passive resistance (i.e., felt resistance toward use, but did not interfere with

school decisions), while 34.6% expressed active resistance to the use, classified into four levels, as shown in Figure 2.

**Q2: The dominant resistance factors at each parental resistance level**

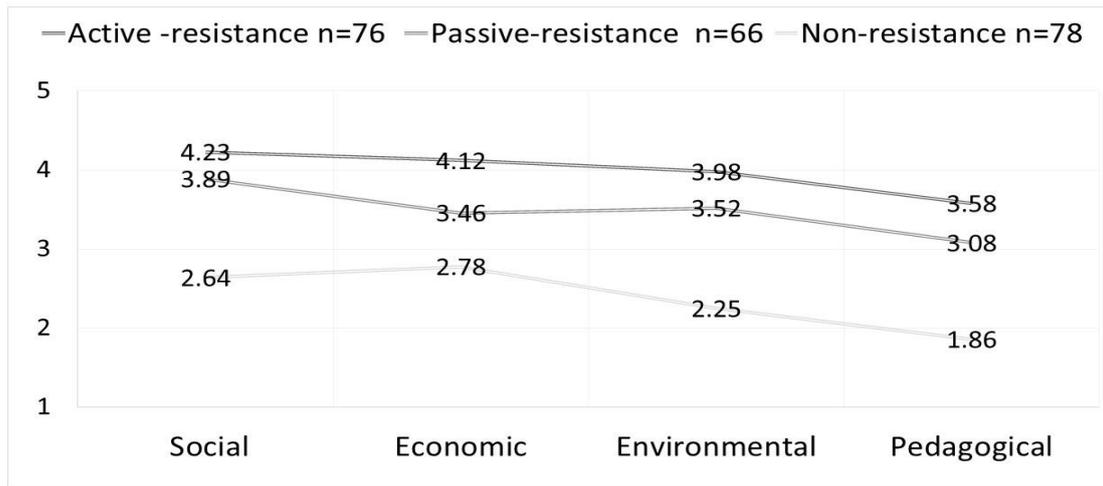
To answer the second research question, we examined which of the four *resistance factors* - social, environmental, economic or pedagogical - are the most dominant among parents, and whether there are significant differences between the resistance factors at each level of parental resistance. Analysis of variance with repeated measures showed that a significant difference was found between the four resistance factors  $F(3,216) = 73.80, p = .000, \eta^2 = .232$ . Pairwise comparisons with Bonferroni Correction, showed that *pedagogical factor* ( $M = 2.83$ ) was rated significantly lower than *social* ( $M = 3.57$ ), *economic* ( $M = 3.45$ ) and *environmental resistance factors* ( $M = 3.23, p's = .000$ ). Social factor was rated significantly higher than pedagogical ( $p = .000$ ) and environmental resistance factors ( $p = .001$ ), but no significant differences were found between the social and the economic resistance factors ( $p = .056$ ).

In order to examine the differences between the *resistance factors* among the parents in *each resistance group*, particularly to reveal the dominant resistance factor in the active parental resistance group, repeated measures ANOVA tests were conducted separately for each resistance level. Table 4 and Figure 3 presents the results.

**Table 4.** Comparisons of the resistance factors at different levels of actual parental resistance (n=220)

Actual parental resistance level	Social resistance	Economic resistance	Environmental resistance	Pedagogical resistance	<i>F</i>	Pairwise comparison: Bonferroni Correction
	A	B	C	D		
	<i>M</i> ( <i>SD</i> )	<i>M</i> ( <i>SD</i> )	<i>M</i> ( <i>SD</i> )	<i>M</i> ( <i>SD</i> )		
Non-resistance (n=78)	<b>2.64</b> (0.97)	<b>2.78</b> (0.97)	2.25 (0.52)	1.86 (0.72)	$F(3,231) = 41.81, p = .000, \eta^2 = .352$	B > C; A, B, C > D
Passive resistance (n=66)	<b>3.89</b> (0.80)	3.46 (1.07)	3.52 (0.91)	3.08 (0.88)	$F(3,195) = 18.09, p = .000, \eta^2 = .218$	A > B & C; A, B, C > D
Active resistance (n=76)	<b>4.23</b> (0.82)	<b>4.12</b> (0.93)	3.98 (0.89)	3.58 (0.92)	$F(3,225) = 28.14, p = .000, \eta^2 = .273$	A > C; A, B, C > D

Pedagogical resistance factor was found to be rated the lowest at all parental resistance levels. In addition, among parents who reported non-resistance, environmental resistance factor was rated lower compared to social and economic resistance factors. On the other hand, among the passive and active resistance groups, social resistance overcame environmental resistance. Figure 3 presents these findings graphically:



**Figure 3.** The differences between the resistance factors at each parental resistance level

#### 4.2 Parenting style, resistance factors, and actual parental resistance

##### Q3: Differences between the resistance factors among each parenting style group

To examine the differences between the four resistance factors among the four parenting style groups, Repeated Measures ANOVA analyses were performed for each group separately, and the resistance factors were used as a within-subject variable. Table 5 presents the test results.

**Table 5.** Comparisons in the resistance factors among different parenting style groups (n=220)

Parenting style	Social	Environmental	Economic	Pedagogical	F	Pairwise comparisons: Bonferroni correction
	resistance	resistance	resistance	resistance		
	A	B	C	D		
	<i>M</i>	<i>M</i>	<i>M</i>	<i>M</i>		
	( <i>SD</i> )	( <i>SD</i> )	( <i>SD</i> )	( <i>SD</i> )		
Authoritarian (n=50)	<b>3.57</b> (1.02)	3.29 (1.12)	<b>3.54</b> (1.12)	2.94 (1.08)	$F(3,147) = 16.45$ , $p = .000$ , $\eta^2 = .251$	A, C>B; A, B, C>D
Authoritative (n=65)	<b>3.55</b> (1.23)	3.13 (1.12)	<b>3.59</b> (1.13)	2.69 (1.17)	$F(3,192) = 32.45$ , $p = .000$ , $\eta^2 = .336$	A, C>B; A, B, C>D
Permissive (n=46)	<b>3.48</b> (1.11)	3.21 (1.12)	<b>3.39</b> (1.06)	2.83 (1.24)	$F(3,135) = 14.86$ , $p = .000$ , $\eta^2 = .248$	A>B; A, B, C>D
Uninvolved (n=59)	<b>3.63</b> (1.05)	3.22 (1.05)	3.26 (1.19)	2.86 (0.99)	$F(3,231) = 16.52$ , $p = .000$ , $\eta^2 = .222$	A>B&C; A, B, C>D

Pedagogical resistance factor was found to be rated the lowest among all parenting style groups. In addition to pedagogical factor, pairwise comparisons showed that in the authoritarian and authoritative parenting style groups, social resistance factor was rated significantly higher than environmental resistance factor, but not compared to economic factor. In the permissive

parenting group, no significant differences were found between ratings of social and environmental resistance factors or between social and economic factors. Among uninvolved parents, there were no significant differences between ratings of environmental and economic resistance.

**Q4: Association between parenting styles and level of parental resistance**

In addition, as described in the method section, parents were classified, as in previous studies, into one dominant parenting style: authoritarian, authoritative, permissive or uninvolved. In order to examine the correlation between the parents' actual resistance level and the four parenting styles, a chi-square test of independence was performed to examine the relation between the *parenting style* and the *resistance level*. The relation between these variables was significant,  $X^2(6, N=220) = 21.55, p = .001$ . Table 6 presents cross-tabulation table in percentages of parental resistance levels among different parenting styles groups.

**Table 6.** Distribution of resistance levels among different parenting style groups (n=220)

Parenting style	Resistance level		
	No resistance (n=78) (%)	Passive resistance (n=66) (%)	Active resistance (n=76) (%)
Authoritarian (n=50)	30	26	44
Authoritative (n=65)	46.2	15.4	38.4
Permissive (n=46)	43.5	30.4	26.1
Uninvolved (n=59)	22	49.2	28.8

Parents who were categorized as authoritarian actively resisted the use of smartphones in learning to a greater extent than other parenting style groups. The majority of parents who were classified as having an authoritative or permissive parenting style did not resist the use of smartphones in learning. About half of the parents who were classified as uninvolved expressed passive resistance.

**4.3 Predicting actual parental resistance to the educational use of smartphones**

**Q5: Predictors of actual parental resistance level**

In order to examine the factors that predict the level of actual parental resistance to the educational use of smartphones, a three-step linear regression analysis was performed. The first step included the demographic and socioeconomic variables, and explained 3.5% of the variance in the level of actual parental resistance. In the second step, the parenting style added 3.8% to the explanation of the variance. Finally, the third step included the four resistance factors underlying parental resistance and explained an additional 41.6% of the variance. Altogether, these variables explained 48.9% of variance in parental resistance level. Table 7 shows the regression results.

**Table 7.** Three-steps linear regression of the study's variables as predictors of parental resistance level

Variables	B	T	p-value
<b>Step 1</b>			
Gender (parent)	.008	.123	.902
<b>Having a smartphone (child)</b>	<b>-0.136</b>	<b>-1.889</b>	<b>.060</b>
Education stage (child)	.007	.095	.924
Education level (parent)	-.057	-.784	.434
Income level (family)	-.094	-1.290	.198
<b>F value</b>	<b>(5,214) = 1.862*</b>		
<b>R<sup>2</sup></b>	<b>.035</b>		
<b>Step 2</b>			
Gender (parent)	-.044	-.626	.532
<b>Having a smartphone (child)</b>	<b>-0.144</b>	<b>-2.002</b>	<b>.047</b>
Education stage (child)	-.009	-.122	.903
Education level (parent)	-.034	-.464	.643
Income level (family)	-.095	-1.305	.193
Authoritarian style	.125	1.597	.112
Authoritative style	-.074	-.839	.402
Permissive style	-.089	-.997	.320
Uninvolved style	.069	.807	.421
<b>F value</b>	<b>(9,210) = 1.947*</b>		
<b>R<sup>2</sup></b>	<b>.073</b>		
<b>Step 3</b>			
Gender (parent)	-.064	-1.205	.230
Having a smartphone (child)	-.015	-.271	.787
Education stage (child)	-.034	-.629	.530
Education level (parent)	-.002	-.027	.978
Income level (family)	-.043	-.773	.440
Authoritarian style	-.012	-.203	.840
<b>Authoritative style</b>	<b>-0.160</b>	<b>-2.336</b>	<b>.020</b>
Permissive style	-.094	-1.398	.164
Uninvolved style	-.002	-.023	.981
<b>Pedagogical resistance</b>	<b>.319</b>	<b>2.989</b>	<b>.003</b>
<b>Social resistance</b>	<b>.252</b>	<b>2.482</b>	<b>.014</b>
Economic resistance	-.017	-.226	.822
Environmental resistance	.176	.1538	.126
<b>F value</b>	<b>(13,206) = 15.141***</b>		
<b>R<sup>2</sup></b>	<b>.489</b>		

Note: Parental resistance: 1=no resistance, 2=passive resistance, 3= active resistance- complaints to other parents, 4=active resistance- complaints to teachers, 4=active resistance- complaints to school management, 5=active resistance-complaints to Ministry of Education and/or a court"

As can be seen, in step 1, the child having a smartphone was associated with the parents expressing less resistance to using it for learning. In step 2, we included the parenting styles. Findings indicated that the *child having a smartphone* was still the only (negative) predictor of parental resistance level. In the third step, among the four *resistance factors*, *pedagogical* and *social resistance factors* were found to positively predict parents' actual resistance. In addition, parents with an *authoritative parenting style* showed less resistance, while *having a smartphone* no longer predicted the parental resistance level.

## 5. Discussion

The purpose of this study was to explore factors explaining parental resistance to the use of smartphones in schools and to identify its predictors. The study examined actual parental resistance to the educational use of smartphones in schools and the factors underlying their resistance. In addition, parental resistance was examined in relation to parenting styles, demographic and socioeconomic factors. Finally, we examined which of the study variables predict actual parental resistance.

The results showed that resistance to smartphone use among parents is a widespread phenomenon. Approximately 65% of the parents who participated in this study opposed the use of smartphones in schools to a certain degree. Moreover, from among the 35% who reported *active resistance*, 10% demonstrated the highest level of resistance by applying to the Ministry of Education and/or to the Supreme court in order to prevent the use of smartphones in schools. The high rate of parents who resist the use of smartphones indicates that, as long as the education system is open to parents' involvement in schools (Park & Holloway, 2018), it will have to cope with parents' resistance to the policy of using smartphones in schools for educational purposes. Thus, it is important for educational decision-makers to understand the factors underlying the parental resistance to the use of smartphones in schools and find ways to cope with it.

Although the parents' appeal to the Israeli court was due to the environmental argument and concern about radiation, the findings of the present study reveal other factors for parents' resistance to using their children on smartphones in school learning. An examination of the resistance factors underlying resistance among parents revealed interesting findings: *social and economic* resistance factors were rated highest, whereas *pedagogical* factor was rated the lowest. *Social resistance factor* can be explained in light of the many studies that report parental concern that their children might be exposed to violent content, inappropriate sexual messages, harassment, bullying, or will provide their personal information to online acquaintances (Genc, 2014; Livingston & Haddon, 2009; Warnich & Gordon, 2015). The *economic resistance* found in this study could be explained by parental concern regarding potential damage to expensive and fragile smartphone devices that they have purchased for their children (Blair & Fletcher, 2011; Ebbeck et al., 2016; Haddon, 2017

On the other hand, the *pedagogical and social* resistance factors significantly predicted a high level of parental resistance. Parents, whose resistance was of pedagogical or social nature, are those who will actually take action and appeal to the Ministry of Education and to courts. Pedagogical concerns are discussed extensively in the literature and refer to teachers' and students' attitudes regarding distraction from learning (Heflin, Shewmaker, & Nguyen, 2017; Sung, Chang & Liu, 2016; Lenhart, 2012). Interestingly, although the *pedagogical resistance factor* was not perceived by most of the parents as a central reason for resistance, the findings indicate (Table 4) that parents who do not believe in the pedagogical potential of smartphones to improve learning, are those who resist such use in the most severe manner and actively try to prevent the use of smartphones in classrooms. Although they are a relatively small group, they have the power to enforce their opinion and change the smartphone-usage policy in the educational system.

The present study also examined the association between *parenting style* and *actual parental resistance level*. Parenting style was tested, based on Baumrind's (1971) and Maccoby and Martin's (1982) typology as authoritative, authoritarian, permissive and uninvolved parenting styles. Based on a salient parenting style coded as a *categorical variable*, the results (see Table 5) show that in all of the parenting style groups, pedagogical resistance factor was rated the lowest, while social and economic factors were rated the highest. The association between parenting styles (as a categorical variable) and the parental resistance level was significant (see Table 6). Forty-four percent of parents classified as *authoritarian* parents actively resisted their children's use of smartphones in school. This is the highest ratio of active resistance in comparison to the resistance in other parenting styles groups. Approximately half of the parents who were classified as *uninvolved* expressed passive resistance. In contrast to other parenting styles, the majority of parents who were classified as having an *authoritative* or *permissive* parenting style, did not resist the use of smartphones for learning. This can be explained in light of studies that have found that *permissive* parents do not believe that they can regulate their child's use of the smartphone (Hwang et al., 2017; Park & Park, 2014). In contrast, the *authoritative* parents are more likely to engage in interpretive mediation and content restrictions through democratic methods (Uhls & Robb, 2017).

As the regression analysis demonstrated (Table 7), based on coding parenting styles as *four separate Likert scales*, an authoritative parenting style was a negative predictor of actual parental resistance. This suggests that parents who are characterized by an *authoritative* parenting style are less likely to resist their children's use of smartphones in learning. Our findings reinforce previous studies in the field, which were not related to technology-enhanced learning, that have found that parenting styles in general, and the authoritative parenting style in particular, are powerful predictors of children's well-being in social, psychological and academic realms (Johnsen et al., 2018; Turner, Chandler & Heffer, 2009; Warren et al., 2018). Authoritative parents tend to give their consent to the use of smartphones in learning. This can be explained in light of studies that have found that authoritative involved parents are capable of maintaining effective and open communication regarding educational issues with the child and the school staff (Cripps, & Zyromski, 2009; Porumbu & Necşoi, 2013; Uhls & Robb, 2017; Uhls & Robb, 2017). These findings indicate the need to empower parental authority, help parents maintain a balanced parental involvement in the education of their children while having an effective dialogue with the educational staff.

In addition, the study examined a variety of demographic and socioeconomic variables related to the child and to the parent. Surprisingly, none of these variables significantly predicted actual parental resistance level.

## **6. Educational Implications and Research Limitations**

Our findings raise a number of implications regarding the integration of smartphones into learning activities in the classroom, relevant for schools, educational policy makers and for future research. The findings indicate that parents, whose resistance source was of pedagogical or social nature, are those who will actually take action to prevent the use of their children's smartphones for school learning. It is imperative that schools involve and enlist the parents as agents of technological innovation in schools, and thus reduce their resistance to such initiatives. Nevertheless, schools must be prepared to deal with parental resistance and to address parental concerns as recommended below:

*Social risk aspects* – social risk was a powerful resistance factor in our findings. We recommend schools determine clear acceptable rules of smartphone usage and effective classroom management, in order to prevent social risks. Additionally, schools should use a firewall or filtering program to restrict harmful content, undesirable websites, malware and spam. BYOD students may use a guest-type Wi-Fi network with limited access to the Internet, enabling access to only certified resources to support learning (Attewell, 2017).

*Pedagogical aspects* - our findings indicate that parents who do not believe in the pedagogical potential of smartphones to improve learning, are those who resist such use in the most severe manner and actively try to prevent their use in classroom. Thus, it is important to familiarize parents with the pedagogical affordances of using smartphones in the classroom (e.g., Coca & Sliško, 2017; Daltio, Gama, França, Prata & Veloso, 2018). As detailed in the above mentioned literature review, smartphones are equipped with a wide range of features and applications, offering access to information at any place and time, thus enabling situated and ubiquitous learning (Sarker & Salah, 2019). Smartphones can be used for drill & practice strategies in applications that provide automatic feedback (Bijlsma et al., 2019). At the same time, using smartphones for learning enables experiential and active learning, through applications using in and out of class activities promoting learning motivation and self-directed learning (Alsadoon, 2018; Coca & Sliško, 2017). Recognizing the educational pedagogical potential of smartphones, will probably reduce parental resistance to their children's use of smartphones for learning purposes.

The research findings offer leaders in the educational system a basis for data-driven decision-making in dealing with parents' resistance to the use of technology in educational institutions in general, and the use of smartphones to support learning in particular. The study introduced and empirically tested an integrated framework for the examination of parental resistance to the educational use of smartphones and identification of its sources (Figure 1). This framework may be useful in studies of parental resistance to other instructional technologies.

However, it should be taken into consideration that this study was conducted in a self-selected sample of parents. Further studies are needed to provide better understanding of the phenomenon of parental resistance to the educational use of smartphones by their children and its association with parenting styles and parental involvement in schools.

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