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Are Digital Natives Digitally Literate?

INSIGHTS FROM A NATIONAL REPRESENTATIVE SURVEY
2016, BULGARIA

PETAR KANCHEV

MARKO HAJDINJAK, EMANUIL GEORGIEV, GEORGI APOSTOLOV

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Introduction

Context

In his 2001 essay “Digital Natives, Digital Immigrants”, Marc Pensky coined the phrase “digital natives”, describing the new generations that grow up with computers and the internet from an early age, and differentiating them from the older generations, or the “digital immigrants” (Pensky, 2001). Ever since then, this phrase has sparked a series of debates regarding Pensky’s claims that “digital natives” think and process information differently from “digital immigrants” and that fundamental educational reforms are needed to accommodate the new generations (Bennet et al., 2008). These debates, however, seem to overlook a very important distinction – being “digitally native” is not the same as being “digitally literate”.

Whether or not and to whatever extent children today think differently, it is a fact that they become active participants on the internet by the age of eight (Common Sense Media, 2013). Their activities online are as various and almost as frequent as their activities offline, including social interactions, learning, and play (Livingstone, 2011). These digital experiences could either be harmful (e.g. early sexualization and sexual abuse, commercialism, discriminatory behaviour, etc.) or beneficiary (e.g. self-empowerment, collaboration, digital citizenship, etc.) for their well-being and development (Livingstone, 2011). Despite the fact that today’s children are “digital natives”, many of them are ill-equipped to effectively avoid the potential harms of the internet, or to take full advantage of its benefits (Livingstone, 2011). It is imperative, then, that policy-makers, industries, schools, and parents empower

“digital natives” so that they not only speak the “digital language”, but are also literate in it and are capable of using it critically in order to minimize the risks and maximize the use of opportunities of the internet age.

An important research effort in that direction has been the EU Kids Online project, which explored children’s experiences on the internet through both theoretical and methodological research (Livingstone, 2011). In a 2010 international study, interviewing 25,142 children between the ages of 9 and 17 across 25 European countries, including Bulgaria, EU Kids Online examined the risks and opportunities that European children face online (Livingstone, 2011). On the basis of the full findings, the following recommendations were provided for the relevant stakeholders: 1. Governments and industries should collaborate in order to provide adequate internet safety mechanisms and positive online content for children; 2. Educational systems should integrate extensive digital skills trainings, internet safety programs, and opportunities for creative internet use into their national curriculums; 3. Parents should focus on improving their children’s self-management skills, and on openly discussing the risks and opportunities of the internet with them (Livingstone, 2011).

This Report

As a continuation of EU Kids Online’s research efforts, The Bulgarian Safer Internet Centre, coordinated by the Applied Research and Communication Fund, examined the behaviour of Bulgarian children online in a national representative survey that was conducted in the last quarter of 2016. The findings are presented in three reports, each of them with a different specific focus. Two of the reports focus on the online risks and on the role of parents and family. **The purpose of this**

report is to gain insight about the digital and media literacy of Bulgarian children by examining and analysing their online behaviour and ICT use. The report uses the 2016 Bulgarian national representative survey to this end and compares the findings to the EU Kids Online 2010 Bulgarian data where applicable.

Digital and media literacy skills have been identified as a crucial prerequisite for advancing children’s rights and civic participation (Committee on the Rights of The Child, 2014; Hobbs, 2010). The Knight Commission and The Aspen Institute issued 15 recommendations for effective democratic citizenship, one of which is developing digital and media literacy from an early age (Hobbs, 2010). During the 2014 Day of General Discussion, The UN Committee on the Rights of The Child has decided that each member state has a responsibility to include digital literacy in the school curricula (Committee on the Rights of The Child, 2014). Furthermore, according to the Committee, digital literacy should not be "limited to technical competence but should also include awareness of ethical principles and values and teach children skills to behave responsibly when they engage and relate to each other online, and to respond to risks appropriately and safely (social literacy)" (Committee on the Rights of The Child, 2014).

The findings and analysis of this report could provide directions for the Bulgarian Ministry of Education and Science in its efforts to meet the standards determined by the Committee on the Rights of The Child. The ministry’s strategy so far has primarily been to ensure access to technology in schools, rather than to develop the digital and media literacy skills necessary for operating that technology. By analysing the online behaviour of Bulgarian children with regards to specific elements of digital and media literacy, this report could be

used as a tool by the regulators to update the school curriculum by focusing on key areas, where Bulgarian children need pressing support and guidance.

Methodology

In the 2016 national representative survey a total of 1000 Bulgarian children and 1000 parents were interviewed across Bulgaria. The demographic data of the children is presented in Table 1. The child surveys took about 45-60 minutes to complete, and the parent surveys took about 15-20 minutes to complete. The surveys queried about both parent and child internet activities and ICT use, as well as about the online risks faced by the children and the mediation / control practiced by the parents. For full description of the methodology, see Appendix 1.

Table 1 Demographic data of the 2016 Survey

Total interviewees		1000
Child gender	Boys	51,1%
	Girls	48,9%
Age	9-11 y.	40,0%
	12-14 y.	27,7%
	15-17 y.	32,3%

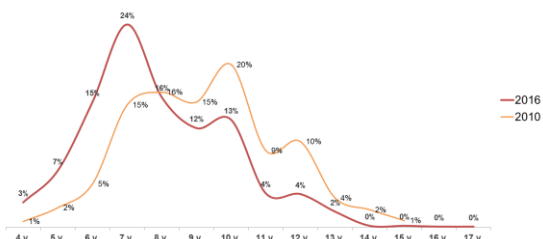
A Word of Caution

The 2016 national representative survey was a sociological research project, aimed at examining Bulgarian children’s online behaviour and ICT use; **it was not designed for testing and diagnosing the digital and media literacy skills of Bulgarian children.** The conclusions of this report are largely based on Bulgarian children’s subjective reports about the level of their digital and media literacy skills. This data is analysed in the context of children’s activities online in order to partially make up for the limited reliability of subjective reports. Nevertheless, this report does not rely on a specifically designed methodology for accurately testing digital and media literacy skills. These limitations of the analysis must be taken into account when interpreting the survey’s results for the purposes of this report.

Trends about Access

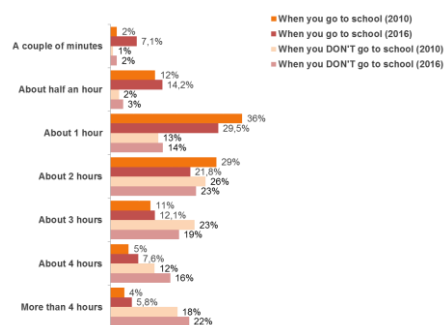
Before delving into the digital and media literacy skills of Bulgarian children, a few important trends about their access to the internet will help establish the context of their online experiences. **First, the average age when Bulgarian children start to use the internet has dropped from 9 years in 2010 (Livingstone, 2011) to 8 years of age in 2016.** Figure 1 shows all responses to the question “How old were you when you first used the internet?” for 2010 and 2016. As can be seen in Figure 2, the **peak age** when Bulgarian children started using the internet was **10 years in 2010** (20% of the respondents), but it has dropped to **7 years in 2016** (24% of the respondents). This demonstrates that Bulgarian children are going online younger today than they did in 2010.

Figure 1 Q: How old were you when you first used the internet?



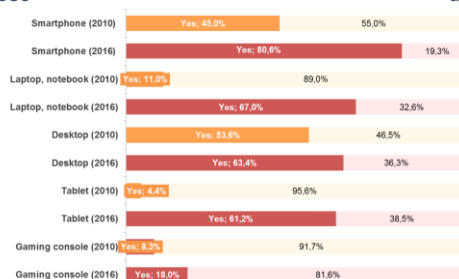
Another important trend to consider is the frequency of internet use by Bulgarian children. **The percentage of kids using the internet every day has jumped from 83% in 2010 to about 93% in 2016.** Figure 2 shows a comparison between the time they spend on the internet during school days and during off days in 2016 vs. 2010. **This graph demonstrates that today Bulgarian kids spend more hours on the internet than they did in 2010.**

Figure 2 How many hours do you spend on the internet when:



Finally, there is a drastic change in the devices used by Bulgarian children to access the internet. Figure 3 shows the percentage of kids using the listed devices. There is an overall increase of online access through all devices, but the most striking jumps are for **laptops (67% in 2016 vs. 11% in 2010), smartphones (about 80% in 2016 vs. 45% in 2010), and tablets (about 61% in 2016 vs. about 4% in 2010).**

Figure 3 Q: Do you go online / use the internet through these devices?



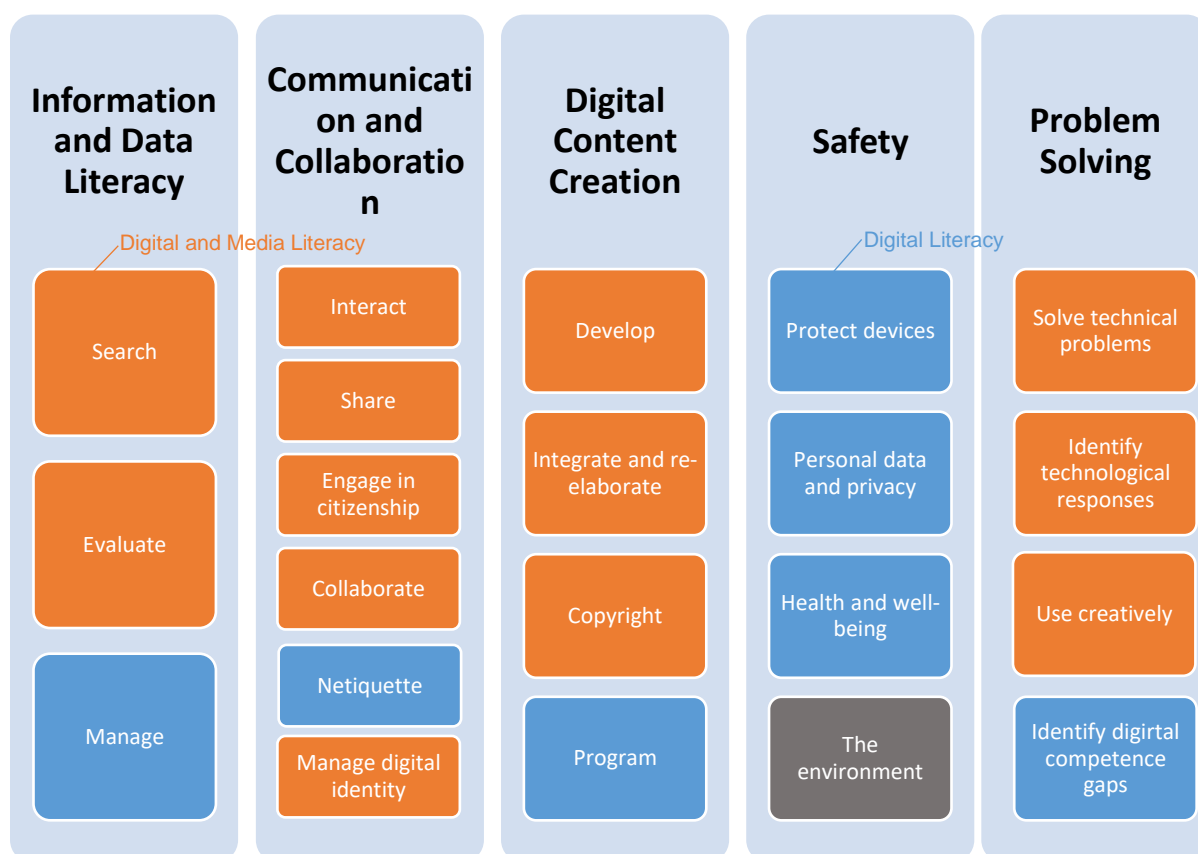
These trends point towards the following conclusion: Bulgarian children access the internet earlier and use it more frequently than ever, while rapidly adopting more mobile means of usage. If the “digital natives” narrative has any merit, it is more valid for today’s Bulgarian children than at any other point in the history of the digital era. The rest of this report will attempt to determine whether or not this increased activity and ICT use of Bulgarian children is enough for the development of their digital and media literacy skills.

Digital and Media Literacy Frameworks

In order to focus the analysis of this report, the digital competence framework developed by the European Union (DigComp) was used as a guideline for examining the digital literacy skills of Bulgarian children (Vourikari et al., 2016). The DigComp conceptual reference model is outlined in Figure 4. The model has five competence areas: Information and Data literacy, Communication and Collaboration, Digital Content Creation, Safety, and Problem Solving. Each competence area includes corresponding competence dimensions, which add up to a total of 21 for the entire model. In order to incorporate media literacy skills into the analysis, the DigComp model was cross-

referenced with the Media Literacy Criteria Framework, developed by the European Association of Viewer's Interests (EAVI – European Commission, 2011). The elements that appear in both frameworks, and thus correspond to both digital and media literacy are marked in orange in Figure 4, and the elements that are solely related to digital literacy are marked in blue in Figure 4. This colour coding persists throughout the report. In the following sections Bulgarian children's digital and media literacy skills will be examined by analysing their online behaviour in the context of the competence areas of the DigComp model.

Figure 4 Digital Literacy as Defined by the DigComp Conceptual Reference Model (Vourikari et al., 2016) and Cross-referenced with the Media Literacy Criteria Framework of EAVI (European Commission, 2011)¹.



¹ Examining the environmental impact of children's ICT use was not in the survey's scope and is thus excluded from this analysis.

Information and Data Literacy

It could be said that the “information and data literacy” and the “communication and collaboration” competence areas are the foundations of the DigComp Conceptual Reference model. While the former is necessary for successfully using data and information in any digital context, the latter is crucial for engaging in any digital interaction with other people. The “information and data literacy” competence area incorporates *searching, evaluating, and managing data, information, and digital content.*

Search

Digital and Media Literacy

Information and Data Literacy

Search

Definition: *“To articulate information needs, to search for data, information and content in digital environments, to access them and to navigate between them. To create and update personal search strategies.”*

(Vourikari et al., 2016)

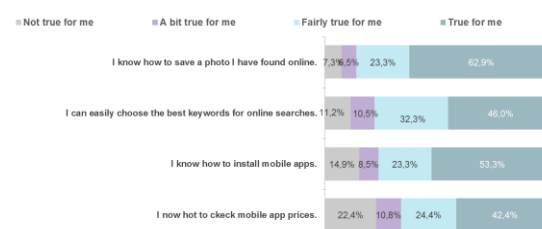
Using the above definition, this section will attempt to address two questions:

- 1) ***Can Bulgarian children identify and articulate their information needs?***
- 2) ***Have they developed effective search strategies for accommodating those needs?***

Figure 5 shows the self-reported competency level of Bulgarian children from the 2016 national representative survey regarding four skills, related to the “Search” competency dimension of the DigComp Conceptual Reference model. **Almost 80% of Bulgarian children feel confident in their**

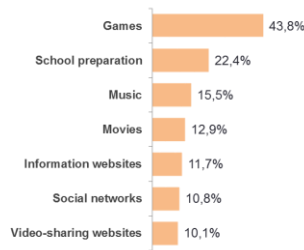
keyword search strategies. This is the most relevant skill from Figure 5, and it seems that Bulgarian kids are quite confident about their keyword search ability online. More than 85% report that they are capable of saving a picture they have found on the internet – this might not be the most difficult skill to grasp, but it is an important prerequisite for effectively utilizing media content. It is also important to note that Bulgarian children seem to be adapting well to the evolving mobile digital environments – about 75% of them report they are capable of installing apps on their phones, while more than 65% say they know how to check mobile app prices. The latter is particularly crucial for ensuring financial safety.

Figure 5 Q: To what extent each of the following applies for you?



As discussed in the “Word of Caution” section, self-reported abilities are not the most reliable sources of information, when it comes to diagnosing competency levels. Therefore, it would be interesting to see whether Bulgarian children’s information needs and search strategies could be derived from their behaviour online. With regards to information needs, only 3.6% of Bulgarian kids disagree that the internet offers a lot of useful things for children their age. This hasn’t changed a lot from the 4.2% in 2010 (Livingstone, 2011). Figure 6 shows the top seven things Bulgarian children find the internet most useful for: games (43.8%), school preparation (22.4%), music (15.5%), movies (12.9%), information websites (11.7%), social networks (10.8%), and video-sharing websites (10.1%).

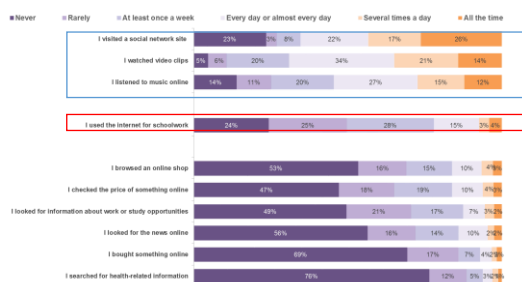
Figure 6 Q: Which internet activities do you consider useful for kids your age?



Does this hierarchy hold true for their activities online? In some cases, yes. **The top three activities Bulgarian kids engage in online are social networking, watching videos, and listening to music** (Figure 7), followed by playing games, and posting pictures and comments (the latter two are not shown in Figure 7). All of these are among the top 7 most useful things online for kids, according to Figure 6.

However, Figure 7 demonstrates an important discrepancy between the kids' information needs and activities online. Even though Bulgarian children consider school preparation as the 2nd most useful thing online for them, it is the 12th most frequent online activity they actually engage in. **24% of them hadn't used the internet for school purposes at all over the past month, while only 50% had done so at least once a week** (Figure 7). The latter number is in striking contrast with their engagement with the top three activities from Figure 7: social networking (73%), watching videos (89%), and listening to music (86%).

Figure 7 Q: How often you have done these things ONLINE in the past month?



Even more worrying is the fact that **in 2010, the percentage of Bulgarian children who used the internet for school preparation at least once a week was 53%** (Livingstone, 2011). This stagnation of kids' use of the internet for school purposes from 2010 to 2016 should be alarming for the Bulgarian Ministry of Education and Science. While an increasing number of Bulgarian children are spending an increasing amount of time on the internet, the time they spend online for activities related to school preparation hasn't caught up at all with that trend since 2010, all in the while they are clearly aware that such activities are useful for kids of their age.

Figure 7 shows some additional information about Bulgarian children's search patterns. About half of them have never searched online shops or prices (69% have never purchased anything online), downloaded movies or TV shows, or looked for educational/work-related information. Less than 45% have the habit of reading online news, while only 14% (27% for 15-17 year olds) do so on a daily basis. **Finally, 76% hadn't searched for health-related information over the past month. This number is quite high even for 15-17 year-olds (56%), who are vulnerable to teenage-related health issues, sexual relationship among the others.**

In summary, Bulgarian children seem to articulate their information needs quite well by identifying a plethora of opportunities on the internet. Nevertheless, their search patterns satisfy mostly the entertainment portion of these opportunities, with school-related and health-related searches lagging behind. It isn't clear whether Bulgarian kids realize that health-related information online is useful for them, but the data suggest that they regard school-related online activities as important. Thus, merely spending a lot of time on the internet is not enough for children to

satisfy their information needs; other sources of motivation are required to that end.

Evaluate

Digital and Media Literacy

Information and Data Literacy

Evaluate

Definition: “To analyse, compare and critically evaluate the credibility and reliability of sources of data, information and digital content. To analyse, interpret and critically evaluate the data, information and digital content.” (Vourikari et al., 2016)

This is perhaps the most crucial competence dimension of the entire DigComp framework. Even if children’s search strategies are flawless, they wouldn’t really benefit from them, if they are unable to filter out unreliable information. Critical evaluation is also a prerequisite for mastering the other competence areas of the model (Communication and Collaboration, Content Creation, Safety, and Problem Solving), since the end products of the activities in these areas must rely on accurately represented information, if they are to be useful and effective.

Figure 8 shows the self-reported ability of Bulgarian children to check whether something they have seen online is true or not. **Only about half of the respondents show confidence in evaluating the reliability of information, and a little more than 25% admit they are unable to do so at all.** This is the third worst self-reported ability of Bulgarian children out of twelve after “using a programming language” and “creating a website”. Thus, even though **80% of the respondents report self-confidence in searching for information (Figure 5), only 50% show confidence in verifying the truthfulness** of the information they find. This mismatch highlights a serious gap of Bulgarian children’s critical thinking and media literacy skills.

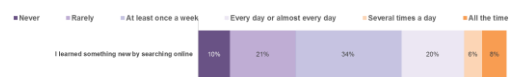
Figure 8 Q: To what extent each of the following applies for you?



One possible explanation for this gap is Bulgarian children’s low usage of the internet for school preparation. The education system is (or should be) one of the primary sources, through which kids develop the ability to critically evaluate information. If only half of Bulgarian children use the internet for school purposes on a weekly basis, it might be difficult for them to transfer this ability from the classroom to their activities online.

Figure 9 shows a very worrisome implication of Bulgarian kids’ gap between searching for information and verifying its truthfulness: **about 70% of them report that they learn new things from the internet every week, and about 35% of them report that they do so daily or more often.** This extremely fast pace of absorbing novel information online makes it more crucial to arm Bulgarian children with the necessary skills for critically evaluating information and filtering out misinformation.

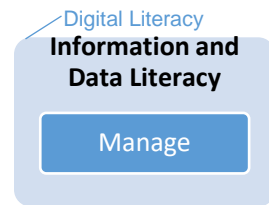
Figure 9 Q: How often you have done these things ONLINE in the past month?



In summary, Bulgarian children’s self-reported ability to evaluate the truthfulness of information they find on the internet is insufficient for coping with their search patterns and with the overall amount of information they absorb online. This is a great example of how being “digitally native” is not enough for becoming “digitally literate”. Schools must take their role in transferring children’s ability to critically evaluate

information from the classroom to the internet seriously, if their goal is to produce successful 21st century digital citizens.

Manage



DigComp definition: *“To organise, store and retrieve data, information and content in digital environments. To organise and process them in a structured environment.”*

(Vourikari et al., 2016)

Unlike the “Search” and “Evaluate” competence dimensions of the DigComp model, managing data and content in digital environments is not a part of the Media Literacy Criteria Framework, developed by the European Association of Viewer’s Interests (EAVI – European Commission, 2011), and is thus only relevant for the digital literacy of children. Nevertheless, developing good digital organizational skills would help kids cope with the large amount of activities and information online.

About 70% of Bulgarian children reported that they have access to their photos and applications from all devices they use (Figure 10). This is also a skill that improves rapidly with age (50% for 9-11 year olds; 77% for 12-14 year olds; and 86% for 15-17 year olds). All of this figures indicate a high competency level of data management of Bulgarian children, when it comes to photos and applications.

Figure 10 Q: Which of the following can you do with a smartphone / tablet?



Figure 11 also gives an idea about Bulgarian children’s data management skills. **About 48% of them are positive that they sometimes end up on websites without**

knowing how they got there. While this seems like a natural side effect of surfing, it indicates a degree of automation with which kids handle information browsing. This automated searching hinders their data organization capabilities. Thus, their habits of organizing photos and applications don’t seem to hold true for organizing the information they find online.

Figure 11 How often you have done these things ONLINE in the past month?



Communication and Collaboration

The “communication and collaboration” competence area of the DigComp model incorporates **interacting, sharing, engaging in citizenship, collaborating, and netiquette** in digital environments. With the increasing use of search engines, social networks, and other online platforms for social interaction, commerce, learning, and social and political discourse, these competence dimensions are becoming more and more crucial for the 21st century citizen.

Interact / Share

Digital and Media Literacy

Communication and Collaboration

Interact

DigComp definition: “To interact through a variety of digital technologies and to understand appropriate digital communication means for a given context.” (Vourikari et al., 2016)

Digital and Media Literacy

Communication and Collaboration

Share

DigComp definition: “To share data, information and digital content with others through appropriate digital technologies. To act as an intermediary, to know about referencing and attribution practices.” (Vourikari et al., 2016)

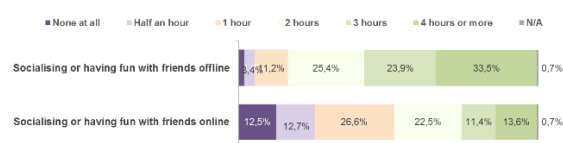
This section will combine insights from the 2016 national representative survey about both the **interacting** and **sharing** competence dimensions of Bulgarian children into a single analysis. Due to the nature of modern online platforms and tools it is reasonable to suggest that online interaction has turned into an

online sharing practice. Video and voice call services, such as Skype, social networks, such as Facebook, video-sharing websites, such as YouTube, and mobile communication applications, such as Viber all offer opportunities for chat, voice, and video interaction, and require minimal competencies in text, image, and video sharing for effective communication. Thus, by combining the “interact” and “share” competence dimensions of the DigComp model, this section will attempt to infer the following two insights about Bulgarian children:

- 1) **Their ability to interact and share through a variety of digital technologies on the basis of their time spent communicating online and on the basis of the diversity of tools they use for online communication.**
- 2) **Their ability to use the appropriate means of communication for interacting with others and for sharing data, information, and digital content².**

Figure 12 shows Bulgarian children’s time spent with friends online and offline. While they do communicate with their peers offline more often, **74% of them spend at least one hour a day with friends online, and about half of them do so for at least 2 hours a day.**

Figure 12 Q: How many hours a day do you do the following things?



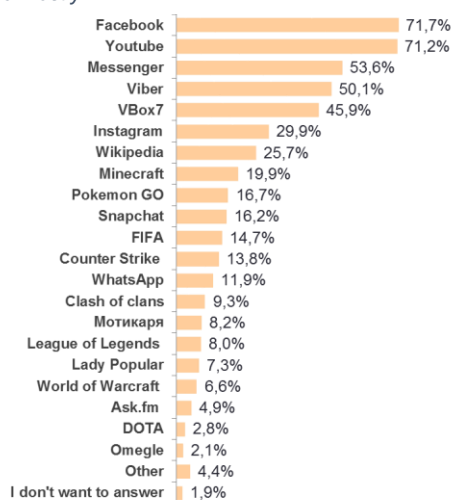
This data, however, is much more staggering for 15-17 year old children: **93% of**

² The referencing and attribution practices of Bulgarian children will be examined in the “Digital Content Creation” section of this report.

them communicate with friends online at least for an hour a day, while 68% of them do so for at least two hours a day. It is unfortunately not possible to establish a trend, since this data is unavailable from the 2010 EU Kids Online survey, but it is safe to say that online communication has turned into a daily activity for Bulgarian children, with teenagers engaging in it almost as often as engaging in offline communication.

Figure 13 shows the most commonly used websites, applications, and online games by Bulgarian children. Multiple answers were allowed in this question, so that it could offer

Figure 13 Q: Which websites, applications, or games do you use mostly?



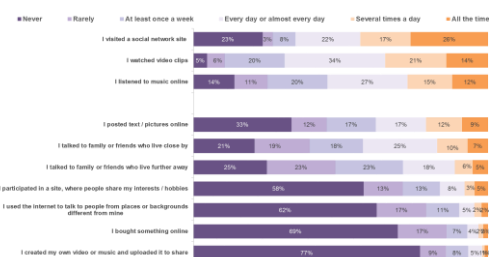
some insight about the variety of online platforms used by kids in Bulgaria. **Google, Facebook, and YouTube are the three most commonly used online platforms by more than 70% of Bulgarian children.** Both Facebook and YouTube are designed for the purpose of interaction between users by sharing text, pictures and video, making them relevant for this section of the report. VBox7, a Bulgarian video-sharing website, lags behind YouTube with 46%. **As for mobile social applications, Bulgarian children use mostly Viber (50%),** with WhatsApp lagging behind (about 12%). It is somewhat surprising to see that gaming platforms, such as Minecraft

(about 20%), Pokemon GO (about 17%), FIFA (about 14%), and Counter Strike (about 14%) are much less used than the pure social networking and video-sharing websites, since video games are the most useful online activity, according to children (Figure 6). League of Legends (8%) and World of Warcraft (about 6%) seem even less popular among Bulgarian kids. This data confirms that Bulgarian children use a variety of social networking, video-sharing, mobile, and gaming platforms for interacting with other users online.

The data presented in this section so far does suggest that Bulgarian kids are able to use a variety of channels for online interaction, but it is still unclear whether or not they can choose the appropriate communication means for interacting with others and for sharing data, information, and digital content.

Figure 14 shows the top 3 online activities of Bulgarian children (social networking, watching videos, and listening to music) contrasted with all activities that demonstrate their ability to use the appropriate means for online sharing. The first discrepancy that can be observed in Figure 14 is that, **while 66% of Bulgarian children use social networks daily or almost daily, only 38% share pictures or text daily or almost daily.** This data suggests that a large percentage of the kids don't use the sharing tools provided to them for active interaction and content creation for the majority of the time they spend on social networks.

Figure 14 Q: How often you have done these things ONLINE in the past month?



Another, even bigger discrepancy, is that, **while 95% of Bulgarian children had watched a video online over the past month, only 23% had created and posted their own video online (Figure 14). This discrepancy isn't because of lack of skill, since almost 80% of Bulgarian children claimed that they are able to use their mobile phone for creating a video and posting it online.** These discrepancies between spending time on social networking and video-sharing websites and sharing text, pictures and video on these websites suggest that Bulgarian children aren't sufficiently using the opportunities for online interaction and sharing that they are clearly aware of. This interpretation of the data is confirmed by the fact that **only 44% of them participated in a group with common interests over the past month online** (Figure 14). Thus, it could be argued that the passive nature of Bulgarian children's time spent on social networks and video-sharing websites decreases their incentive to actively engage with peers that share their interests.

Another important insight from Figure 14 is that Bulgarian children **use VoIP tools quite often.** Almost 80% of them had spoken online with family or friends that live close to them at least once over the last month, and 75% had done so with friends and family that live far away from them. In addition, about 40% of them had used VoIP to communicate with or get to know people from another country.

In summary, Bulgarian children communicate online daily and increasingly with age. They use a variety of social networking, video-sharing, mobile and gaming platforms to that end. Nevertheless, they share text, pictures, and videos on these platforms much less than their total time spent there, which hinders their success in finding and joining online groups with common

interests. Finally, they are active users of VoIP for communicating with friends and family, which opens up international communication opportunities for them as well.

Engage in Citizenship

Digital and Media Literacy

Communication and Collaboration

Engage in citizenship

DigComp definition: *“To participate in society through the use of public and private digital services. To seek opportunities for self-empowerment and for participatory citizenship through appropriate digital technologies.”* (Vourikari et al., 2016)

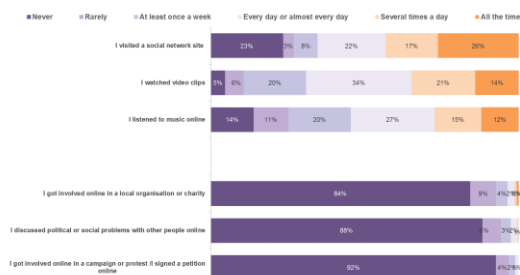
Digital citizenship is one of the long-term benefits of digital and media literacy skills. The 21st century democratic society has been projected to require digitally literate citizens in order to effectively utilize the mechanisms of free speech and social discourse in digital environments (Committee on the Rights of The Child, 2014; Hobbs, 2010).

The previous section already shed light on the missed opportunities of Bulgarian children in terms of joining online groups of people with similar interests. On one hand, this insight identifies a deficiency in self-empowerment, since they are not actively engaging with other people to improve their knowledge and skills in areas they are already interested in. On the other hand, it hints a lack of incentive for them to become active participants in online social discourse, including participatory citizenship, in general.

Figure 15 confirms this hypothesis. Among the 26 things that Bulgarian children do online, digital citizenship activities are the three areas they are the least engaged in: **only 8% of children had participated in an online campaign, protest, or petition in the past month; only 12% had participated in political**

and social discussions in the past month; and only 16% had engaged in charity. The contrast with the top 3 activities of Bulgarian children is evident in Figure 15.

Figure 15 Q: How often you have done these things ONLINE in the past month?



driven by online collaboration. As a reminder, less than half of Bulgarian children had joined a group with similar interests over the past month (Figure 14). This low activity in communication concerning common interests is a barrier for potential collaboration, as well. In addition, the low participation of Bulgarian kids in charity endeavors (16% of children the past month), as well as in campaigns, protests, and petitions (8% of children the past month) discussed in the previous section (Figure 15) is unfortunate, since these activities are an excellent example of how a large group of people can work together towards achieving a goal that they wouldn't be able to tackle alone.

Collaborate

Digital and Media Literacy

Communication and Collaboration

Collaborate

DigComp definition: *"To use digital tools and technologies for collaborative processes, and for co-construction and co-creation of resources and knowledge."* (Vourikari et al., 2016)

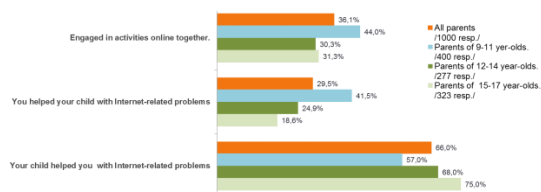
Collaboration is the second aspect of the "Communication and Collaboration" competence area of the DigComp model and the one that gives constructive purpose to the entire online interaction process. In its core, collaboration is a goal-directed behavior which requires two or more participants. On one hand, it requires effective communication so that the participants agree on the goal and on the steps for achieving it. On the other hand, it is a driver of effective communication, since it motivates people to work with others in order to achieve something they wouldn't be able to achieve by themselves.

The previous sections already gave some insight about Bulgarian children's lack of incentive to join internet groups with similar interests and to actively participate in digital citizenship initiatives, which both drive and are

If Bulgarian children aren't reaching their online collaborative potential on their own initiative, parents and schools should be encouraging and supporting them as much as possible. The level of collaborative online activities between parents and their children are shown in Figure 16. The first thing to notice is that **children help parents with internet-related problems much more often than vice versa (66% vs. about 30%), and this trend increases rapidly with age.** While these findings support the "digital natives competence" hypothesis to a degree (it is not clear whether the kids' help is directed towards purely technical problems, or to problems requiring critical thinking / media literacy), they point towards something much more interesting – children *are* willing to spend time with their parents on the internet, and this tendency is highest for teenagers. However, as can be seen in Figure 16, **parents engage in less and less online activities with their children, the older their kids become (44% for 9-11 year olds vs. about 30% for 12+ year olds).** Regardless of age, **if only about 36% of all parents engage in online activities with their children (Figure 16),** the online collaboration skills of a majority of kids are expected to suffer. Since Bulgarian children

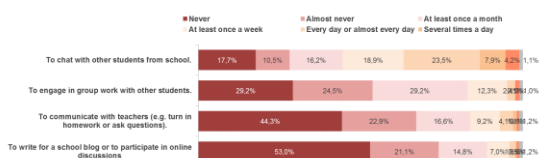
(and especially teenagers) demonstrate a willingness to use the internet together with their parents, parents should use this opportunity and give them the support they need for becoming effective online collaborators.

Figure 16 Q: When your child uses the internet, you:



Do Bulgarian schools foster online collaboration of students? Figure 17 shows the three online collaborative school-related activities that Bulgarian children engage in. **Only about 17% of Bulgarian kids use the internet for participating in group projects with other students more than once a week**, and this is the most frequent collaborative online school-related activity of the three. In contrast, **more than 55% of Bulgarian kids chat with other students weekly or more often**. This data suggests that online peer collaboration is underutilized by the Bulgarian education system, even though students are already online and communicating with their classmates.

Figure 17 Q: How often do you use the internet to do each of the following?



How about online collaboration between teachers and students? A little more than **55% of Bulgarian children have ever communicated with teachers online for school-related tasks with only about 15% having done so more often than once a week** (Figure 17). This discrepancy demonstrates

that a minority of teachers are capable of and willing to use the internet for instruction purposes regularly. Writing for a school blog is another underutilized teaching method, with less than **half of the students ever having had the opportunity to be engaged in it** (Figure 17). The Bulgarian education system should use these findings to identify the successful ICT-users in its teacher base and use their know-how to adopt a more holistic strategy for training and incentivizing teachers to incorporate ICT methods in their everyday practice.

In summary, Bulgarian children seem to be missing out on one of the internet's greatest opportunities – working together with other people in order to achieve a goal that they wouldn't be able to take on individually. Thus, it is proposed that parents and schools should support and encourage kids to develop their online collaboration skills and to understand why these skills are crucial for the 21st century digital age. The fact that children are more than happy to help their parents with internet -related problems is a great opportunity for parents to spend some quality time with their kids online and help them become better collaborators in the process. The Bulgarian educational system also has an opportunity - find the teachers who demonstrate ICT excellence in the classroom and scale their expertise, so that all students have access to such opportunities.

Netiquette



DigComp definition: "To be aware of behavioural norms and know-how while using digital technologies and interacting in digital environments. To adapt communication strategies to the specific

audience and to be aware of cultural and generational diversity in digital environments.” (Vourikari et al., 2016)

Netiquette is a necessary prerequisite for constructive and effective communication and collaboration. It is also a preventive measure of some online risks, such as cyberbullying and hate speech, which hinder the incentive of children to engage in active online interaction and teamwork. Therefore, developing the netiquette of children would facilitate their communication and collaboration in the internet, while providing for a safer and a more positive experience online.

Figure 18 shows the percentage of Bulgarian children that had been emotionally hurt by peers (both offline and online) in 2016 broken down by gender and age, as well as the frequency of these offences. **About 29% of Bulgarian children had been emotionally hurt by peers during 2016 either online or offline**, with the offences being equally spread between genders and increasing with age. It is worrisome that offensive behaviour towards kids **has increased from 20% in 2010** (Livingstone, 2011), affecting almost an additional 10% of Bulgarian children. **About 30% of the affected kids had had these negative experiences at least once a month with about 4% suffering them daily.** The percentage of monthly victims hasn't changed from 2010, and the percentage of daily victims has decreased from 8.5% (Livingstone, 2011).

Figure 18

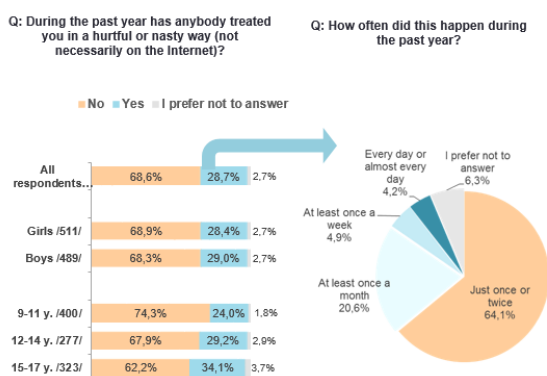


Figure 19 shows whether these negative experiences had occurred online or offline and shows the emotional impact they had had. **About 38% of the 2016 incidents had occurred online, which is a rapid jump from about 25% in 2010** (Livingstone, 2011), demonstrating the increasingly important role of the internet in modern children's emotional development. **More than half of Bulgarian kids reported that they had been upset** by these negative experiences, which highlights their seriousness.

Figure 19

Q: If somebody acted in a mean way, Q: The last time this happened, how did it happen? how upset were you?

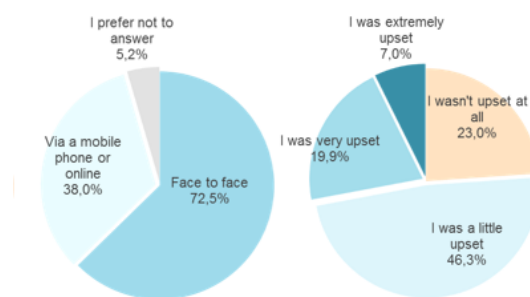
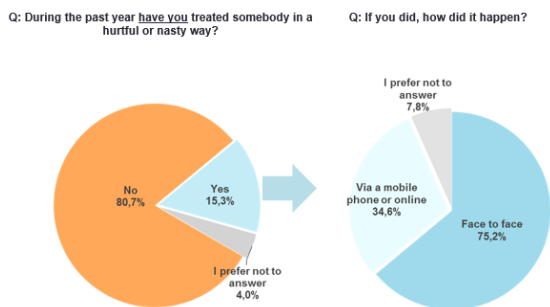


Figure 20 shows the reported instances by Bulgarian children of engagement in abuse towards others. **About 15% have admitted that they have done so**, which reveals an about two-to-one ratio between victims and perpetrators. According to Livingstone (2011) there is a high chance that victims of bullying could become perpetrators themselves, which could explain the overall increase of abuse from 2010 to 2016. More importantly, however, it suggests that the victims who currently aren't perpetrators could start abusing others themselves, making the two-to-one victim/perpetrator ratio a potential trigger of additional increase of offline and online bullying in the future. Figure 20 also shows that **almost 35% of the offences**

had occurred online, which is close to the 38% reported by victims.

Figure 20



In summary, the data of the 2016 national representative survey is demonstrating an increasing trend of abuse between Bulgarian children, and an increasing portion of that abuse taking place online. These figures aren't speaking well of kids' netiquette ability, and the fact that more than half of them are being upset by the reported abuse highlights the importance of netiquette for constructive communication and collaboration online. It could be argued that this trend is partly causing the passivity of Bulgarian children online proposed in the previous sections. The discovered two-to-one ratio between victims and perpetrators is worrisome due the potential of victims to become perpetrators themselves. All of these findings suggest that rapid actions by all stakeholders are needed for building netiquette awareness among Bulgarian children.

Manage Digital Identity



DigComp definition: "To create and manage one or multiple digital identities, to be able to protect one's own reputation, to deal with the data that

one produces through several digital tools, environments and services." (Vourikari et al., 2016)

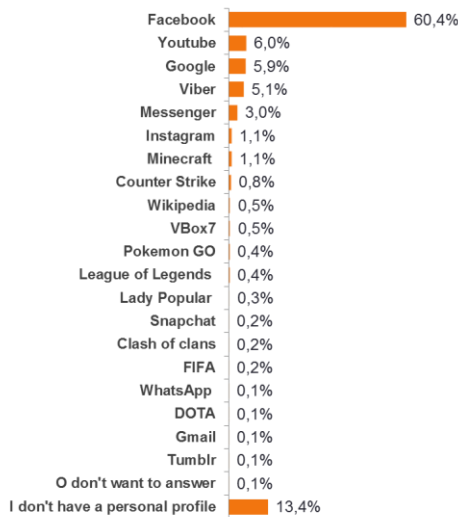
Through social networking, gaming, civic participation, e-commerce, and internet banking, the 21st century digital citizens create their own unique digital identities, whether they are aware of it or not. Due to the detailed and sensitive manner of this data, digital identities are becoming as important as physical identities, and thus the abilities to understand, develop, and protect them are crucial for Bulgarian children's successful and safer online activity.

This section will attempt to answer two questions:

- 1) ***How do Bulgarian children create and develop their digital identities?***
- 2) ***How do Bulgarian children protect their digital identities?***

In order to understand how Bulgarian children develop and create their digital identities, it would be useful to examine their ICT use, which involves the creation of personal profiles. Figure 21 shows the most commonly used websites, applications, or online games by Bulgarian children, where they have personal profiles. Only a single answer was permitted in this question. As can be seen in Figure 21, about **86% of Bulgarian children have online profiles, which is a high jump from 54% in 2010** (Livingstone, 2011). About **60% of Bulgarian children (78% of 15-17 year olds) use Facebook as their main social networking platform**. No other website, application, or online game comes close to this figure: YouTube, Google, and Viber come in second, third, and fourth place respectively with 6% or less of the Bulgarian children having personal profiles in those platforms and using them more often than Facebook.

Figure 21 Q: Which social network, application, or game, in which you have a personal profile do you use mostly?

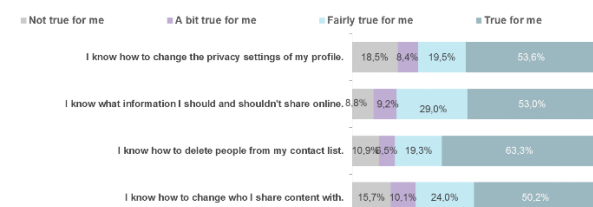


There is a significant difference between Figure 13, which examined Bulgarian children’s use of websites and applications in general and permitted multiple answers and Figure 21, which examined Bulgarian children’s use of websites and applications where they have personal profiles and permitted a single answer. As a reminder, Figure 13 showed that Bulgarian kids use a variety of internet platforms, with Facebook, YouTube, and Google being the top 3. However, Figure 21 demonstrates that **Facebook is the unmatched champion of their online activities that require a personal profile**. This means that Bulgarian children have a tendency to manage and develop a single digital identity, rather than multiple ones at the same time. While this helps focus their data protection efforts, it decreases their online flexibility and their opportunities for empowerment in digital environments.

If Bulgarian children focus on managing a single digital identity, are they capable of keeping it safe? Figure 22 shows their reported abilities of protecting the personal data they share online. **About 73% of them reported that they are confident in their ability to change the privacy settings of their profiles**. This figure has jumped from about

64% in 2010 (Livingstone, 2011). In addition to this positive trend, **82% of Bulgarian children feel confident that they are aware what information they should and shouldn’t share online**. This figure speaks well not only for their data protection abilities, but also for their overall level of understanding of how sharing personal data contributes towards the creation of their identities online. Finally, **more than 83% of them reported that they know how to delete people from their contact list, while about 74% reported they know how to choose the people with whom they share content**. Even though a degree of caution should be applied when making conclusions due to the subjective nature of these figures, they do seem to suggest that the majority Bulgarian children are aware of the implications of sharing personal data online and are capable of protecting it effectively.

Figure 22 Q: To what extent each of the following applies for you?

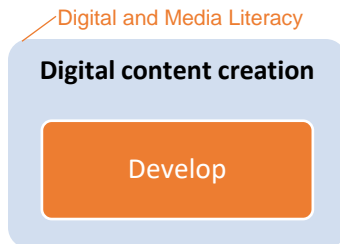


In summary, Bulgarian children’s flexibility in managing their identities across digital environments suffers due to their almost exclusive preference for Facebook as the platform for creating personal profiles. Nevertheless, they demonstrate high levels of awareness and data protection abilities with regards to sharing personal data online. Due to the subjective nature of the data supporting this conclusion, however, the “Personal Data and Privacy” section of this report will examine their activities related to sharing personal data in order to confirm its reliability.

Digital Content Creation

If the abilities to search, evaluate, and manage information effectively and the abilities to communicate and collaborate effectively in digital environments are the roots of digital and media literacy, then the ability to create digital content is its fruit. The “digital content creation” competence area includes *developing, integrating, and elaborating digital content, understanding copyright, and using programming languages*. This section will demonstrate that, apart from programming, these competence dimensions are interdependent either with the “information and data literacy” or with the “communication and collaboration” competence areas. To this end a lot of the data already presented in the report will be re-examined the context of the “digital content creation” competence area.

Develop



DigComp definition: *“To create and edit digital content in different formats, to express oneself through digital means.”* (Vourikari et

al., 2016)

What constitutes for the development of digital content in today’s internet? Does a child taking a picture with a smartphone and posting it online create new content? Or does the child have to add some artistic/intellectual value in order for the creation to count? What criteria should be used for determining the artistic/intellectual value of digital content?

Technology seems to develop faster than society’s ability to answer these questions as new gadgets and digital environments continuously change the way kids and adults

use the internet. Earlier in the report a case was made that modern online platforms have melded “interacting” and “sharing” between users, since they offer opportunities for chat, voice, and video interaction, which require minimal competencies in text, image, and video sharing for effective communication. This section of the report will make the case that ***the processes of online interaction and sharing between users in modern digital environments require user-generated digital content in order to function effectively.***

For a long time it has been suggested that only 1% of the internet users actively create digital content, but this paradigm is less and less applicable as interactive opportunities on the internet and access to technology increase. In an article in The Guardian, Arthur (2006) analysed the “1% rule”, which states that only 1% of the online population creates digital content, while 10% actively share it, and 89% consume it passively without contributing. These figures were supported by the 2006 YouTube “creator to consumer” ratio, as well as by Wikipedia edits vs. visits and by Yahoo’s forum participation (Arthur, 2006). In a 2011 article in the Online Community Blog Schneider (2011) challenged the 1% rule by analysing contemporary data about online engagement. As a result of the analysis, he came up with a new version of the rule: 10% of users create digital content, 20% actively share it, and 70% consume it (Schneider, 2011).

Both of these articles examined limited spectrums of digital content creation activities and used contemporary data, which is no longer relevant. Today digital environments often *rely* on active engagements by the users in order to function. A perfect example of this is Facebook which is based on the interaction with user-generated text, pictures, and videos. According to a GlobalWebIndex report, in 2015 **more than**

half of Facebook users were actively posting, commenting, or uploading pictures and videos (Mander, 2015). In fact, this number was reported as a negative trend, since it had dropped from 70% in 2012 (Mander, 2015). However, the drop was mostly due to the rise of other interactive social media, such as Tumblr, Snapchat, and the many mobile applications, which boomed between 2010 and 2015 (Mander, 2015). Neither the 70% nor the 50% active Facebook users figure is compatible with the 1% rule described above. Thus, it could be claimed that modern online platforms and mobile applications have redefined the meaning of user-generated digital content by making it far more accessible and by extending its function for everyday social interaction on the internet.

This report already established that Bulgarian children's sharing of text, pictures, and videos on online platforms is quite low compared to their total time spent there. This passivity of Bulgarian children on social media and video-sharing websites hinders not only their interaction with other users online, but their digital content creation potential as well. As a reminder, 66% of Bulgarian children use social networks daily or almost daily, but only 38% share pictures or text daily or almost daily. This ratio between time spent and activity on social media isn't much different between age groups, either (37% vs 20% for 9-11 year-olds; 77% vs. 46% for 12-14 year-olds; and 89% vs. 53% for 15-17 year-olds). Since Bulgarian children use predominantly Facebook as their social network of choice, and as Facebook activity requires user-generated content, the passivity of kids on social media has a negative impact on their potential to create digital content as well.

Another important statistic to recall is that while 95% of Bulgarian children had watched a video online over the past month,

only 23% had created and posted their own video online over the past month, even though 80% of them claimed they had the ability to do so. Even though nowadays uploading one's own video online is as easy as pressing a couple of buttons thanks to modern technology, Bulgarian children's lack of incentive to do so limits their opportunities to use more advanced technology for creating, editing, integrating, combining, and sharing video content in digital environments. In essence, due to the nature of modern online platforms, Bulgarian children's passivity in online interaction transfers into passivity in developing digital content and hinders their creativity.

Even though Bulgarian kids demonstrate some degree of passivity with regards to creating and sharing text, images, and videos, modern technology makes the basics of grasping these activities easy and accessible without the need for a lot of practice. However, the same cannot be said about more complex development of digital content, such as creating blogs or websites. **About 44% of Bulgarian children claimed that they are capable of creating a webpage, but only 13% had done so during the past month.** In this instance there is also a discrepancy between "can" and "do", but it is much more difficult to establish with reasonable certainty whether the "can" figure is realistic, since the process of creating a webpage requires many more (and much more complex) steps than the more basic digital content examples discussed above. What could be said for certain on the basis of this discrepancy is that Bulgarian children's passivity in creating basic digital content holds true for more challenging examples of digital content as well.

In summary, modern technologies have made the potential for creating digital content much more accessible than 10 years

ago. Nevertheless, Bulgarian children don't seem to take advantage of this opportunity as much as they could. The same conclusion can be drawn for less easily accessible digital content, even though a large percentage of Bulgarian children claimed they can engage in it successfully.

Integrate and Re-Elaborate

Digital and Media Literacy

Digital content creation

Integrate and re-elaborate

DigComp definition: "To modify, refine, improve and integrate information and content into an existing body of knowledge to create new, original and relevant content and knowledge." (Vourikari et al., 2016)

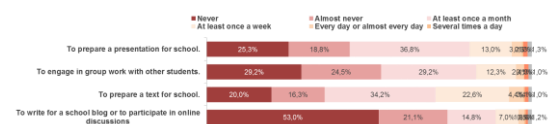
While developing digital content is interdependent with the "interaction" and "sharing" competence dimensions, **effectively integrating and re-elaborating digital content is dependent on the entire "information and data literacy" competence area.** If it is expected that children of the 21st century should be capable of high-quality refinement of information for the purpose of enriching it and creating new digital content, it should first be expected of them to be capable of high-quality searching, evaluating, and managing information.

As a reminder, earlier in the report it was established that Bulgarian children are able to identify a variety of information needs on the internet, but their search and use patterns satisfy mostly the entertainment portion of these needs, with school-related and health-related searches lagging behind, even though kids identified online school preparation as one of the most useful activities on the internet for their age. With regards to their ability to evaluate information, even though 80% of them reported self-confidence

in searching for information, only 50% showed confidence in verifying its truthfulness, while 25% reported they were completely unable to do so, which is worrisome due to the large amount of new information absorbed by them on the Internet. In the "Information and Data Literacy" section of this report it was suggested that there is a connection between the low Internet use for school preparation of Bulgarian children and their low confidence in evaluating the truthfulness of information they find online.

This section will go into more detail about the specific school assignments, given to Bulgarian children, which require integration and re-elaboration of online information into new and original content. Figure 23 shows four activities that fit this description. **Only about 20% of Bulgarian students use the Internet to prepare presentations for school on a weekly basis, and about 30% of them use the Internet to create texts for school on a weekly basis.** It has already been established that about 20% of them use the Internet for group activities with classmates weekly, and 25% write for school blogs or participate in school-related online discussions weekly.

Figure 23 Q: How often do you use the Internet to do each of the following?



This frequency of online school-related activities is far from sufficient for developing the critical and media-literacy skills necessary for effective evaluation and integration of information, having in mind that about 70% of Bulgarian kids learn new things on the internet every week. The fact that a large percentage of students have never done such school assignments (about 25% for presentations; 20% for texts; and about 30%

for group works) is even more worrisome. Furthermore, the data does not describe the criteria of these assignments and their sensitivity to plagiarism. Thus, it is possible that some of these presentations, group projects, and texts don't involve rigorous integration and re-elaboration of information.

In summary, less than one third of Bulgarian students receive regular school assignments, requiring integration and re-elaboration of online information, with about a fourth of them never having had the opportunity. This is another example of the Bulgarian educational system's slow adaptability to modern technological developments and to children's increased and wide-ranged internet usage. In this field the education system's role is even more crucial, since schools are in the best position to provide structured step-by-step instructions of searching, evaluating, and integrating information for the purpose of improving it and creating new content. Thus, increasing the frequency of school-related online assignments developing such skills should be on the priority list of the Bulgarian Ministry of Education and Science.

Copyright



2016)

DigComp definition: "To understand how copyright and licences apply to data, information and digital content." (Vourikari et al.,

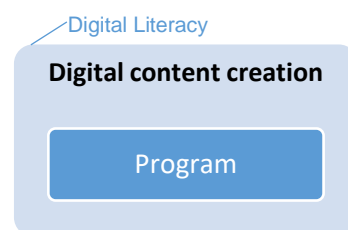
The available data does not allow for extrapolating the sensitivity to plagiarism of school-related online assignments, but it is possible to draw some conclusions about students' reference and attribution practices by examining their understanding of copyright

principles. **Only less than half of Bulgarian children responded that they are confident in their ability to recognize online information that is protected by copyrights** (Figure 24). This figure is problematic, since creating original content by integrating information requires the ability to distinguish one's own ideas and products from other people's ideas and products. If children are unable to apply copyright principles, it is difficult for them to practice reference and attribution and thus to develop a clear concept of their own work, and to understand how it is different from other people's work. Since more than half of Bulgarian children fall into this category, this problem is quite significant.

Figure 24 Q: To what extent each of the following applies for you?



Program



or perform a specific task." (Vourikari et al., 2016)

DigComp definition: "To plan and develop a sequence of understandable instructions for a computing system to solve a given problem

While programming skills have been traditionally associated with a niche profession, more and more software products and mobile applications incorporate such functionalities in a user-friendly way. It is possible that in the future, programming, similarly to creating digital content, will become a much more widely used and required skill by the 21st century digital citizen.

About **35% of Bulgarian children reported that they are confident in their**

ability to use programming languages (Figure 25). Having in mind that programming skills are still more or less a niche, this figure is quite high and promising should they become more important for navigating digital environments in the future. However, this subjective report of Bulgarian children is not enough to extrapolate their degree of competency and whether or not it is sufficient for developing a computer system that successfully solves a given problem on its own.

Figure 25 Q: To what extent each of the following applies for you?



Safety

So far in this report the DigComp Conceptual Reference Model has served for identifying the opportunities that Bulgarian children can take advantage of by developing their digital and media literacy skills. The interconnectivity between information and data literacy, communication and collaboration in digital environments, and creating digital content that has been established in the previous sections outlines a paradigm which seems to suggest that the more kids articulate and satisfy their information needs through careful information evaluation and management, and the more they interact, share, collaborate, and engage in digital citizenship activities online, the more they will realize their potential as digitally creative 21st century critical-thinking citizens. However, without mastering the abilities to **protect their devices, personal data, privacy, health, and well-being**, children would be vulnerable to the risks of using the internet, which could turn this “more = better” paradigm into a negative rather than a positive factor for their development.

Protect Devices



DigComp definition: “To protect devices and digital content, and to understand risks and threats in digital environments. To know about safety

and security measures and to have due regard to reliability and privacy.” (Vourikari et al., 2016)

Protecting one’s devices is becoming increasingly important due to the ever increasing pervasive nature of automated Big Data collection and the rise of e-commerce and Internet banking services. It is also a

prerequisite of protecting one’s personal data and digital assets. Thus, by acquiring this competency dimension, Bulgarian children would have a head start in the entire “Safety” competence area of the DigComp model.

About 26% of Bulgarian children had their devices infected by a virus during the past year (Figure 26). There is a jump in digital virus infections for **12-14 year olds (30%)** as compared to **9-11 year-olds (about 16%)**. While this could be partially explained by the increased Internet usage with age, another important factor should also be mentioned: all of the study’s questions towards parents indicate a clear trend: **parental support, intervention, and observation rapidly decreases for 12-14 year-olds as opposed to 9-11 year-olds**. While the decrease of parent’s engagement has been partially addressed in the “Communication and Collaboration” section of this report, its relevance is especially important for understanding how different age groups of Bulgarian children acquire digital safety skills.

Figure 26 Q: During the past year has any of the following happened to you, while using the internet?

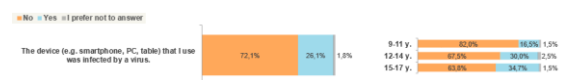


Figure 26 also demonstrates that **15-17 year olds had had the most virus infections of the three age groups (almost 35%)**. This observation indicates that Bulgarian children aren’t sufficiently developing the necessary skills for protecting their devices as they get older. More importantly, however, it supports the idea that “digital natives” shouldn’t be expected to acquire digital literacy skills on their own and it highlights the crucial role of parents for that end.

Personal Data and Privacy

Digital Literacy

Safety

Personal data and privacy

DigComp definition: *“To protect personal data and privacy in digital environments. To understand how to use and share personally identifiable information while being able to protect oneself and others from damages. To understand that digital services use a “Privacy policy” to inform how personal data is used.”* (Vourikari et al., 2016)

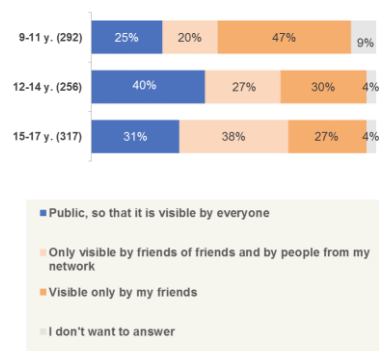
In the “Manage Digital Identity” section of this report it was established that Bulgarian children feel quite confident in their ability to protect their personal data. As a reminder, about 73% of them reported that they are confident in their ability to change the privacy settings of their profiles; 82% of them reported that they are aware what information they should and shouldn’t share online; more than 83% of them reported that they know how to delete people from their contact list; and about 74% reported they know how to change the people with whom they share content. In the conclusion of the “Manage Digital Identity” section caution was taken in interpreting these figures due to their subjective nature. This section will examine Bulgarian children’s activities of personal data sharing in order to confirm their subjective reports.

The percentage of Bulgarian children whose profiles in social networks are public hasn’t changed from 2010 (31.7% in 2010 vs. 31.5% in 2016). As a reminder, the percentage of kids who reported that they can change the privacy settings of their profiles has increased from about 64% in 2010 to about 73% in 2016. Thus, even though more children in 2016 report that they know how to change the privacy settings of their profiles than in 2010,

the percentage of children who have public profiles hasn’t decreased since 2010.

Figure 27 shows an even more important issue regarding the public profile usage of Bulgarian children in 2016. Once again it can be seen that there is a rapidly increased risk for **12-14 year-olds (40% of them have public profiles) as opposed to 9-11 year-olds (25% of them have public profiles)**. Similarly to the device-protection findings in the previous section, this discrepancy can also be partially explained by the decrease of parent’s engagement. While in this case 15-17 year-olds seem to catch up (31% of them have public profiles), this data, as well as the device-protection data, demonstrates that 12-14 old Bulgarian children are extremely vulnerable to and unprepared for online risks.

Figure 27 Q: Your profile is...



In summary, Bulgarian children’s self-reported high level of personal data protection isn’t sufficiently supported by their actual activities related to personal data protection. Even though an increased number of kids reported better understanding of privacy settings for their online profiles since 2010, the actual percentage of kids who have public profiles hasn’t changed. In addition, the data suggests that 12-14 year-olds are the most vulnerable age group to online risks due to their decreased caution online as opposed to 9-11 year olds, coupled with a rapid drop in parental engagement.

Health and Well-being



DigComp definition: *“To be able to avoid health-risks and threats to physical and psychological well-being while using digital technologies. To be*

able to protect oneself and others from possible dangers in digital environments (e.g. cyber bullying). To be aware of digital technologies for social well-being and social inclusion.” (Vourikari et al., 2016)

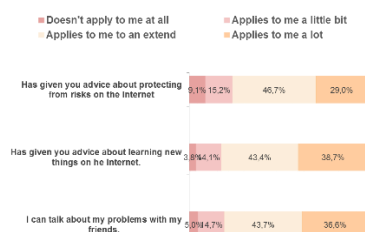
The health and well-being risks related to the ICT use of Bulgarian children are thoroughly examined in a dedicated report to the subject based on the findings of the 2016 national representative survey. In a nutshell, the report reveals that **over the past year about 20% of Bulgarian children had met strangers face-to-face after online interactions; about 14% of them reported having had a negative online experience; 10% were bothered by encountering inappropriate content on the internet; and about 10% had received messages containing sexual content.** These risks increase with age due to increased internet use, decreased parental mediation, and decreased caution applied by the kids themselves.

This report has paid special attention to online bullying due to its effect on children’s communication and collaboration in digital environments. As a reminder, in the “Netiquette” section of the report it was pointed out that both offline and online bullying among Bulgarian children have increased since 2010 and that there is a two-to-one victim perpetrator ratio, which is a prerequisite of further increase in the future due to the tendency of victims to become perpetrators themselves.

These findings confirm the hypothesis that kids need support in order to minimize the risks they face online. While the role of parents is clearly crucial for kids’ internet safety, the role of schools should also be underlined. **About 42% of Bulgarian children reported that internet safety isn’t addressed enough in ICT classes.** This figure reveals a large gap between kids’ expectations for receiving internet safety education and the actual delivery by the educational system.

While the roles of parents and schools in the development children’s internet safety skills are crucial, there is another partner they can and do rely on – their peers. **Figure 28 demonstrates that more than 75% of Bulgarian children have been advised about internet safety by their friends, while more than 80% of them have been advised about learning opportunities online. In addition, according to Figure 28 about 80% of them feel comfortable about discussing any problem they might have with their friends.** This data points towards the conclusion that peers are a fantastic channel for popularizing both internet safety guidelines and constructive internet use among Bulgarian children.

Figure 28 Q: Your friend has:

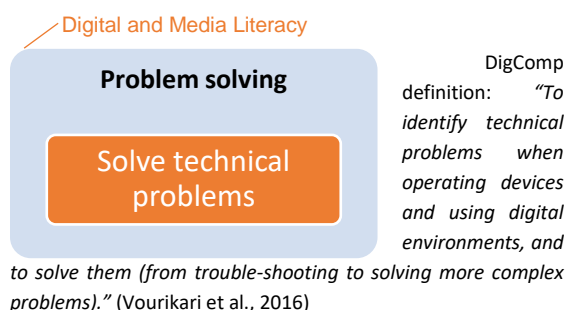


In summary, the older Bulgarian children become, the more they are susceptible to online risks. In addition, online bullying between them has increased since 2010. Thus, they should receive support by parents and schools and should be guided to popularize internet safety among themselves.

Problem Solving

After establishing the need for developing Bulgarian children’s digital safety skills and the roles of parents, schools, and peers to that end, it has become clear that taking advantage of the internet’s opportunities goes hand in hand with minimizing the online risks. The final piece of the DigComp Conceptual Reference Model’s puzzle integrates the “Data Literacy”, “Communication and Collaboration”, “Digital Content Creation”, and “Safety” competence areas into a single analysis aimed at assessing the problem solving skills necessary for mastering these competence areas. As it will become evident from the definition of the problem solving dimensions themselves, ***solving technical problems, identifying technological needs, using digital tools creatively, and identifying digital competence gaps*** all rely on and refer back to the other four competence areas. Thus, this section will mostly rely on already presented data, but it will revamp the analysis in order to focus on specific skills relevant to the context of the problem-solving competence dimensions of the DigComp model.

Solve Technical Problems



The previous sections of this report have already established three observations relevant to Bulgarian children’s technical problem solving skills when operating devices and using digital environments: 1) They help

their parents with internet-related problems much more often than vice versa (66% vs. about 30%), and this trend increases rapidly with age; 2) They are more confident in their ability to properly utilize their social network’s profile settings than they were in 2010 (64% in 2010 vs. 73% in 2016), but the amount of children’s public profiles hasn’t changed (31.7% in 2010 vs. 31.5% in 2016), and it increases as parental mediation decreases; and 3) The older they become, the more their devices get infected by computer viruses (about 16% for 9-11 year-olds; about 30% for 12-14 year-olds; and about 35% for 15-17 year-olds). These findings suggest that Bulgarian children become better at solving technical problems related to ICT use as they get older, but they still need their parents’ support to that end.

In addition to revamping these three observations, this section will analyse Bulgarian children’s technical problem solving skills, which are most relevant for their 2016 device usage habits. At the very beginning of this report it was demonstrated that Bulgarian children are rapidly changing their device usage patterns by moving towards a more mobile access to the internet. As a reminder, their device usage has jumped mostly for laptops (67% in 2016 vs. 11% in 2010), smartphones (about 80% in 2016 vs. 45% in 2010), and tablets (about 61% in 2016 vs. about 4% in 2010). In the context of these findings, it would be useful to examine Bulgarian children’s technical problem solving skills related to their increased mobile device usage.

As a reminder, it has already been pointed out that about 75% of them report they are capable of installing apps on their phones, while more than 65% say they know how to check mobile app prices. Figure 29 shows an additional set of technical problem

solving skills related to using smartphones and tablets. As evident from Figure 29, about 85% of Bulgarian children report that they are able to connect to a wireless network; about 76% of them report that they are able to lock their devices with a password; and a little more than 64% say they can turn off the localization functionality of the GPS devices. In contrast, more of them seem to struggle with blocking notifications and advertisements – about 44% report that they can do the former, and about 40% report that they can do the latter. All of these competencies increase as children get older.

Figure 29 Q: Which of the following can you do with a smartphone / tablet?



(10.1%). While their actual online activities do satisfy the entertainment portion of these needs, there is a mismatch between the reported usefulness of school-related activities by Bulgarian children and their actual engagement with those. While this discrepancy suggests a lack of ability to identify appropriate technological responses on one hand, it could also be interpreted as a lack of incentive to do so on the other. Due to numerous missed opportunities by the Bulgarian educational system to engage students with school-related activities identified throughout this report, the latter interpretation does seem to have a lot of merit.

Another finding relevant for Bulgarian children’s competency to evaluate and select the best technological responses for their needs can be seen in Figure 30. **Exactly half of the respondents say that they know how to compare similar mobile phone applications** in order to choose the one they like more. While this figure seems low due to the fact that 75% of Bulgarian children say that they can *install* mobile apps, it is important to note that their ability to compare apps improves gradually with age (28% for 9-11 year olds; 58% for 12-14 year olds; and 70% for 15-17 year olds).

Figure 30 Q: Which of the following can you do with a smartphone / tablet?



In summary, Bulgarian children seem to identify, evaluate, and select appropriate technological responses for their needs adequately, as long as they are motivated to do so. It is up to the Bulgarian Ministry of Education and Science to develop a strategy for supporting schools and individual teachers in creating incentives for students to use ICT solutions for their educational needs.

Identify Technological Responses

Digital and Media Literacy

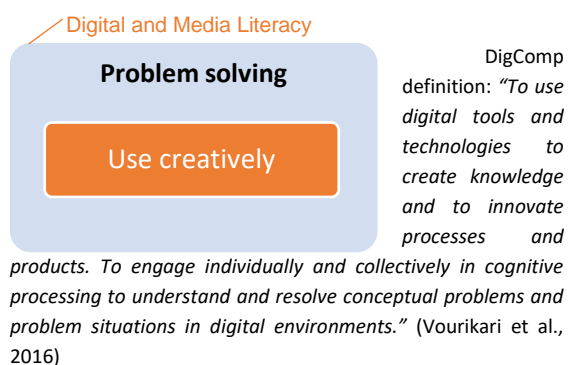
Problem solving

Identify technological responses

DigComp definition: “To assess needs and to identify, evaluate, select and use digital tools and possible technological responses to solve them. To adjust and customise digital environments to personal needs (e.g. accessibility).” (Vourikari et al., 2016)

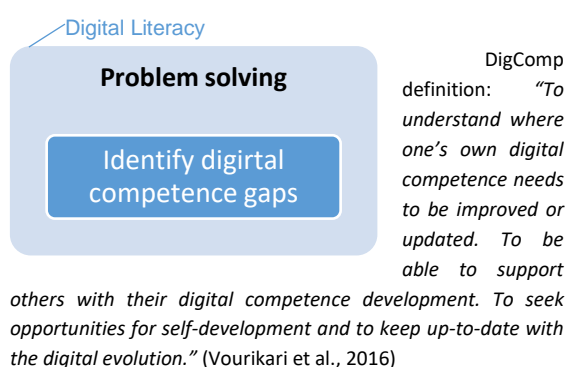
This report has already looked extensively into Bulgarian children’s ability to match their needs with appropriate technological solutions. As a reminder, it was established that Bulgarian children are capable of identifying a variety of opportunities on the internet by rating online activities according to their usefulness (games (43.8%), school preparation (22.4%), music (15.5%), movies (12.9%), information websites (11.7%), social networks (10.8%), and video-sharing websites

Use Creatively



Based on the above description, this competence dimension seems to emphasise problem solving skills based on the already discussed "Collaboration", "Development of Digital Content", and "Integration of Digital Content" competence dimensions. As a reminder, it was established that Bulgarian children's passivity in online interaction and sharing as well as the increased bullying they encounter online hinder their collaborative and creative online potential. Parents and schools were identified as crucial sources of support for addressing these issues. Thus, in order to develop individual and collaborative problem solving skills in digital environments, Bulgarian children would first have to become active communicators and collaborators in digital environments, especially with regards to developing and integrating digital content.

Identify Digital Competence Gaps



One good indication of Bulgarian children's ability to identify their own digital competencies level would be a match between their subjective reports about their level of competency and actual evidence about their level of competency. Even though the 2016 national representative survey wasn't designed for diagnosing their digital and media literacy skills, this report has already suggested some areas, in which there is a mismatch between Bulgarian children's self-reported abilities and their actual use in practice. As a reminder, even though 80% of them claimed they had the ability to create and post their own video online, only 23% had done so over the past month. Similarly, even though 44% of them claimed they had the ability to create their own webpage, only 13% had done so over the past month. Finally, even though an increased percentage of them reported the ability to change their social network's profile settings (64% in 2010 vs. 73% in 2016), the percentage of public profiles among them hasn't changed (31.7% in 2010 vs. 31.5% in 2016). While these findings aren't evidence for a mismatch between the self-reported digital competencies and the actual digital competency of Bulgarian children, they do indicate a degree of passivity, which might be interpreted either as over-confidence in their digital competence or as a lack of incentive to improve their digital competencies.

On the other hand, Bulgarian children demonstrate high abilities for supporting others with their digital competencies development. As a reminder, 66% of Bulgarian parents reported that they receive support regarding internet -related problems from their children. In addition, more than 75% of Bulgarian children have been advised about internet safety by their friends, and more than 80% of them have been advised about learning opportunities online by their friends.

Conclusions and Recommendations

This report used the DigComp Conceptual Reference Model as a guideline for examining the digital and media literacy skills of 9-17 old Bulgarians on the basis of their online behaviour and ICT use. The findings suggest that Bulgarian children use the internet at an earlier age and more frequently than ever, which has helped them develop their digital and media literacy skills. They demonstrate high abilities in articulating their information needs and satisfying most of them, using a variety of means for online interaction, managing and protecting their digital identities, supporting their friends and parents in developing their digital competency levels, and even using programming languages. Nevertheless, several competency gaps were also identified in the report. Following is an overview of the key digital and media literacy competency gaps of Bulgarian children as well as recommendations for addressing them.

Five Competency Gaps

As a result of this report's analysis, the following 5 key competencies gaps of Bulgarian children have been identified:

1. **Low incentive to satisfy school-related information needs.** Even though Bulgarian children consider school preparation as the 2nd most useful thing online for them, it is the 12th most frequent online activity they actually engage in. The weekly frequency of engagement with school-related online activity in 2016 (50% of kids) hasn't changed from 2010 (53% of kids).
2. **Insufficient ability to evaluate online information.** Bulgarian children absorb online information at an unprecedented rate: about 70% of them learn new things on the internet every week. Nevertheless, only 50% of Bulgarian kids show confidence in verifying the truthfulness of the information they find online, even though 80% of them report self-confidence in their key-word search strategies. In addition, only less than half of them responded that they are confident in their ability to recognize online information that is protected by copyrights, making it difficult for them to differentiate between using other people's ideas and creating original content.
3. **Passivity in online interaction, which translates into passivity in online sharing and digital content creation.** Modern online interaction is enhanced by, and in many cases even requires, either sharing or producing text, images, or videos. A large portion of the time Bulgarian children spend in interactive digital environments is passive: 66% of them use social networks daily or almost daily, but only 38% share pictures or text daily or almost daily; 95% of them had watched a video online over the past month, but only 23% had created and posted their own video online over the past month, even though 80% claimed they had the ability to do so; 44% of them claimed they had the ability to create their own webpage, but only 13% had done so over the past month. This passivity hinders Bulgarian kids' online communication and digital creativity.

4. **Missed opportunities for online collaboration and civic participation.**

Using online communities for tackling issues impossible for the individual is one of the internet's greatest strengths. Bulgarian children, however, have underutilized this opportunity: only 44% of them participated in a group with similar interests over the past month online. In addition, among the 26 things that Bulgarian children do online, participating in online campaigns, political/social discussions, and charities are the three areas they are the least engaged in.

5. **Underdeveloped digital safety skills of older children.**

The older children become, the more likely it is for their devices to be infected by a virus (16% of 9-11 year olds; 30% for 12-14 year olds; 35% of 15-17 year-olds). In addition, even though, relative to 2010, an increased percentage of Bulgarian children reported the ability to change their social network's profile settings (64% in 2010 vs. 73% in 2016), the percentage of public profiles among them hasn't changed (31.7% in 2010 vs. 31.5% in 2016). The percentage of public profiles for 12-14 year olds was the highest (40%) of all age groups. This increase of online risks for older children correlates with more internet usage, but it also correlates with decreased parental mediation and insufficient internet safety education in schools.

These five competency gaps are evidence that being born in the digital era and spending more time online are not enough for effectively developing digital and media literacy skills. The following section proposes

concrete actions that can be taken by the relevant stakeholders in order to directly address the five competency gaps.

Actions for Policy Makers and Industries

Governmental institutions and industries have the potential to take large scale action for addressing the digital and media literacy competency gaps of Bulgarian children. Here are two specific recommendations for them:

- **Collaborate in the production of positive online content.** Livingstone (2011) suggested large-scale collaborative efforts between policy makers and industries for the creation of positive online content. The importance of such efforts is still relevant today, especially for Bulgarian children, who demonstrate rather passive attitudes in constructive online interaction, collaboration, and civic participation. Due to Bulgaria's strategic direction towards becoming an innovative economy, these efforts would be particularly effective if they target small and medium-sized ICT businesses by incentivizing them to enter the industry with online solutions for children. Incentive should be especially directed towards interactive content that promotes digital collaboration and content creation among children.
- **Create nation-wide peer-to-peer education programs.** More than 75% of Bulgarian children have been advised about internet safety by their friends, and more than 80% of them have been advised about learning opportunities online by their friends.

These findings are a fantastic insight about the potential of peer-to-peer education programs. The Bulgarian Safer Internet Centre, together with Telenor Bulgaria, and the Ministry of Internal Affairs started the “Cyberscout” education program in 2015, which utilises a peer-to-peer methodology for training and raising awareness about online safety and digital and media literacy of children 11-12 years old. Through collaboration across industries, national institutions, and NGOs such programs have an enormous potential for closing the digital and media literacy competency gaps of Bulgarian children. Thus, initiating and supporting such programs is highly recommended.

Education and Schools

Among all relevant stakeholders, schools are in the best position for providing structured and comprehensive instructions about internet safety, critical thinking, social competency, and creative problem solving, all of which are incorporated in the DigComp model. Here are some concrete recommendations for the Ministry of Education and Science and for individual schools:

- **Increase the frequency of digital safety trainings.** With the increasing trend of abuse between Bulgarian children, and an increasing percentage of that abuse taking place online, as well as with the increasing vulnerability to online risks as kids get older, introducing basic guidelines for online safety in schools is more important than ever. About 42% of Bulgarian children reported that internet safety is not addressed

enough in their ICT classes. Increasing the frequency and comprehensiveness of safety trainings in schools would counter these issues and help students avoid online risks.

- **Incorporate digital and media literacy elements throughout the curriculum.** The abilities of critically evaluating information, collaborating in digital environments, and integrating existing content into original bodies of knowledge have as much (if not more) in common with subjects like History, Literature, Philosophy, Chemistry, and Biology, as they do with ICT classes. The fact that only about a third of Bulgarian students use the internet for preparing presentations and texts and for participating in group-work assignments weekly or more often hinders their potential for mastering these abilities. Updating the national curriculum with media literacy elements would help increase the frequency of these school activities and as a result improve students’ abilities to critically evaluate information and to constructively interact and collaborate online.
- **Identify “digital star teachers” and scale their expertise on a national level.** Updating the curriculum wouldn’t be enough for filling Bulgarian children’s digital and media literacy gaps without a critical mass of trained and motivated teachers, willing to implement it in the classroom. The fact that only 55% of Bulgarian students have ever communicated with teachers online for school-related tasks demonstrates either a lack of competency or a lack of incentive on behalf of the teacher base

to incorporate ICT elements in their practice. Nevertheless, a niche of “digital star teachers” does seem to exist in Bulgaria, since 15% of students report collaborating with their teachers online weekly or more often. The Bulgarian Ministry of Education and Science can use this insight to identify these teachers, study their successes, and implement their findings into training programs on a national level.

Advice for Parents

A specific report dedicated to the role of parents in Bulgarian children’s digital lives on the basis of the 2016 national representative survey offers a thorough set of recommendations to parents. Nevertheless, on the basis of this report, the following recommendations are suggested:

- **Seek advice from experts.** Due to the popularity of the “digital natives competence” hypothesis, parents don’t feel as digitally competent as their children, and thus are reluctant to mediate their online experiences, especially as their kids get older. As this report has demonstrated, however, Bulgarian children’s vulnerability to risks increases as they get older. If parents don’t feel competent enough, they could turn to experts, such as the Bulgarian Safer Internet Centre for support. In addition, they can take advantage of modern online platforms’ increasingly responsive tools for mediating children’s online experiences, such as Facebook’s Parent Portal, which is translated in 55 languages, including Bulgarian.

- **Promote self-management skills.** An alternative to direct control and mediation by parents is promoting self-management skills in their children by incentivizing them to learn more about online risks and benefits on their own.
- **Engage in online activities with their children.** The fact that children actively help their parents with internet problems increasingly as they get older demonstrates that they are willing to spend time with a parent in front of the computer, even as they become teenagers. Parents can take advantage of this and engage in online activities with their children. In this way they can establish open conversations with their kids about their online experiences, while directly engaging them with online collaboration.

This report has identified a key distinction, relevant for the information age: being “digitally native” is not the same as being “digitally literate”. Today’s Bulgarian children, who use the internet at an earlier age and more frequently than ever, need pressing support and guidance for developing their critical evaluation skills, constructive online interactive and collaborative competencies, and creative potential, which are necessary for the successful 21st century digital citizenship. With the combined efforts of policy makers, industry, schools, teachers, civil society and parents these goals can and should be met.

Appendix Methodology

1:

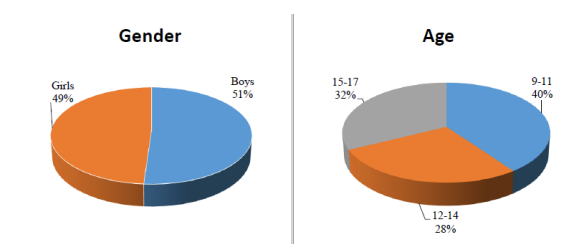
In September 2016, the Applied Research and Communication Fund, coordinator of the Bulgarian Safer Internet Centre in cooperation with the MarketLinks agency conducted a national representative survey titled “Online Conduct of Children in Bulgaria.” The survey, which is a part of the larger European-wide research “EU Kids Online 2016-2017,” examined how children and young people engage with the internet and digital technologies in their everyday lives.

In the 2016 national representative survey a total of 1000 Bulgarian children and 1000 parents were interviewed across Bulgaria. The researchers visited families in their homes and conducted two comprehensive face-to-face interviews – with one child and one parent.

The design of the sample is multistage cluster random sample stratified by region and place of residence (capital, city, medium-sized city and small town), combined with quota of ethnicity. It includes both issues associated with the use of the internet by the interviewee and by the child.

The study divided the children into three age categories based on the assumption of differences in habitual use and skills: children aged 9-11, the children aged 12-14 years and children aged 15-17. The demographic data of the children is presented in Figure 1.

Figure 31 Demographic data of children (number of interviewed children = 1,000)



Since adults were interviewed in their capacity of parents they are also divided into categories according to the age of their

children. The method applied was personal interviews using questionnaires developed initially by the *EU Kids Online* research network and updated by the *Global Kids Online* network among 1000 children and 1000 parents. The parents were interviewed about their own internet use and about the online behaviour and habitual use of internet by their children too. Among 1.000 parents interviewed 79.4% were women (72% were mothers) and 20.6% were men (18.2% fathers).

The base of the survey includes parents of children aged 9-11 (400), parents of children aged 12-14 (277) and parents of children aged 15-17 (323). Additionally 130 families with children under 9 years were also interviewed in order to get some insights about what parents of children under 9 years of age allow them to do online.

The child surveys took about 45-60 minutes to complete, and the parent surveys took about 15-20 minutes to complete. The surveys queried about both parent and child internet activities and ICT use, as well as about the online risks faced by the children and the mediation / control practiced by the parents.

The survey covered several important themes: children’s access to internet and their online practice; their online skills and abilities; their digital environment; parental support and mediation; and issues dealing with risks and safety. Different demographic data and information on family and social surroundings were also gathered. The Bulgarian Safer Internet Centre used the results from the survey to produce three reports. The first report focuses on the online risks the children and young people are exposed to in the digital world. The second paper cover the topics of parental mediation. The third report focuses on children’s digital and media literacy skills.

Where appropriate and where comparable data were available, these reports juxtaposes the results from the 2016 survey with the research, conducted by the EU Kids Online during spring and summer 2010 in 25 European countries, including Bulgaria.

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