# PROMOTING DIGITAL AWARENESS AT SCHOOL: A THREE-YEAR INVESTIGATION IN PRIMARY AND SECONDARY SCHOOL TEACHERS

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## Abstract

Educating to the responsible use of digital technology has become a hot topic over the last few years. Considering that children access online activities at an early age, they need to be conscious of the risks to safely move in the digital environment (Corradini, Nardelli, 2018). Moreover, because of the Covid-19 pandemic in 2020, educational institutions have relied on online learning to adapt to the situation (Teras et al., 2020), thus increasing the need for fostering in teachers and students awareness on security and privacy issues.

In this paper we present the results of a three-year analysis regarding teachers' perception about their students' digital awareness and the actions recommended to promote an effective responsible use of digital technologies. The teachers of the study (3,893 in 2018; 2,229 in 2019; 1,764 in 2020) are involved in "Programma il Futuro" Project, a national initiative whose goal is to spread the scientific principles of informatics and the basic concepts of digital awareness in primary and secondary schools.

The comparative analysis of the questionnaire answers over the last three years confirms the increasing interest of teachers in digital awareness issues, both for them and for their students, and the need of specific training activities.

Keywords: School education, Digital awareness, Security and Privacy.

## 1 INTRODUCTION

Over the last few years the topic of a responsible use of digital technologies has become a priority for schools' education programmes, considering the increasingly use of different technologies and their applications. Moreover, because of the Covid-19 pandemic, the 2020 year has represented a watershed for the digital future, since all companies, institutions and schools have moved to online to ensure business and educational continuity.

Many scientists have highlighted the problems related to an overuse of digital technology in children (Eidi and Delam, 2020; Montag and Elhai, 2020). A range of factors, such as isolation and reduced opportunities for supports has increased the exposition to domestic violence (Usher et al., 2020), while the wide use of digital platforms and social media has incremented the opportunities for different forms of online violence and cyberbullying (Babvey et al., 2020).

Considering that digital technologies will increasingly affect our daily lives in the future, it is fundamental to promote a proactive use of them, through specific digital awareness programmes in schools (Corradini and Nardelli, 2020).

In this paper we present the results of a three-year analysis (2018, 2019, 2020) involving school teachers participating in Programma il Futuro project (Corradini et al., 2014; Nardelli and Corradini 2015), whose goal is to spread the scientific principles of informatics and the basic concepts of digital awareness. For this goal the project provides dedicated courses and guides on the basis of Code.org materials (for the part regarding the scientific principles of informatics) and Common Sense materials (for the part regarding the responsible use of digital technology). Active since 2014, the initiative has involved more than 2.5 million students and almost 40,000 teachers.

## 2   METHODOLOGY

The sample of our study is made up of teachers (3,893 in 2018; 2,229 in 2019; 1,764 in 2020) belonging both to primary and secondary schools, and with the demographic characteristics shown in figures below.
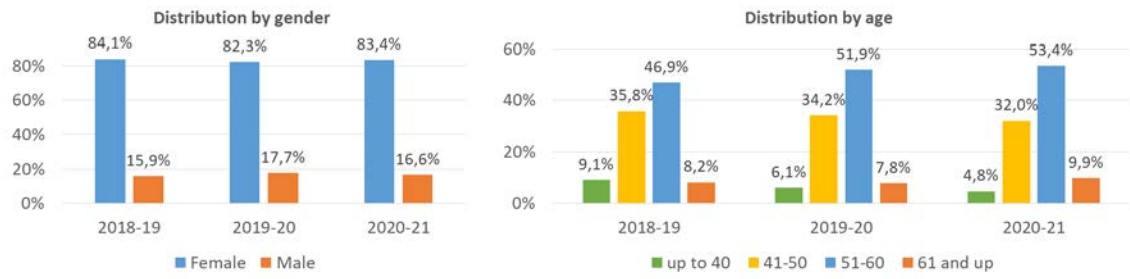


*Figure 1. Distribution by gender (left) and by age (right) of teachers across school years*
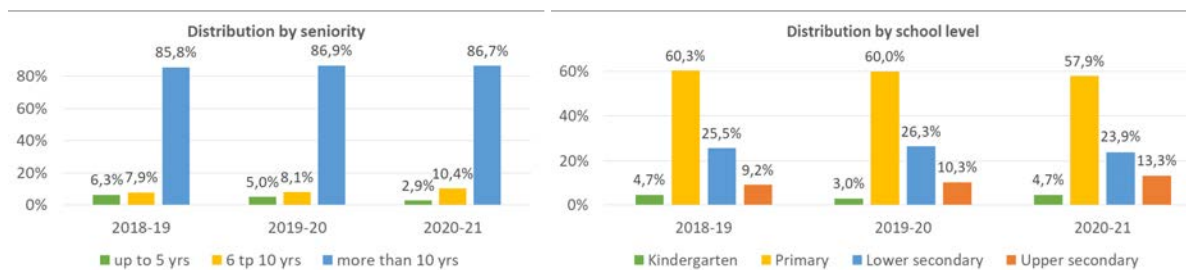


*Figure 2. Distribution by seniority (left) and by school level (right) of teachers across school years*

Teachers are asked to fill in a monitoring questionnaire, periodically updated and sent to all participants through the project platform, in order to evaluate year by year the level of involvement both of teachers and students in the various activities. A special area of the questionnaire, made up of 15 multiple choice-questions and one open-ended question, is dedicated to the digital awareness issue. Its goal is to analyse the teachers' perception regarding their students' behaviour when using digital technologies and what actions should be implemented for a safer use of them.

In this paper we analyse the trend of the digital awareness area considering some key questions.

## 3   RESULTS

In this section we report the main outcomes of our study for what concerns the "digital awareness" area of the monitoring questionnaire. In particular, the outcomes are related to the following four items:

a)  What is necessary for a responsible use of digital technologies?

b)  What topics should be addressed to students for developing digital awareness?

c)  What actions are needed to support teachers in developing awareness programs for their students?

d)  What topics should be included for teachers training?

Note that question a) and b) are included in all versions of the monitoring questionnaire administered during the three years, while questions c) and d) are included only in the 2019 and 2020 versions. However, the qualitative analysis based on an open-ended question in the 2018 monitoring questionnaire provided useful information on activities and contents suggested by teachers for improving the project, and this information confirms the trend of 2019-2020 years. Actually, the standardization of the answers provided by teachers have been used for updating the questionnaire to the current version.

### 3.1   Responsible use of digital technologies

As you can see in Figure 3, "knowledge of risks" is considered essential for a responsible use of digital technologies, even though across the three years the percentage of this answer is higher in 2018

(79%) and lower in 2020 (63%). This difference between the two values, even if not significant, could be attributed to the increased risks awareness produced by the information activities and webinars constantly implemented by the experts of the project. At the same time, "ability to use digital technologies effectively" has increased during the three years (from 32% in 2018 to 50% in 2020), confirming the relation between the knowledge of technical aspects and risks.
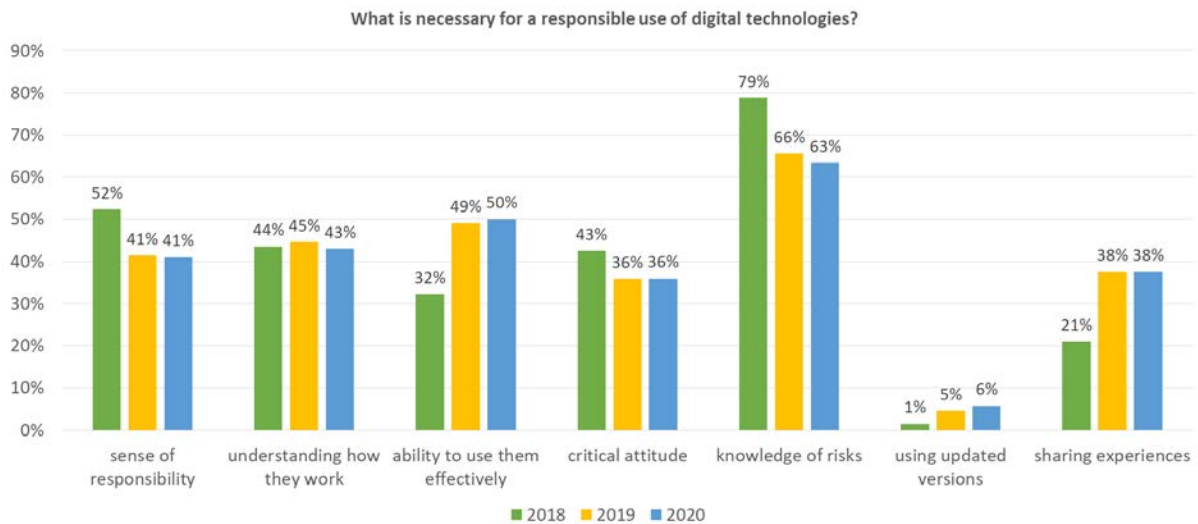


*Figure 3. Required competences for a responsible use of digital technologies*

## 3.2 Topics for digital awareness

According to our sample, the topics that should be addressed to students for developing digital awareness (see Figure 4 below) are aligned with the answers to question a), since they correspond to the most common risks on the Internet. Teachers were asked to rate on a scale 1 (negligible) to 4 (high) the importance of various specific topics and the graph shows the average values. If, on the one hand, "online harassment" (e.g. cyberbullying, cyberstalking) continues to be one of the most worrisome risks for its health effects, on the other hand, "data protection and privacy" is considered as important as "online harassment". This result could be attributed to the constant sensitization activity provided by the project across the years focused on the proper and safe use of digital technologies. In 2018 the topic "safe online behaviours" was not among the possible answers.
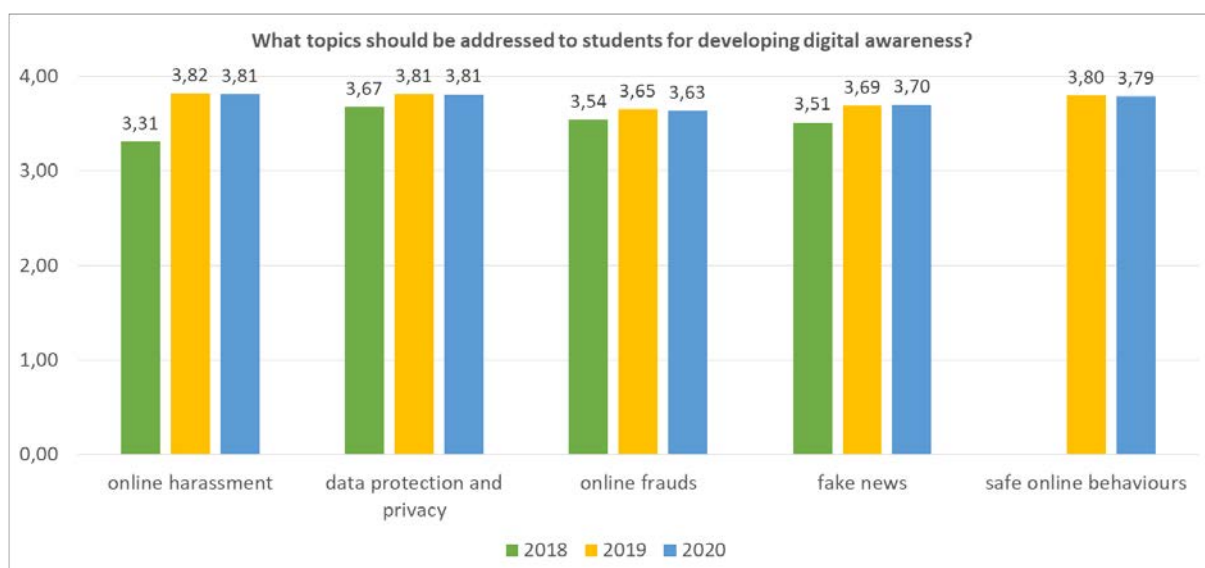


*Figure 4. Topics for educating students to a responsible use of digital technologies*

## 3.3 Actions for supporting teachers

As you can see in Figure 5, "sharing experiences" (around 65%) is perceived by teachers as the most important action for supporting them in developing digital awareness programmes at school, followed by "training in presence" and "webinars". While in 2019 training in presence (53%) shows a higher value than webinars (45%), in 2020 webinars play a major role, because of the situation determined by Covid-19 pandemic.

The qualitative analysis in 2018 monitoring questionnaire is aligned with the trends above identified, and highlights the role of parents in supporting teachers' educational actions.
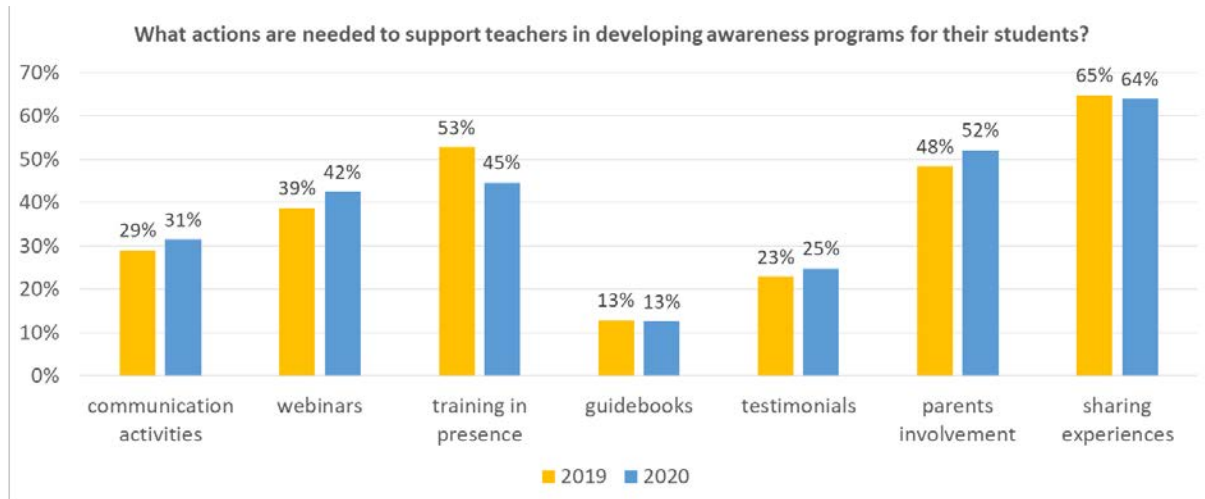


*Figure 5. Support actions for teachers in relation to educating their students to a responsible use of digital technologies*

## 3.4 Topics for teachers professional development

Teachers are aware that they need to be well-prepared to manage educational programmes on digital awareness. They confirm the importance of receiving a specific training, especially on "social media use" (around 71%) and "fake news" (around 60%) – two related topics – followed by "online harassment" and "identity theft". Note the interest of teachers in security issues, such as password management. It is likely that such interest is related to the webinars realized by Programma il Futuro on cybersecurity issues.

The qualitative analysis of the 2018 monitoring questionnaire had suggested the topics which were subject of the specific analysis in 2019 and 2020, and the need of implementing training activities in security issues.
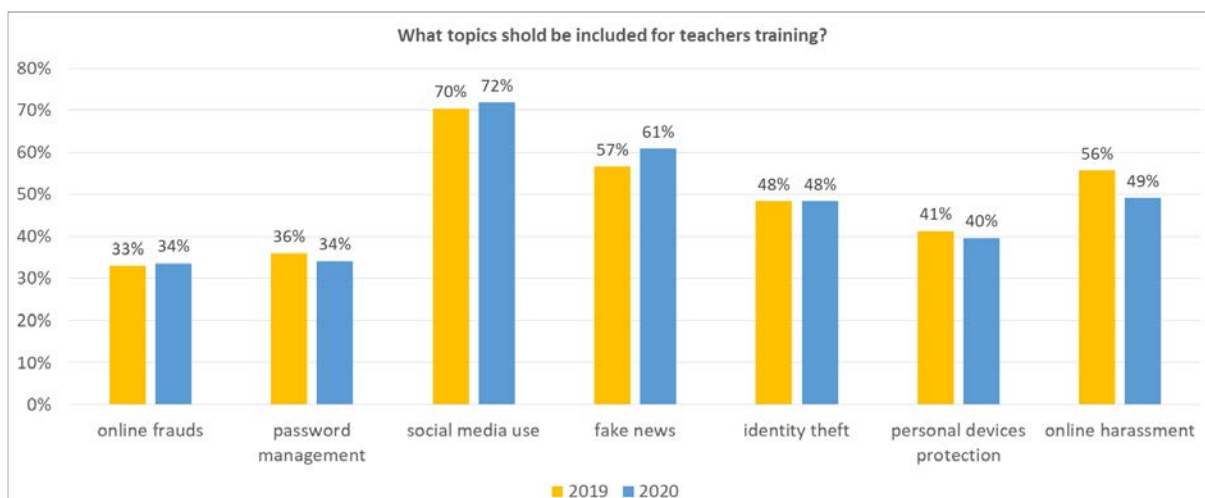


*Figure 6. Topics for the professional development of teachers in relation to educating their students to a responsible use of digital technologies*

# 4   CONCLUSIONS

The comparative analysis of the questionnaire answers over the last three years confirms the increasing interest of teachers in digital awareness issues, both for them and for their students. The general tendency is to associate the concept of "responsible use of digital technology" with being informed about the various risks on the Internet.

Training in specific topics is perceived as an essential activity to support students in moving safely on the Internet. In particular, teachers highlight the importance of preparing students not just to recognize and manage cyberbullying, but also to handle their personal data. Moreover, students should be trained in the proper use of social media, since this can promote the ability to recognize fake news.

Teachers themselves are aware that they need to be prepared to effectively manage educational programmes on digital awareness for their students. Therefore, training courses and webinars should be focused on the proper use of digital technologies and social media, including cybersecurity issues.

Finally, considering the nature of cybercrime and the different risks on the Internet, it is clear that digital awareness programmes at school are an essential step for developing a cybersecurity education (Corradini and Nardelli 2020; Corradini, 2020).

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