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# INFORMATION AND COMMUNICATION TECHNOLOGIES TEACHERS' PERSPECTIVE REGARDING ONLINE RISK BEHAVIORS IN SCHOOL AGE

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## Abstract

The present study aimed to investigate primary school ICT teachers' perceptions regarding students' online risk behaviors and their responses to relevant hypothetical scenarios. In addition, it examined the network of relationships among ICT teachers' perceptions and their responses to scenarios to predict their perceived likelihood of intervention. One hundred and thirty-eight (138) ICT teachers (60 men, 78 women), selected randomly from schools all over Greece, participated in the study. The sample completed a set of self-reporting questionnaires online. According to the results, ICT teachers declared that they do not feel confident to manage students' online risk behaviors, regardless of their awareness and sensitization on the issue. The same perspective was also reflected in their responses to the scenarios. Path analyses showed that ICT teachers' perceptions regarding this issue (e.g., high perceived awareness) directly and positively predict their perceived seriousness of the scenarios and their perceived confidence to intervene. However, ICT teachers' likelihood of intervention in the scenarios seemed to be predicted only indirectly (and positively) by their perceptions, through how serious they perceived the scenarios to be and their self-confidence to intervene. The above findings constitute a basis for modifying/designing new training actions for ICT teachers regarding the prevention of children's risk cyber-navigation.

**Keywords:** Online risk behavior, Primary school students, ICT teachers, Perceptions, Hypothetical scenarios

## INTRODUCTION

The United Nations Educational, Scientific and Cultural Organization (UNESCO) has emphasized that the active use of Information and Communication Technologies[1] in every phase of educational activities is acknowledged as both a necessity and an opportunity (UNESCO, 2009). Consequently, the level of ICT equipment in education has continually increased over the last decade. Computer and internet access are the case for nearly all schools, even in primary education, making teaching procedure more interactive and generally offering great academic benefits (Gillen, Arnott, Marsh, Bus, Castro, Dardanou et al., 2019; Lee & Winzenried, 2009; Mandal, 2020; Nikolopoulou & Gialamas, 2016; Urhahne, Schanze, Bell, Mansfield, & Holmes, 2009). One representative example of this effort in the Greek educational system is the number of primary schools with a revised educational program, which refers, among others, the introduction of ICTs -with an emphasis on the Internet- both as a separate course and as a useful tool for other school courses (Ministry of Education, 2010). Essentially, the only difference between these primary schools and other schools in Greece is the systematic investment of Greek educational authorities in the integration of new technologies into the school curriculum for the support of learning, similar to other European countries (Buabeng-Andoh, 2012; DeCoito & Richardson, 2018). However, the level of technology integration in the school curriculum in many countries has remained rather low, with most teachers often relying on reasons of inadequate training and arguing that successful integration of technology into students' school life

[1] From this point on and for the rest of the present article Information and Communication Technologies will be mentioned as ICT.

requires informed technology leaders (Evans-Andris, 1995; Kwok-Wing & Keryn, 2004; Nikolopoulou & Gialamas, 2016).

This situation reflects the necessity for teachers who are responsible for the computer and internet implementation process in secondary schools but mostly in primary schools where the digital literacy of the students begins more formally (Lazonder, Walraven, Gijlers, & Janssen, 2020; Vélez & Zuazua, 2017). These teachers are found in literature mostly as ICT teachers[2] or as ICT coordinators, computer teachers, technology coordinators or computer coordinators. Despite the different terms, these teachers have common duties, including technical support, helping classroom teachers to develop curriculum materials and lesson plans, evaluating ICT programs in schools. Apart from these duties, it is widely accepted, that ICT teachers' most important role in the school community is to promote ethics on the internet and a safe online culture among students (Evans-Andris, 1995; Kwok-Wing & Keryn, 2004), and this is the main argument for choosing primary school ICT teachers as a sample of the present study. However, safe online culture among students should not be taken for granted as recent studies reveal that even primary school students get involved in online risk behaviors, such as unintentional visit to potentially harmful websites, excessive internet use and cyberbullying (Antoniades & Kokkinos, 2013; DePaolis & Williford, 2015; Ki Sook & Kyunghee, 2009; Livingstone Haddon, Görzig, & Ólafsson, 2010, 2011; Machimbarrena & Garaigordobil, 2018; Olenik-Shemesh & Heiman, 2014; Touloupis & Athanasiades, 2014; Twardowska-Staszek, Zych, & Ortega-Ruiz, 2018). These behaviors seriously affect students' well-being and daily school life (Bulu, Kavuk-Kalender, & Keser, 2017; Hinduja & Patchin, 2010; Smith, Sundaram, Spears, Blaya, Schäfer, & Sandhu, 2018).

The findings mentioned above have recently turned researchers' interest towards investigating school personnel's related perceptions, namely their beliefs, understanding, and views (Philippou & Christou, 2001), regarding students' online risk behaviors. This is because, according to the Theory of Planned Behavior (TPB), teachers' perceptions, namely their perceived seriousness of a student's problem behavior (e.g., online risk behavior) and their perceived confidence to intervene, can predict teachers' potential intervention (perceived likelihood of intervention) in the student's behavior and, consequently, their real intervention (Ajzen, 1991; Bauman & Del Rio, 2006; Boulton, Hardcastle, Down, Fowles, & Simmonds 2014; Craig, Henderson, & Murphy, 2000; Dedousis-Wallace, Shute, Varlow, Murrihy, & Kidman 2014; Ellis & Shute, 2007; VanZoeren & Weisz, 2017; Yoon, 2004; Yoon & Kerber, 2003).

Somebody would expect that ICT teachers, due to their responsibility for students' online safety, would play a key role in the studies mentioned above, which could predict ICT teachers' potential involvement in the management of incidents of students' online risk behaviors. Unfortunately, this is not the case. Most studies have investigated secondary school teachers'[3] and principals' perceptions, revealing their medium awareness of and sensitization about the cyberbullying phenomenon. Also, the findings mention that teachers and principals are poorly trained and unable to handle it, being afraid of overstepping the legal boundaries (e.g., Beringer, 2011; Campbell, Whiteford, & Hooijer, 2019; Eden, Heiman, & Olenik-Shemesh, 2013; Graves, 2013; Hunley-Jenkins, 2012; Hyland, 2014; Li, 2008; Kavuk, 2016; Macaulay, Betts, Stiller, & Kellezi, 2018; Moore, 2018; Stauffer, Heath, Coyne, & Ferrin, 2012; Stewart Jr, 2019; Thomas, O'Bannon, & Britt, 2014).

Only very few studies have focused on ICT teachers' perceptions regarding the issue under study. For example, Bulu et al. (2017) revealed that preservice ICT teachers' were not as ready as they should for dealing with students' internet safety problems, suggesting mostly superficial solutions, such as about referring the problem to the school counselor. As far as inservice ICT teachers, the available studies come mainly from secondary education and concern only cyberbullying (Cassidy, Brown, & Jackson,

[2] Based on the term used in most relevant studies, from this point on and for the rest of the present article the term "ICT teachers" will be used in order to present relevant findings of the literature as well as the results of the present study.
[3] Secondary school teachers whose expertise is not ICTs

2012; Chou & Peng, 2007; Tomczyk, 2019), without paying the required attention to other equally online risk behaviors among students (e.g., excessive internet use, unintentional access to harmful online content). Nevertheless, even these studies have not focused exclusively on inservice ICT teachers, as they also include in their sample school teachers of other specialties and/or school administrators. As a result, these studies do not offer "clear" findings regarding ICT teachers' related perspective. Furthermore, based on these minimal findings, a contradictory picture arises: On the one hand, ICT teachers confess awareness of and concern about students' online risk activities (e.g., extent of anonymous online friendships, sexting, cyberbullying) (Cassidy et al., 2012; Chou & Peng, 2007; Tomczyk, 2019), acknowledging that promoting safe cyber-navigation in the school context should constitute a teachers' priority. On the other hand, they admit that they are not fully informed about the extent of risk students are exposed to through online friendship, feeling at the same time unable to manage this issue (Cassidy et al., 2012; Chou & Peng, 2007).

Compared to the very limited international literature, almost no Greek relevant study has been identified by authors. It seems that, so far, most researchers have focused primarily on secondary school ICT teachers' perceptions regarding their curriculum, course teaching, interaction with their students and their training needs (e.g., Kallivretaki, 2016; Konstantinou, Pellas, & Georgiou, 2014; Manika, 2018; Varsos, 2016) but not on the issue under study.

Furthermore, attention should be drawn to the fact that based on the limited international findings from secondary school ICT teachers, we are not allowed to draw respective conclusions regarding primary school ICT teachers' related perspective. Primary schools, compared to secondary schools, are organized and operate in a different level (e.g., less anxious school climate, closer interpersonal relationships and stronger cooperation within the school community, launch of students' digital literacy). These parameters, according to teachers, seem to affect more positively their perceptions and their predisposition towards getting involved responsibly in managing school issues and their school work generally (Anagnostopoulou, 2005; Wong, Chong, Choy, Wong, & Goh, 2008), compared to secondary school personnel. Nevertheless, it is still to be confirmed if this is valid or not for the specific issue of primary school students' online risk behavior.

Another important issue that emerges from the available literature is that, so far, ICT teachers' related perceptions are reflected only through a self-reported questionnaire (Bulu et al., 2017; Cassidy et al., 2012; Chou & Peng, 2007). This means that teachers have to express their perceptions regarding a students' online risk behavior, such as cyberbullying, in a more "theoretical" or "general" level, without a specific context or condition under which the students' behavior is taking place described to them. However, compared to a self-reported questionnaire, teachers' responses to hypothetical scenarios seem to reflect more effectively the way they perceive and respond (e.g., perceived seriousness / confidence/likelihood to intervene) to specific situations where students engage in online risk behaviors. This is because hypothetical scenarios describe conditions very close to the school reality, eliciting in that way more honest responses from teachers (Alexander & Becker, 1978; Martin, 2006; Poulou, 2001). Actually, related studies based on teachers' perceptions regarding cyberbullying among students, have revealed contradicting findings, depending on whether a self-reported questionnaire or hypothetical scenarios were used. For example, teachers, despite their positive perceptions of cyberbullying in schools (e.g., high perceived awareness), tend to underestimate the seriousness of the issue and their likelihood to intervene when they face specific episodes in hypothetical scenarios (e.g., Boulton et al., 2014; Byers, Caltabiano, & Caltabiano, 2011; Craig et al., 2011; VanZoeren & Weisz, 2017). Taking into consideration that no related study seems to make use of both research tools (self-reported questionnaire and hypothetical scenarios), as well as the fact that our perceptions of an issue (e.g., student problem behavior), which are gradually formed and are considered relatively permanent, usually predict the way we approach (e.g., confidently, willingly) specific circumstances of this issue (e.g., episodes of students' problem behavior) (Filippou & Christou, 2001; Kao & Tsai, 2009; Martin, 2006; Wilson, 2006), a clear research need has emerged: to further investigate and clarify the relationship between ICT teachers' perceptions (e.g., perceived

awareness/school involvement) and their responses to hypothetical scenarios regarding online risk behaviors among primary school students (e.g., perceived seriousness / confidence/likelihood to intervene).

In summary, to cover the research gaps mentioned above, the present study aimed to answer the following research questions: What are the primary school ICT teachers' perceptions regarding online risk behaviors among primary school children (perceived awareness/confidence to intervene/school involvement/adequacy of uneversity training)? How do primary school ICT teachers approach hypothetically related incidents among students (perceived seriousness / confidence/likelihood to intervene)? Does the kind of the hypothetical scenario affect ICT teachers' repsonses? In the context of a holistic interpretation model, what is the network of the relationships between the primary school ICT teachers' perceptions and their responses to the hypothetical scenarios under study, which can predict their declared likelihood of intervention in the scenarios? The theoretical model of linking the variables of the present study is illustrated in Figure 1.

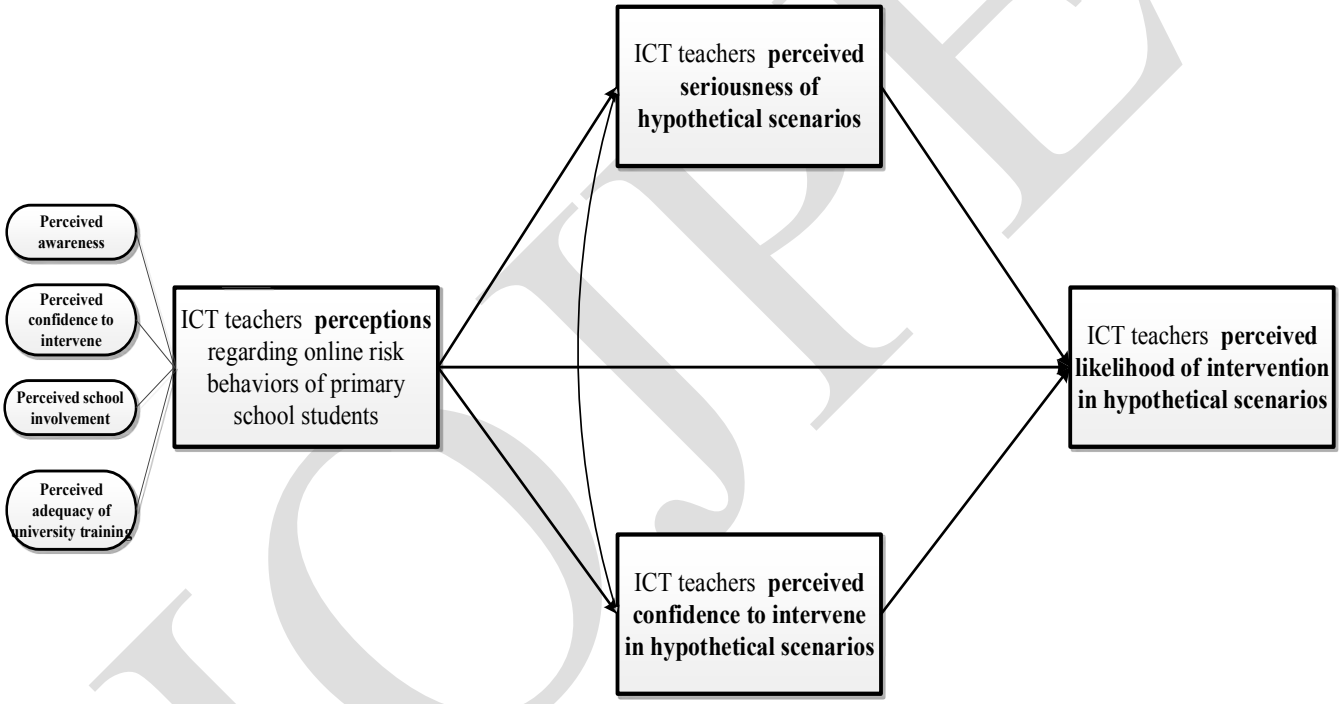


**Figure 1.** Hypothetical structural model of the network of relationships among variables
Note: The convex arrow shows the correlation between the variables

Regarding the first three research questions no research hypothesis can be deduced, due to the limited (or absent) and contradictory findings. As far as the fourth research question, based on the relevant literature (Filippou & Christou, 2001; Martin, 2004; Wilson, 2006), it was expected that primary school ICT teachers' perceptions regarding online risk behaviors of primary school students (perceived awareness/confidence to intervene/school involvement/adequacy of uneversity training) directly and positively predict their responses to the hypothetical scenarios (perceived seriousness / confidence/likelihood to intervene) (Hypothesis 1). Additionally, it was expected that primary school ICT teachers' perception of seriousness and confidence to intervene in hypothetical scenarios positively mediate the relationship between their perceptions and their declared likelihood of intervention in the hypothetical scenarios (Ajzen, 1991; Bauman & Del Rio, 2006; Boulton et al., 2014; Craig et al., 2000; Dedousis-Wallace et al., 2014; Ellis & Shute, 2007; VanZoeren & Weisz, 2017; Yoon, 2004; Yoon & Kerber, 2003) (Hypothesis 2).

## METHOD

### Procedure

After the approval of the survey by the Greek Ministry of Education, Research and Religious Affairs, an email was sent to the 900 selected primary schools, asking the principals to promote the email to the ICT teachers in their school. The email included details about the identity of the study and the researchers (authors of the article) as well as the relevant link of the survey questionnaires that were designed using the online Google Drive platform. The answers of the 138 ICT teachers from the 138 responding primary schools were automatically entered in a logistic sheet of the platform. The above process was initially carried out on a pilot basis, with fewer schools and ICT teachers ($N$=31). Due to the fact that the pilot study did not lead to a modification of the survey questionnaires, which were then promoted to the sample of the main study, the pilot sample were included to the final sample. The survey questionnaires were completed outside of school hours and their duration was estimated at around 10΄-15΄. The research was based on the voluntary participation of the ICT teachers and ensured the anonymity and confidentiality of the data.

### Participants

The sample included exclusively ICT teachers of all the Regional Education Directorates of Greece, who work in primary schools with revised educational programs. Out of the 1.336 Greek primary schools that follow the revised educational program, nine hundred (900) were randomly selected to participate in the study, taking into consideration the geographic region and the student population of each county. Out of the 900 selected schools 138 responded to the survey, resulting in a sample of 138 ICT teachers (response rate 15.3%) made up of 60 men (43.5%) and 78 women (56.5%). Regarding their demographic characteristics, the majority of them were 35 to 39 years old (40.6%) and had 10 to 14 years of work experience (42.8%). Despite the small response rate (15.3%), the ICT teachers that completed the questionnaire come mainly from schools in the geographical regions of Central Macedonia (39.9%) and Attica (19.6%), which are among the largest in Greece and have a student population that is representative of the whole Greek student population (Pan-Hellenic School Network, n.d.).

### Data collection

For the present study, a set of self-reported questionnaires was used, which were presented and answered electronically. Initially, information was provided on most of the common students' online risk behaviors, which constitute the focus of the present study, followed by demographic questions. The questionnaire included two main parts. The first part consisted of four hypothetical scenarios regarding students' online risk behaviors, investigating accordingly the related responses from ICT teachers. The second part assessed related perceptions from ICT teachers. The two parts of the questionnaire are presented in detail below:

### Hypothetical scenarios of students' online risk behaviors

The first part consisted of four (4) hypothetical scenarios (A, B, C, and D), which referred to four different incidents of online risk behaviors among primary school students (see Appendix). Scenario A referred to contact with inappropriate images on Facebook in a computer classroom, scenario B to excessive internet use outside of the school, scenario C to denigration via email outside the school, and scenario D to mockery via mobile phone in the school corridor. The researchers (and authors of this paper) structured the first two scenarios (A, B) while considering the fact that students' exposure to harmful virtual content via social networking sites and excessive internet use are not often investigated even though they constitute common forms of online risk behaviors among children and adolescents (e.g., Ki Sook & Kyunghee, 2009; Livingstone & Bober, 2004; Livingstone et al., 2010, 2011; Valcke, Schellens, Van Keer, & Gerarts, 2007). The last two scenarios (C, D) were translated and adapted to Greek from the cyberbullying scenarios found in Boulton et al. (2014) and Byers et al. (2011). Each scenario was followed by three questions eliciting the following ICT teachers' responses: (a) their perceived *seriousness* of the incident described ("In your opinion, how serious is the above

situation?"); (b) their perceived *confidence to intervene* ("How confident do you feel to intervene in the above situation?"), and, (c) their perceived *likelihood of intervention* ("How likely are you to intervene in the above situation?"). The answers were rated on a five-point scale ranging from 1 ("Not at all serious", "Not at all confident", "Not at all likely") to 5 ("Very serious", "Very confident", "Very likely"). The internal reliability (Cronbach's alpha) for the above three parameters proved satisfactory (a. perceived *seriousness a* = .684, b. perceived *confidence to intervene a* = .846, c. perceived *likelihood for intervention a* = .727).

**Perceptions of students' online risk behaviors**

This part of the questionnaire included 22 proposals/statements that investigate ICT teachers' perceptions regarding online risk behaviors among primary school students. This part was based on Li's questionnaire, which was designed to investigate Preservice Teachers' Perceptions of Cyberbullying (Li, 2008). Particularly, the questions investigated preservice teachers' (a) perceived *awareness* of cyberbullying (e.g., "Cyberbullying is a problem in schools"), (b) perceived *confidence to manage* this issue (e.g., "I feel confident in managing cyberbullying"), (c) beliefs about the commitment of the school (perceived *school involvement*) in preventing and addressing the phenomenon (e.g., "Schools should develop policies on cyberbullying"), and (d) perceived *adequacy of* teachers' *university training* regarding cyberbullying (e.g., "My current university education has been preparing me to manage cyberbullying"). For the purpose of the present study, besides translating Li's questionnaire into Greek (by the method of direct and reverse translation), all the necessary legislative modifications were made so that the proposals/statements refer to in-service ICT teachers, while the word "cyberbullying" was replaced by the phrase "online risk behaviors" to include all the kinds of students' online risk behaviors, where the study focused. The answers were given to a 5-point Likert-type scale, ranging from 1 ("Absolutely disagree") to 5 ("Absolutely agree").

**Table 1.** Confirmatory Factor Analysis of questionnaire on perceptions and correlations among the factors

| | F1 | F2 | F3 |
|---|---|---|---|
| 7. Primary schools should develop policies on students' online risk behaviors. | .538 | | |
| 9. Teachers should use a curriculum on online risk behaviors to teach children. | .587 | | |
| 11. School administrators should organize school-wide activities to deal with students' online risk behaviors. | .644 | | |
| 12. Surveys should be given to children to ask them about their online experiences. | .578 | | |
| 14. Primary schools should discuss students' online risk behaviors with parents. | .639 | | |
| 15. Primary school assemblies should address students' online risk behaviors. | .680 | | |
| 16. Primary schools should link with community resources to deal with students' online risk behaviors. | .710 | | |
| 17. TV and other media should discuss students' online risk behaviors. | .595 | | |
| 19. Primary school resources should be used to help teachers deal with students' online risk behaviors. | .522 | | |
| 22. In comparison to other topics I wanted covered in my university education, students' online risk behaviors is just as important. | .548 | | |
| 1. Online risk behavior is a problem among primary school students. | | .517 | |
| 2. Children are affected by online risk behaviors. | | .787 | |
| 3. I am concerned about primary school students' online risk behaviors. | | .709 | |
| 4. I feel confident in identifying primary school students with online risk behaviors. | | | .890 |
| 5. I feel confident in managing primary school students with online risk behaviors. | | | .857 |

| | F1 | F2 | F3 |
|---|---|---|---|
| **F1** | - | | |
| **F2** | .535** | - | |
| **F3** | .245** | .211* | - |

Note1: **F1**: Factor "Perceived school involvement", **F2**: Factor "Perceived awareness", **F3**: Factor "Perceived confidence to manage", Note 2: all of the above standardized loadings among the three factors are statistically significant ($p < .05$)
Note3: * $p < .05$, ** $p < .00$

In the ICT teachers' answers, initially, exploratory factor analysis was applied using the main component method and Varimax type rotation (KMO = .753, Bartlett Chi-square = 466.30, $p < .001$). Three factors emerged with an eigenvalue > 1.0 and a significant interpretive value: Factor 1 = *Perceived school involvement*, explaining 20.86% of the total variance, Factor 2 = *Perceived awareness*, explaining 15.34% of the total variance, and Factor 3 = *Perceived confidence to manage*, explaining 12.76% of the total variance. A confirmatory factor analysis was then performed, using the Mplus programe with the Maximum Likelihood method, which confirmed the above model (Table 1). The model has a very good fit, $\chi^2_{(87,\ N=295)} = 167.295$, $p < .05$, CFI = .955, TLI = .946, RMSEA = .037, SRMS = .038. The correlations between the three factors are presented in Table 1. The internal consistency indexes for the three factors are: Factor 1 ($\alpha = .771$), Factor 2 ($\alpha = .629$) and Factor 3 ($\alpha = .768$). The affinities (according to Pearson's correlation coefficient $r$) of the score of each question by each factor with the sum of the scores of the remaining questions of the same factor are considered satisfactory[4]: Factor 1, from $r = .35$ to $r = .62$, Factor 2, from $r = .35$ to $r = .52$, and Factor 3, $r = .62$.

## RESULTS

To depict the ICT teachers' perceptions and their responses to the hypothetical scenarios, descriptive statistics was used. To investigate the effect of the hypothetical scenarios on the ICT teachers' responses, repeated measures Anova was performed. To investigate the dyadic relations between the variables involved (perceptions, responses to scenarios), a series of Pearson correlation analyses was carried out (Pearson $r$). The confirmation of the research hypotheses (Hypothesis 1 and 2) was checked by applying path analysis to the data (using the Mplus programe with the Maximum Likelihood method) to depict the network of relationships among the variables involved, which leads to the ICT teachers' declared likelihood of intervention in the scenario incidents.

### ICT teachers' perceptions regarding online risk behaviors of primary school students

According to the statements of the ICT teachers, it seems that their *perceived awareness* of students' online risk behaviors is at higher levels ($M = 4.36$, $SD = .46$), as is their *perceived school involvement* in the prevention and treatment of this issue ($M = 4.41$, $SD = .58$), with most preferable (from 88% to 96%, approximately) preventive practices the adoption of a school policy that secures children's safe online behavior, classroom and school-based prevention actions, collaboration with parents and community, and promotion of a secure online culture through media. On the contrary, ICT teachers' *perceived confidence to manage* students' online risk behaviors is at a lower level ($M = 3.88$, $SD = .73$). Finally, on ICT teachers' *perceived adequacy of their university training*[5] regarding the issue under study, more than half of them (51.5%) agree/totally agree that their university studies offer adequate training on this issue. However, 71% of the ICT teachers admit that they would like better university training on how to handle students' online risk behaviors, while almost 81% of them declare that the issue under study is just as important as other topics covered in ICT teachers' university education.

### ICT teachers' responses to hypothetical scenarios

Based on the ICT teachers' responses to the questions that followed the four hypothetical scenarios, their perceived *seriousness* of the incidents described in the scenarios and their perceived *likelihood of intervention* are at higher levels ($M = 4.51$, $SD = .47$ and $M = 4.50$, $SD = 50$, respectively), compared to their perceived *confidence to intervene* in the incidents of the scenarios ($M = 3.89$, $SD = .64$).

[4] In a sample of 300 and 600 people, loadings of more than .29 and .21, accordingly, are accepted (Field, 2005).
[5] For the parameter of ICT teachers' *perceived adequacy of university training* regarding the issue under study, answers to the relevant questions are depicted by percentages and not by *Mean* and *SD*, as the above parameter was not confirmed as a distinct factor in the questionnaire of perceptions.

**Effect of hypothetical scenarios on ICT teachers' responses**

The content of the scenarios seemed to affect statistically significantly ICT teachers' perceived *confidence to intervene*, Pillai's Trace = .134, $F_{(3, 135)} = 6.969$, $p < .001$, partial $\eta^2 = .134$, as well as their perceived *likelihood of intervention* in each incident, Pillai's Trace = .258, $F_{(3, 135)} = 15.664$, $p<.001$, partial $\eta^2 = .258$. Violation of the Sphericity assumption of Mauchly's $W$ ($p<.05$) led to Huynh-Feldt's correction of degrees of freedom in the two above-mentioned cases: perceived *confidence to intervene*, $F_{(2.8, 379.41)} = 8.554$, $p < .001$, partial $\eta^2 = .059$, and perceived *likelihood of intervention*, $F_{(2.9,402.91)} = 13.899$, p<.001, partial $\eta^2 = .092$.

Pairwise comparisons between scenarios, applying the Bonferroni criterion ($p < .012$), showed that ICT teachers feel more confident to intervene in the case of the student who secretly watches inappropriate Facebook images in the computer classroom (Scenario A) ($M = 4.07$, $SD = .77$), and less confident in the case of the mockery of a student via mobile phone by his classmates in the school corridor (Scenario D) ($M = 3.80$, $SD = .75$). Accordingly, ICT teachers stated that they were more likely to intervene in Scenario A ($M = 4.75$, $SD = .59$), while they considered their intervention less likely in the case of the student's denigration by email from her friends outside the school premises (Scenario C) ($M = 4.38$, $SD = .76$). It should be highlighted that the moderate-to-low partial $\eta^2$ in the above results implies that the difference among the ICT teachers' responses to the four scenarios, although statistically significant, should be interpreted with caution.

**Correlations between variables**

In Table 2, it is clear that there are positive correlations among the ICT teachers' responses to the scenarios (perceived seriousness/confidence to intervene/likelihood of intervention) (from $r = .323$ to $r= .535$, $p < .001$), as well as among their perceptions regarding online risk behaviors of primary school students (perceived awareness/confidence to manage/school involvement) (from $r = .219$ to $r = .466$, $p < .001$). Furthermore, it is observed that ICT teachers' perceptions under study are positively correlated with their responses to the hypothetical scenarios (from $r = .219$ to $r = .681$, $p < .001$).

**Table 2.** Correlations among variables

| | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| **1** Perceived seriousness | - | | | | | |
| **2** Perceived confidence to intervene | .323** | - | | | | |
| **3** Perceived likelihood of intervention | .504** | .535** | - | | | |
| **4** Perceived awareness | .535** | .380** | .453** | - | | |
| **5** Perceived confidence to manage | .499** | .630** | .392** | .466** | - | |
| **6** Perceived school involvement | .270** | .681** | .417** | 350** | .219** | - |

Note 1: **$p < .01$

Note 2: No statistically significant correlations ($p > .05$) were omitted.

**Path analyses**

To map the network of the relationships among the variables involved (perceptions, responses to scenarios) leading to the ICT teachers' perceived *likelihood of intervention* in the incidents of the scenarios (independent variable), a series of preliminary analyses of linear stepwise regressions was performed to check the predictive relationships between the variables per two. Meeting the assumptions of normality, in the path analyses were included only those variables that had statistically significant predictive relationships among them. Without any missing cases, the path models that emerged from the ICT teachers' answers had good fit indexes: $\chi^2_{(38, N=138)} = 41.815$, p>.05 (CFI= .993, TLI= .989, RMSEA=0.067, SRMR=0.081) (Figure 2).

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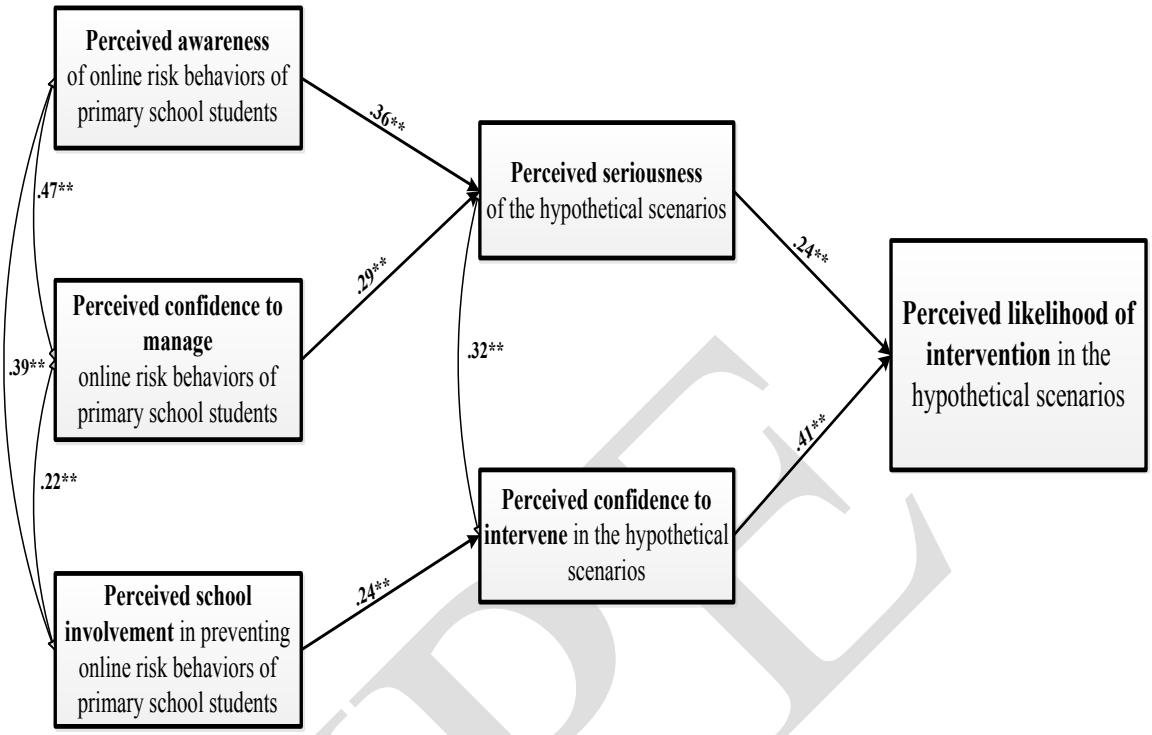


**Figure 2.** Schematic representation of the path model for the ICT teachers' perceived likelihood of intervention in the scenarios

Note 1: The values on the arrows are standardized coefficients of the model. The values next to the convex arrows are correlation coefficients.
Note 2: ** $p < .01$

According to Figure 2, there are positive correlations among ICT teachers' perceptions under study (perceived awareness/confidence to manage/school involvement) (from $r = .22$ to $r = .47$, $p < .001$), as well as between their perceived seriousness of the hypothetical scenarios and their perceived confidence to intervene in ($r = .32$, $p < .001$).

Furthermore, as can be seen from Figure 2, ICT teachers' perceptions of online risk behaviors of primary school students constitute direct and positive predictors of ICT teachers' perceived seriousness and their perceived confidence to intervene in the incidents of the scenarios. In particular, ICT teachers who think that they are aware of primary school students' online risk behaviors (perceived awareness) and feel capable of managing this issue (perceived confidence to manage) tend to perceive the relevant scenario incidents as serious. Also, ICT teachers who support school involvement in preventing and addressing online risk behaviors among primary school students (perceived school involvement) appear more confident about their ability to intervene in the specific scenario incidents.

By examining the statistically significant mediating role of ICT teachers' perceived *seriousness* and their *confidence to intervene* in the scenario incidents in the relationship between their relevant perceptions under study, on the one hand, and their perceived likelihood of intervention in the scenario incidents, on the other hand, the following was found: ICT teachers' perceived *awareness* of the issue under study ($Z$[6] = 2.35, $p < .05$) and their belief that they are capable of managing it (perceived *confidence to manage* it) ($Z = 2.20$, $p < .05$) indirectly and positively predict their perceived likelihood of intervention in the scenario incidents through their perceived *seriousness* of the scenario incidents. Furthermore, ICT teachers' belief about the holistic type of school involvement in preventing primary

[6] $Z$ = standardized normal distribution value

school students' online risk behaviors (perceived *school involvement*) seemed to indirectly and positively predict their perceived likelihood of intervention in the scenarios through their perceived confidence to intervene in ($Z = 5.39$, $p < .01$). The above findings imply that ICT teachers, regardless of their general positive perceptions regarding online risk behaviors among primary school students (e.g., high perceived awareness/school involvement), to declare their likely intervention in specific relevant students' cases, have to first perceive these cases as serious and feel confident to intervene in and handle them.

## DISCUSSION

The present study aimed to investigate ICT teachers' perceptions of online risk behaviors during school age, as well as how they respond to similar hypothetical incidents among students. At the same time, in the context of a holistic interpretative model, the study examined the mediating role of ICT teachers' perceived seriousness and their perceived confidence to intervene in these incidents in the relationship between their perceptions under study, on the one hand, and their declared likelihood of intervention in the hypothetical incidents, on the other hand.

### ICT teachers' perceptions and responses to hypothetical scenarios regarding online risk behaviors of primary school students

Regarding the descriptive findings of the study, ICT teachers state that they are aware of online risk behaviors among primary school children and support the involvement of the school community in preventing and addressing the issue. Also, ICT teachers, even though more than half of them consider that they have been adequately trained during their university studies regarding students' online risk behaviors, do not feel particularly capable of managing this issue effectively. The perceptions mentioned above of ICT teachers seemed to be reflected when they faced such incidents among students as those described in the hypothetical scenarios. That is, while ICT teachers state that they perceive as serious the incidents described, and although they feel likely to intervene, they do not feel sufficiently confident to do it. The above findings seem to reflect partially the conclusions based on some of the limited studies on secondary school ICT teachers (Cassidy et al., 2012; Chou & Peng, 2007; Tomczyk, 2019). Namely, on the one hand, ICT teachers of these studies state aware of and sensitized about students' online risk behaviors, such as anonymous online friendships while, on the other hand, they feel uncertain or unable to manage and intervene effectively in this issue (Cassidy et al., 2012; Chou & Peng, 2007; Tomczyk, 2019).

First, the findings of the present study could imply that the favorable conditions prevailing in primary schools (e.g., closer interpersonal relationships and stronger cooperation within the school community, launch of students' digital literacy), as perceived by school personnel (Anagnostopoulou, 2005; Wong et al., 2008), may not be enough to make ICT teachers feel more confident in securing a safe online culture among students. Furthermore, given the fact that in recent years emphasis has been laid on schools, especially in Greece, regarding actions on information (for teachers) and prevention of children's safe online navigation (e.g., Thematic Network on Internet Security, 2014), the aforementioned findings could possibly suggest primary school ICT teachers' inability to translate into practice what they already know about effective ways of preventing and addressing students' online behavior problems. This suggestion is more highlighted by taking into consideration the fact that 71% of the primary school ICT teachers admitted that they would like better university training on how to handle students' online risk behavior. Alternatively, the above findings could reveal the teachers' tendency to discard their responsibility to intervene in students' behavior problems that usually take place outside the school context (Athanasiades & Psalti, 2011), such as online risk behavior. In the latter case, it is confirmed that "police role" is usually adopted by teachers, regardless of their specialty, in episodes of traditional bullying among students, as teachers often choose to intervene only in episodes inside the school environment, which is supervised by them (Boulton, 1997).

**Effect of hypothetical scenarios on ICT teachers' responses**

Regardless of the context where students' online risk behavior takes place, the way primary school ICT teachers tend to approach and manage such incidents seems to depend also on the kind of behavior concerned. Specifically, ICT teachers are considered to be more confident to intervene in the case of the student who secretly views inappropriate Facebook images in the computer classroom (Scenario A), compared to the other scenarios. The fact that Scenario A evolves into the main teaching area of ICT teachers seems to enhance their sense of confidence to completely control and, consequently, better manage the incident. Based on the above finding, it is not surprising that ICT teachers expressed a correspondingly higher likelihood of intervention in Scenario A, compared to other scenarios. It is possible that Scenario A, which happens within the school environment, is estimated to be easier in terms to management, as it includes only one student while the particular place where it evolves (computer classroom) favors the implementation of measures (e.g., installation of additional filters) that may guarantee more permanent results. On the contrary, Scenario D (student's mockery via mobile phone by his classmates in the school corridor), although it also takes place inside the school, is obviously appreciated by ICT teachers as more complicated to deal with because more students are involved and, therefore, a larger number of people and/or families need to be informed. Also, the fact that Scenarios B (student with excessive internet use at home) and C (student's denigration via email by her friends outside of the school) take place outside the school context can inhibit ICT teachers from taking the responsibility to intervene, possibly throwing the burden on the family. In other words, the above findings suggest that ICT teachers, no matter what incidents they feel confident about and likely to intervene in, ultimately seem to choose to get involved mainly in those cases that are not only taking place within their area of responsibility (school environment) but also appear more manageable (e.g., including fewer students). Nevertheless, the above tendency of ICT teachers needs further investigation due to the lack of similar findings.

It is also worth mentioning that ICT teachers' perceived seriousness of the four scenarios was not significantly differentiated based on the content of the scenarios. This could be interpreted twice: On the one hand, the fact that ICT teachers usually do not receive undergraduate training regarding psycho-educational issues and didactic approaches (Liakopoulou, 2009) is likely to inhibit the adoption of a more sensitized perspective on the use of new technologies. A perspective that could allow ICT teachers to distinguish the dimensions of a specific scenario incident as more serious compared to other scenarios. On the other hand, of course, it could be argued that ICT teachers, due to their specialized knowledge and high level of familiarity with internet use, may be able to appreciate more clearly and objectively the seriousness of some students' online behaviors without entertaining the tendency to demonize them.

**The network of the relationships among ICT teachers' perceptions and responses to hypothetical scenarios**

From path analyses results, it was found that ICT teachers' (positive or negative) perceptions of online risk behaviors among primary school students (e.g., high/low perceived awareness/school involvement) contribute to their (positive or negative respectively) responses to the relevant hypothetical scenarios (e.g., high/low perceived seriousness/confidence to intervene), confirming in that way Hypotheses 1 and other similar studies (Filippou & Christou, 2001; Martin, 2004; Wilson, 2006). Furthermore, it was found that ICT teachers' perceived seriousness and confidence to intervene in the hypothetical scenarios positively mediate the relationship between their perceptions under study and their perceived likelihood of intervention in the scenarios, confirming Hypotheses 2 and relevant findings as well (Ajzen, 1991; Bauman & Del Rio, 2006; Boulton et al., 2014; Craig et al., 2000; Dedousis-Wallace et al., 2014; Ellis & Shute, 2007; VanZoeren & Weisz, 2017; Yoon, 2004; Yoon & Kerber, 2003). Specifically, it seemed that when ICT teachers feel aware of students' online risk behaviors in school (perceived awareness) and able to manage this issue (perceived confidence to manage) they tend to perceive as serious relevant incidents among students, like those of the hypothetical scenarios, and thus indicate their possible intervention in them (perceived likelihood of intervention). It is worth noting that ICT teachers' perceived confidence to manage the issue of online

risk behaviors among primary school children did not directly predict (as someone would expect it) their perceived confidence to intervene in the relevant hypothetical incidents among students. An important predictive role in this was played by ICT teachers' perception of responsible school involvement in preventing and addressing the issue under study (perceived school involvement). Taking into consideration that ICT teachers interact with the students in the classroom during only one or two teaching hours per week, it makes sense that the feeling of overall responsibility among the school community (perceived school involvement) towards the prevention of students' online risk behaviors is perceived by ICT teachers as a crucial aspect of this issue. In other words, this feeling of general responsibility perhaps makes ICT teachers believe that they can effectively manage similar episodes among students, as they do not feel alone in this effort, which encourages them to declare their possible involvement in such incidents. The above finding, although needs further investigation, highlights those areas where the emphasis should be placed in school ICT teachers' training regarding students' online safety. For example, holistic-type interventions to this issue, involving all the members of the school community, could be an important aspect during ICT teachers' university training. Something that probably is not the case and maybe justifies the fact that ICT teachers' *perceived adequacy of* their past *university training* towards the issue under study did not seem to predict significantly their responses to hypothetical scenarios.

As far as the fact that the primary school ICT teachers' perceptions under study (perceived awareness/confidence to manage/school involvement) seemed to indirectly predict their perceived likelihood to intervene in the scenario incidents, through their perceived seriousness and confidence to intervene, the following could be stated: ICT teachers' positive perceptions of online risk behaviors among primary school children do not seem to automatically imply their stated likelihood and willingness to intervene in relevant episodes among students. This seems to happen as long as these episodes are considered serious and manageable by ICT teachers. The latter is in line with the broader interpretive framework of the Theory of Planned Behavior and other relevant findings, where teachers' perceived seriousness of bullying/victimization incidents among students and their perceived confidence to deal with them significantly predict teachers' likelihood and final decision to intervene (Bauman & Del Rio, 2006; Boulton et al., 2014; Craig et al., 2000; Dedousis-Wallace et al., 2014; Ellis & Shute, 2007; VanZoeren & Weisz, 2017; Yoon, 2004; Yoon & Kerber, 2003).

**Conclusions, limitations and future research**

Summarizing the above findings, it is noted that primary school ICT teachers, although generally declare to be aware and sensitized about online risk behaviors among children, do not feel confident enough to manage this issue effectively. Actually, when they come up with similar incidents among students, they prefer to intervene mainly in cases that are less complicated in terms of management (e.g., that happens inside the school or involves one student). Moreover, the way ICT teachers' designate the issue under study as one requiring intervention in the case of a student who performs an online risk behavior seems to require that the case is estimated as serious and manageable. This study constitutes the first attempt to construct a holistic interpretative model of how ICT teachers approach episodes of students involved in online risk behaviors. Information about the degree of ICT teachers' awareness and sensitization on this issue, their self-confidence, as well as their beliefs about school's related responsibility contributes to improving, modifying or designing new relevant training actions for ICT teachers. These actions should focus on aspects of the issue which seem to determine ICT teachers' potential intervention in related incidents among students (perceived likelihood to intervene). Namely, these actions should focus on enhancing ICT teachers' awareness of the serious dimensions of different incidents of children's online risk behaviors (perceived seriousness), as well as their self-confidence in dealing with every type of incident (perceived confidence to intervene), no matter how complex or simple it seems in its management. Furthermore, training actions should give emphasis on different ways that ICT teachers can make the school community get involved in the prevention and/or intervention of students' online risk behaviors, enhancing in that way ICT teachers' sense of school responsibility towards this issue (perceived school involvement), which in turn seems to determine

their self-confidence and potential intervention in related students' incidents. For example, within this purpose, training actions can make use of real or hypothetical cases of students' online risk behaviors, cases that will address different kinds of online behaviors (not only cyberbullying) taking place inside or outside the school, with one or more students involved, where ICT teachers, according to each scenario, will be asked to organize a school prevention and/or intervention plan. The proposals mentioned before imply that these training actions for ICT teachers should be long-term and experiential, and not as usually just one-day workshops based on lectures.

Undoubtedly, the findings of the present study should be taken into consideration with caution as they are subject to limitations. In particular, the relatively small sample of ICT teachers and the possibility of socially acceptable answers may affect the generalizability and the internal validity of the data, while the restriction to the quantitative method does not allow an in-depth qualitative investigation of the ICT teachers' perspective. At the same time, the present study encourages new similar studies to be conducted, not only on ICT teachers, but also on other members of the primary school community (e.g., school principals), combining quantitative and qualitative data.

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## APPENDIX

### Scenarios

### Scenario A

While you are in the computer classroom with your students, you notice that a male student watches secretly, via computer, inappropriate images (e.g., with violent content) on Facebook without your permission. This is not the first time you notice this student's behavior.

### Scenario B

During the last month, you notice that one of your female students is usually sleepy in the classroom, while her school performance declines. To find out what happens you ask the student during a school break about this situation. The student confides you that during the last weeks she spends daily many hours surfing on the Internet, often until late at night.

**Scenario C**
Mary and Johanna, students of your classroom, had been best friends. They had a massive argument. The next day Johanna's inbox in her email account was full and there were numerous postings on her "my Space" page. The emails and postings were rude and offensive. When she looked at her account, she realized that a group email had been sent from her own account making racially discriminating comments as well as rude and hurtful comments about all her friends and classmates. She had not written the emails. When friends, Johanna had told Mary the passwords of her hotmail and "my Space" accounts.

**Scenario D**
Just before your lesson you witness a group of children in the corridor outside the computer classroom looking at their mobile phones and laughing. You overhear them mention a name of a student in a mocking manner. You have witnessed similar situations before mocking the same student in the same way.