Parents' knowledge and skills about the risks of the digital world

Łukasz Tomczyk [ID] **and Katarzyna Potyrała** [ID]
Institute of Educational Studies, Faculty of Pedagogy and Psychology, Pedagogical University of Cracow, Kraków, Poland
lukasz.tomczyk@up.krakow.pl

In this article we present the level of knowledge and literacy held by the parents of primary school students regarding internet safety (online safety, digital safety) in the context of digital literacy (DL) in terms of both technical skills and knowledge. The study reported on here was conducted in Poland, and was commissioned by the Ministry of National Education. The research involved measuring the knowledge and skills regarding the prevention of electronic threats (e-threats) which are defined as problematic situations and behaviour mediated by digital media and the internet. E-threats are related to mental and physical health, social aspects and technical matters related to the use of information and communication technologies (ICTs). In order to narrow down the research area, 6 components related to e-threats were selected, namely: the ergonomics of using digital media; the evaluation of the reliability of online information; the influence of advertising on consumers' choices; risky online relationships; understanding the mechanisms of secure logging-in; and protection against malware. The DL level was measured using a competence test. An analysis of 514 tests revealed that the most neglected areas were the protection of children against unwanted communication with other users, and secure logging-in. The strongest component was the ergonomics of using ICT. We also noted that more than one fifth of parents showed a satisfactory level of DL related to online safety. Another observation was that DL is a complex and heterogeneous concept. The DL components are related with one another to different extents. Some DL elements are determined by the level of education, place of living, subjective sense of own well-being or intuitive perception (self-evaluation).

Keywords: digital literacy; digital safety; first stage of education; parents; school

Introduction
The increasing prevalence of technology in our daily reality has stirred a public debate on the role of ICT in children's lives. The debate focuses on the concerns related to the ways in which technology transforms childhood. There are many voices saying that the cognitive, emotional and social development of children are threatened. The discussion usually focuses on the dominance of screen-based media in children's lives and the problems resulting thereof, such as social isolation or obesity.

Digital safety has become a global challenge. With the popularisation of the new digital technologies (smartphones, tablets, notebooks) and the development of fast internet, the positive aspects of this progress (such as quick access to information, advanced forms of communication and entertainment) co-exist with the threats posed by the digital world. Considering both, the opportunities and the challenges connected with the penetration of human life by the internet, people involved in education more often notice dangerous situations mediated by the internet. Intentional education also includes recognising and responding to the negative processes resulting from the use of the new media. In order to implement such intentional educational activities, one needs at least basic knowledge about the typical and emerging threats related with the development of the information society. Therefore, successful education in the digital world requires recognising the level of knowledge and skills of parents in the area of e-threats. In this article we attempt to diagnose DL in parents, narrowed down to the issue of digital safety. The results presented are the starting point to designing complex educational activities, both in the home and school environment, which help to prevent dangerous situations.

Literature Review
The problem of DL among parents is particularly important in order to keep their children safe in the digital world. It is the family environment that is primarily responsible for modelling safe ICT use by persons subject to intense socialisation and media education. For many years researchers studying media pedagogy has been noticing the dual nature of new media in the process of education and socialisation – they present huge potential advantages but also threats (Plowman, McPake & Stephen, 2010). In 2015, Plowman described the role of parents in shaping their children's experiences with new technologies. The primary role of parents is creating new educational solutions ensuring fluent and safe use of ICT by their children. This process is realised through intentional activities and media socialisation, which take place through modelling behaviour (e.g. observing the activities undertaken online by parents). The family environment is crucial for the development of the soft aspects of using digital media (for example, hygiene of using digital media). Studies into children's competencies related to new technologies were mainly based on an observation of their parents' internet accounts. A detailed analysis showed that the presence of digital natives (individuals who do not know the world without ICT, born during the development of the information society) (Prensky, 2001) in the family motivates parents to use the internet more often: 70% of parents are internet users, while only 53% of non-parents do so (Allen & Rainie, 2002). An exploration of the mindset, aspirations and expectations of these parents was based on their memories of the use of technology in their own childhood. Experiences and

memories of parents about their technological socialisation also influence how they model DL and media-related values in their children (Plowman, 2015). An analysis of the relationship between ICT, education and media socialisation was also motivated by attempts to involve children in participatory activities (Druin, 2002; Zbigniew, 2018) and assigning them roles as active explorers in their own learning environments (Cheminais, 2012). The results of a study conducted by Scaglioni, Arrizza, Vecchi and Tedeschi (2011) showed some significant correlations between parents and children in relation to the positive and negative behaviour mediated by digital media reported in the survey. The role of parents in education, also known as minimising undesirable behaviour, becomes the key element in cyberspace (Jayakumar & Janaki, 2017).

The outcomes of recent research imply a relatively high level of self-awareness regarding DL among parents (Tomczyk, 2018). However, we need to point out that awareness considered as the declarative layer does not always coexist with the proper, desired DL level. At the declarative level, parents confirm that digital safety, DL and awareness of new e-threats are crucial in the education process but they do not always make efforts to acquire new knowledge and skills in this area. Marsh, Hannon, Lewis and Ritchie (2017) suggest that in light of the socio-cultural development of the age of new media, a shift from "family literacy" to "family DL" is necessary. The concept of a catalogue of media and information competencies (Lipszyc, 2012) created to build a comprehensive and cohesive set of teaching resources for media and information training at different stages of education and within the framework of lifelong learning, is based on the media access model of Van Dijk and Van Deursen (2014) and the "information-knowledge-wisdom" model introduced by Postman (2011).

One of the four levels of media access identified by Van Dijk and Van Deursen (2014) concerns skills, because using computers and the internet requires a certain literacy related to the use of software, searching for information on the internet, the evaluation of the credibility and relevance of this information, and the ability to process this information and use it for one's own purposes. In this approach, motivation is the key element, as it is the basis for the development of skills in all other areas. Postman (2011) postulates a clear division of information, knowledge, and wisdom, arguing that information is only a statement that a certain event has taken place in the world, knowledge is a set of many such statements, and wisdom is the ability to see relationships between the two and choose what is important and valuable. This is directly connected with the

concept of media and information literacy (Lipszyc, 2012:8).

Stunża (2017:87) emphasises that recognising the needs of young people and any reflections on their DL should be combined with observations of children and young people, and investigations into the technology or pop-cultural reference points they use, which would allow for at least initial contact with and understanding of the communication codes they use.

There is a need for a new vision of ICT and learning – one which would include changes and trends that transform the way people work, learn, train, comprehend the world, and entertain themselves in a digital reality. For years it has been argued that we need a new, holistic vision of learning in what has become a knowledge-based, internet-saturated society (Barr, Harrison & Conery 2011; Greenhow, Robelia & Hughes 2009; Punie, 2007). Learning happens at different levels, in different forms and directions, and involves a holistic view of the phenomena that occur within the information society. Research in recent years has shown that the way people interact with new media is currently changing in areas such as cultural participation, relationships with other people, peer relationships and consumer activities (Giordan, 2018; Stunża, 2018). These changes resonate positively as new challenges for media pedagogy (Giordan, 2018) and negatively as, among others, parents and teachers not being prepared to actively support children in educational and social activities using ICT (Ford, 2017). For several years, the emphasis has been on the competencies of the future in the personal and institutional dimension (Veteška, 2016).

Facer (2011), for example, provided a convincing argument in favour of a different approach to the future, one for which we need to prepare our children. Facer claims that our vision of the future is too narrow and, therefore, we should adopt a new set of solutions, including those facilitating the development of new relationships between people and technology, and new relationships between generations. Facer refers to the studies into the education of young people by means of new technologies outside the school environment (2011:18), which show that adolescents learn to navigate the online world by trial and error and, instead of following an expert-led "training curriculum", they receive support from their peers, siblings, and older family members. But most often, the younger generation increases their knowledge and skills through self-learning and peer education. Paradoxically we can observe a similar correlation in the parent group as well. The constant acquisition of new knowledge or the updating of old skills is typical in the information society (Kajee, 2018; Maden, 2018).

The collected information was the starting point for a review of research on parents' digital competences in the context of their children's digital security. Davis (2012) carried out research which showed relationships between information seeking, parents' fears concerning risks experienced by their kids and opportunities of using some digital safety resources. In Davis' research, children had access to a mean of five connected devices at home; a higher number of devices was correlated with increased risks experienced by children, but was not associated with increased concern or information seeking from parents. Parents' main fear connected with their kids' internet usage concerned accidental exposure to pornography but 65% of parents sought information on the subject of security less than twice per year.

The data collected by Marsh (2016) indicate that children demonstrated more skills and competence across operational and cultural dimensions, whereas the critical dimension was less frequently observed in the data. This analysis indicates that there are some areas of young children's DL skills that are more developed than others. Based on the data collected among parents, it can be noted that the skills of children and young people in handling basic information society services are at a satisfactory level. At the same time, parents perceive the need for continuous reinforcement of knowledge and skills to increase digital resilience. Bakó and Tőkés (2018) aimed at exploring digital practices of 4 to 8 year old Romanian children with a focus on parental mediation, which resulted in the conclusion that parents did not realise that they were role modelling factors in transmitting digital practices to their children. The children's DL was overestimated, whereas parents' mediating role as primary technology educators was grossly underestimated. Parents lack digital skills and awareness and as a result they have a passive attitude towards shaping children's digital experiences, and seem to ignore the fact that they are role models for their kids (Bakó & Tőkés, 2018).

The important aspect of DL for parents in the use of social networks was underlined by Moreno López, González Robles, Torres Gómez and Araya Hernández (2017). According to them the way to interact in social networks is changing the way of communication and integration of children and parents. There is a big fear of the reach of social networks in the daily lives of adolescents, who use these with little control and surveillance, since parents are unaware of the use, functionality and imminent risks to which their children are exposed in the network (Moreno López et al., 2017). Control and surveillance measures can be implemented implicitly or explicitly, but this will depend on the parents' knowledge of social networks. Parents increasingly recognise the importance of improving their own knowledge in the area of ICT use. Improving the digital competence of parents allows to increase the digital security of the whole family environment. Parental knowledge is proving particularly useful in preventing cyber threats among their own children (Moreno López et al., 2017). To date, no in-depth research has been conducted into the level of knowledge and skills that parents should have in order to be able to protect their children from e-threats.

Theoretical Framework

The term "digital literacy" has gained popularity for some years now, both in the scientific literature and in international reports. Researchers agree that there are different types of ICT, or, more generally, media-related "literacy." All are in line with the concept of digital skills (Martin, 2006; Midoro, 2007; Tornero, 2004). Gilster (1997) was the first to use the notion "ability to use digital technology", focusing more on the ability to think critically rather than on information technology (IT) operational skills (Calvani, Cartelli, Fini & Ranieri, 2008). Eshet (2004) suggests that there are five types of literacy covered by the term "digital literacy." They seem particularly important in the context of e-threats. These types are: photo-visual literacy (cognitive ability that uses visualisation), reproduction literacy (the art of creative copying), branching literacy (using hypertext to create a non-linear information medium and the smooth navigation through the information displayed), information literacy (the ability to use information connected with critical thinking and the ability to research, locate and evaluate information), and socio-emotional literacy (literacy related to the emotional and social aspects of interaction, collaboration and performance of routine tasks like online banking or shopping). It takes critical thinking and analysis to avoid online "traps" like fraud and viruses. While developing the research process (in particular, the research problems and tool), information literacy (soft DL aspects) and socio-emotional literacy components were considered, as they are an integral part of DL – just like technical ability to use digital media. We are aware that DL related to safety involves not only fluent operation of websites, hardware and applications (including malware protection) but also social aspects related to ergonomics, information noise, manipulation in media and conflict of interest of stakeholders in cyberspace. Therefore, we think that the presentation of soft aspects is of particular importance for the holistic understanding of DL.

Meyers, Erickson and Small (2013) say that DL involves the issues of cognitive authority;

security and privacy; and the creative, ethical and responsible use of online media. DL is a complex hybrid of knowledge, skills and attitudes related to new media which changes with the development of digital services (Tomczyk, 2018).

Despite the great number of theoretical analyses, there are no clearly-defined instruments that enable schools to assess their students' DL, whether we consider the youngest students or the most experienced teachers, or which provide the necessary guidelines for the potential development of DL.

DL is often considered to be made up of the competencies learned at school, but it is often introduced and developed in non-formal learning contexts and, of course, at home. Teaching certain skills, especially when rooted in certain behaviour rather than concept structures, may fail to keep up with the fast pace of change in the area of digital technology (Meyers et al., 2013:359).

Little literature exists that looks at the experiences of children in pre-school and the early years of school with online technologies at home, and there are not many discussions on how children use these technologies for their own purposes. However, it has been proven that the communicative and creative skills amassed during the first years of life are a valuable foundation for more formal development as these children begin their school education – especially in the context of learning to read and write (McPake, Plowman & Stephen, 2013). These competencies are developed and supported by digital technology and the growing number of tools, from computers and mobiles to electronic toys and games available at home (McPake et al., 2013). In this context, the family plays a crucial role in developing DL, and parents should ensure their children's safety both online (through proper DL) and offline (by possessing certain social and educational competencies). Basińska (2012) writes that adults create a space where children can be active; they may reinforce, accelerate and facilitate children's activities and they can also influence these activities directly by forbidding some and encouraging others. Thus, parents can have a great influence on their children, especially at a young age. But the virtual worlds of children and adults are different. Adults' attitudes towards the public space and forms of social participation change depending on the needs of children and young people in this regard, and their DL level is too low to deal with all the educational and social challenges posed by the new media (Ford, 2017).

A study conducted by Wojtasik in 2009 indicated that parents who compared their own internet skills with those of their children, admitted that their literacy was *much* lower or *rather* lower (24% and 27% respectively), whereas only half as many evaluated their competencies as *much* higher or *rather* higher (18% and 12% respectively). However, the data on DL self-evaluation from 10 years back are not longitudinal, that is why it is hard to indicate clearly how the level of DL has been changing in the populations of parents, teachers, children and youths. Self-evaluation is not a reliable technique of the measurement of DL levels.

Recent research has highlighted the low level of DL among parents, with the weakest areas relating to copyright and issues related to online interactions (Tomczyk, 2018). At the same time, parents who are responsible for ensuring digital security are beginning to recognise the necessity of improving their knowledge in an informal or a non-formal way. Their participation in projects that address children's online safety increases their awareness of different activities and behaviour related to the safe use of the internet, especially in terms of privacy settings in social media and the use of secure passwords. The parents were least aware of the issues related to network security and securing computers against hackers (Baran & Maranowski, 2018). Local initiatives connected with building the information society hope for their beneficiaries to increase their use of computers and share the knowledge they acquire, for example with family members (Kupidura, 2013). According to a study by Cholewa (2016), parents of children aged 13 to 16 think that the greatest dangers their children are exposed to are interactions with strangers met online (88%), exposure to harmful content (68%), publishing or sharing confidential information or personal data (58%), and verbal abuse (42%). Similar results were obtained 7 years earlier: parents asked about the e-threats that affected their children most often listed exposure to pornography and violence (67%), sharing private information (60%), new online friendships (51%), meeting people met on the internet (22%), sharing personal photographs or videos (19%), and internet addiction (16%) (Knol-Michałowska, 2012).

Tadeusiewicz (2014) says that the migration towards mobile devices hinders the supervision of parents and teachers over young people's use of the internet. It is, however, believed that parents need to set certain guidelines for using the internet and mobile technologies and maintain open communication with their children about these issues (Kowalski & Limber, 2007).

Tadeusiewicz also appreciates the range of useful applications that can be made through new technologies. In general, he evaluates this process as positive. This is an important voice in the ongoing debate on the advantages and disadvantages of the growing participation of young people in cyberspace. This participation generates new educational and organisational challenges that must be faced.

During recent years, there have been many discussions about the concept of "digital natives" and their different knowledge and use of digital technologies in the context of informal and formal education (Potyrała, 2017). We must mention that the idea of "digital natives" was suggested by Prensky in 2001 and refers to the generation born after 1980. Today they are the parents of the next generation of digital natives. Researchers argue that age is not relevant when describing today's youth, but that other factors like the availability of technology and the extent of its use, previous experience, sense of self-effectiveness, and educational background (Ng, 2012) are more relevant. A study by Ng (2012) showed that digital natives are not necessarily familiar with educational technologies and must be educated in this area as they can easily use new technology to learn and raise their awareness of e-threats. However, the amount of research in this area is still insufficient and studies are required on the use of research strategies that would show the actual knowledge of parents, children and teachers about the positive and negative consequences of the development of the information society.

Method
Research Objective
The main objective was to determine the DL level in the area of digital safety among the parents of primary school students in Poland (the first stage of education). The research objective was formulated as follows: What level of knowledge and skills do parents need to be able to prevent e-threats? The detailed research problems, which set the course of investigations and the results, are presented below:

- What results did parents achieve in the certain DL areas?
- What is the distribution of the results within the group of parents?
- In which areas do independent variables (gender, education, income, place of living) determine the DL level?
- To what extent does the style of media education determine the DL level in the area of safety?
- Are parents capable to evaluate accurately the level of their own DL?
- What is the relationship between the DL components?
- How do the DL results obtained differentiate the population of parents?

It was possible to determine DL through the use of the quantitative technique of a competence test. The research was commissioned by the Polish Ministry of National Education and was executed by the Cities on the Internet Association (Stowarzyszenie Miasta w Internecie). This method may be considered innovative because it was the first time that quantitative methods of collecting data related to digital safety was used, other than in diagnostic surveys based on self-declarations.

Research Tool
The research tool consisted of two parts (see Appendix A). The first part provided the socio-demographic characteristics of the parent-respondents and a self-evaluation of their DL. It also referred to the teaching styles related to online media. The second part comprised the test of knowledge and competence regarding individual digital safety as well as digital safety in the family environment. The competence test was constructed based on the test questions – in each of the six areas one could achieve up to 100% correct answers. Based on the arithmetic mean of the 18 questions, a global variable was constructed, this being the average level of DL in the area of digital safety.

The test covered six areas, each of which was determined by experts from the project CyfrowoBezpieczni (Digitally Safe). Each category had at least three indicators representing knowledge in the selected area. The test components (variables) and their indicators are described below. The competence test referred to the following areas:

a) the ergonomics of using digital devices (indicators: knowledge about the maximum safe amount of time spent in front of a screen, awareness of the negative consequences of using online tools for too long, awareness of the consequences of keeping a computer in a child's bedroom);
b) the reliability of online information (indicators: ability to evaluate different content available online, awareness of the mechanisms for verifying information on Wikipedia, ability to assess the credibility of online services);
c) online advertising (indicators: awareness of the consequences of clicking on online ads, knowing which portals are ad-free, awareness of the relationship between the use of new media and children's eating habits);
d) interactions with other internet users (indicators: awareness of the portals and tools facilitating online interactions with strangers, understanding of the mechanisms of online communication, ability to create an appropriate educational message related to the protection of children in their interactions with strangers);
e) passwords, logins and secure logging-in (indicators: ability to choose optimal passwords for important services, awareness of the rules for online safety regarding logging-in to e-services);
f) protection against viruses (indicators: ability to apply the right protective measures against viruses, basic knowledge of how computer viruses work, realistic evaluation of the potential harm to the computer that will result from downloading viruses).

Test procedure
The research tool was constructed in accordance with the guidelines regarding digital safety set by the Bezpieczna+ (Safety+) program created by the Polish Ministry of National Education. The study was conducted as part of the research and training

project Cyfrowo Bezpieczni (Digitally Safe) coordinated by the Cities on the Internet Association from Tarnów. The methodological correctness of the tool was verified by external experts, and an initial validation was performed by means of a pilot study. The ethical aspects of the research were evaluated by an independent expert, a media pedagogy specialist from a leading Polish university (University of Lodz). Sampling was random, conducted by the external agency NAVIGO from Wrocław. The survey was carried out by external interviewers experienced in conducting research in the social sciences. The results presented herein are only an excerpt from the comprehensive report presenting the most important influencers of digital safety in the home environment (Tomczyk, Srokowski & Wąsiński, 2016).

Sample

The research was conducted in the second half of 2016 in Poland (all regions). The sample consisted of 514 parents of primary school students (the first stage of education). There were 431 women (83.9%) and 83 men (16.1%). Almost half of the respondents lived in a village (49.8%), while the others lived in a town with a population of up to 50,000 (17.1%), a city with more than 200,000 residents (16.3%), a city with a population of 50 to 100,000 (10.7%) or a city with a population of 100 to 200,000 (6%). More than half of the parents were university graduates (55.4%), whereas 24.7% graduated from high schools, 8.2% from vocational schools, 7.2% had reached the post-secondary stage and 4.5% had only completed primary school. Sixty seven point one per cent of the respondents declared that their family lived at an average level in terms of standard of living, 22.6% indicated that their living standard was high, and 10.3% declared that they lived modestly.

Results

Table 1 presents the distribution of answers related to the six DL components in the area of digital safety. The parents scored the lowest in an area which is very important for the youngest internet users, namely online interactions. Literacy in securing confidential data by using secure logins, passwords or safe logging-in procedures was also at a low level. The biggest dispersion of results was visible in the category of protection against viruses ($SD > 29$). The table shows the descriptive statistics of the relevant variables and the mean value of all the results, which will be the reference point for further analyses. Table 1 presents the descriptive statistics for certain DL components.

Table 1 Descriptive statistics of DL

	M	*Mdn*	Lower quartile	Upper quartile	*SD*	Skewness	Kurtosis
Ergonomics	75.11	77.77	66.66	88.88	15.00	-1.31	3.35
Credibility of information	66.38	70.00	50.00	80.00	21.67	-0.18	-0.57
Advertisements	59.90	66.66	44.44	77.77	21.27	-0.32	-0.46
Interactions with others	50.38	44.44	33.33	66.66	17.83	0.40	-0.23
Passwords and logins	53.44	57.14	42.85	57.14	16.13	-0.47	0.83
Protection against viruses	70.31	71.42	57.14	100.00	29.84	-1.18	1.54
Average (AVG) result	62.59	64.41	56.93	70.13	12.00	-1.11	2.01

The parents of pupils from grades 1 to 3 scored between 60 and 70 percentage points (42.8% respondents). This result indicates that they had the knowledge and skills that enabled them to ensure basic protection. Only 12.84% of the respondents gave the correct answer less than half of the time in the competence test. Here we need to emphasise that ergonomics and technical securing of hardware (passwords, logins, anti-malware) are the issues which can be formulated relatively quickly due to their limited content. In turn, the social aspects of ICT interactions involve a wide range of problems (like influence of advertisements and consumer choices of children, evaluating the credibility of information in times of increased information noise and smog) which require extended knowledge and the willingness to self-learn. In that moment knowledge ceases to be just a simple element of competencies but it also determines the education styles of parents. The cumulated values are compared in Table 2.

Table 2 Distribution of mean values of competence test results

	Number	Cumulative number	% of valid	Cumulative % of valid	% of general cases	Cumulative % of general
0.000<x<=10.00	0	0	0.00	0.00	0.00	0.00
10.00<x<=20.00	6	6	1.16	1.16	1.16	1.16
20.00<x<=30.00	5	11	0.97	2.14	0.97	2.14
30.00<x<=40.00	14	25	2.72	4.86	2.72	4.86
40.00<x<=50.00	41	66	7.97	12.84	7.97	12.84
50.00<x<=60.00	96	162	18.67	31.51	18.67	31.51
60.00<x<=70.00	220	382	42.80	74.31	42.80	74.31
70.00<x<=80.00	116	498	22.56	96.88	22.56	96.88
80.00<x<=90.00	16	514	3.11	100.00	3.11	100.00

For four components (ergonomics, credibility of information, advertisements, protection against viruses) there were subtle differences in the results, depending on the gender of the respondents. However, these differences were not big enough to allow the conclusion that gender determined the outcomes. Only in the case of the ergonomics of using new media did women show a higher level of knowledge – $F(1, 512) = 18.090$, $p = .00003$. The differences between the mean values (DL components) and gender are shown in Figure 1.

As we analysed the global variable – the average result from the competence test – we noticed some differences in the results obtained. For example, the higher scores belonged to parents with higher education levels – $F(4, 509) = 32.318$, $p = 0.0000$; parents declaring a high and average standard of living – $F(2, 511) = 8.6447$, $p = .00020$; residents of big cities – $F(4, 509) = 6.8090$, $p = .00002$; and parents who used public e-services (e.g. electronic administration [e-administration]) – $F(3, 510) = 9.1780$, $p = .00001$.
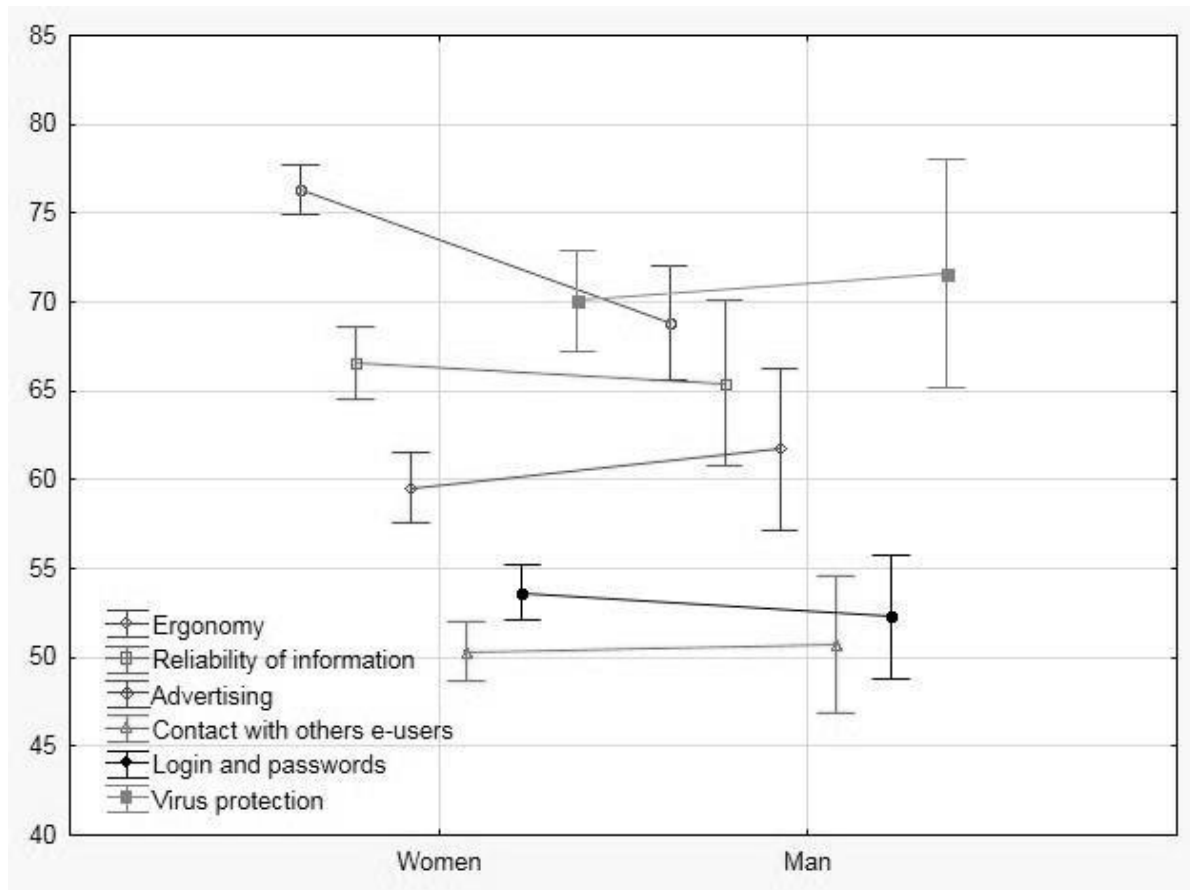

Figure 1 Mean values of DL components versus gender

We also observed that setting rules for using online media at home and ensuring that these are followed by their children coincides with the test results – $F(4, 509) = 9.1648$, $p = .00000$. Those

parents who declared that their children were limited regarding the use of online media showed a much higher level of DL than the respondents who indicated that they had no means of controlling the

online activity of their children, or the parents who declared that no limits were set in this area. Setting rules correlated strictly with the results obtained so this relation is a visible postulate to support parents who declare the passive style of educating their children in the area of digital media. Development of knowledge and skills is strictly related to the education style, which means that the DL construct is not merely theoretical with no connection to praxis. This correlation is presented in Figure 2.
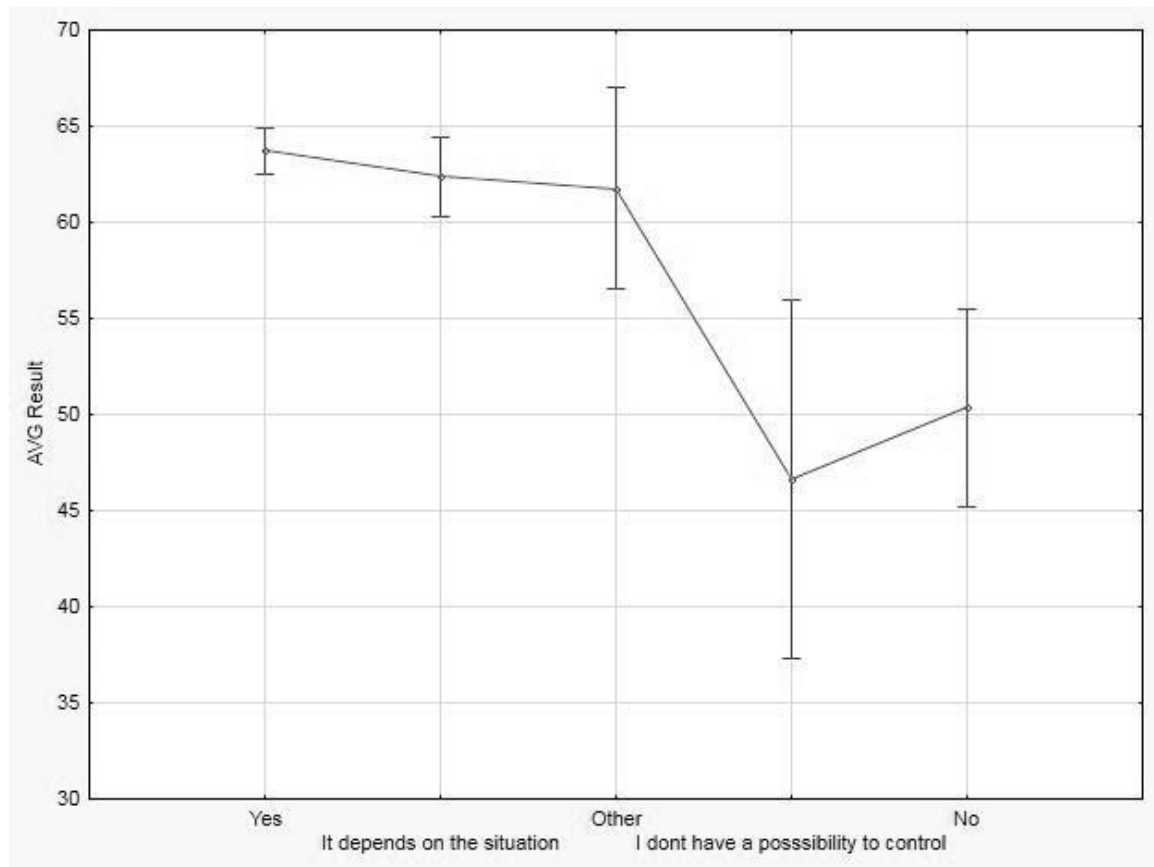

Figure 2 Parental control of online media usage and competence test results

The test results are not affected by online safety procedures introduced in schools – $F(2, 511) = 1.3041$, $p = .27233$ or how often parents talk to their children about e-threats – $F(5, 508) = 1.9815$, $p = .07986$.

Most often, the parents evaluated their computer literacy, awareness of e-threats and ability to operate digital devices as average or high. We can also see that parents who highly evaluate their level of competencies regarding e-threats, declare a similar level of literacy in using computers ($X^2 = 471.4154$, $df = 25$, $p = 0.0000$, Cramer's V coefficient [CVC] = 0.428) and mobile devices ($X^2 = 319.09$, $df = 25$, $p = 0,0000$, CVC = 0.352). Self-evaluation of own DL presented in Figure 3 is not an easy task for non-professionals (parents). This results mainly from the lack of clear criteria for evaluating knowledge and skills related to digital safety. The absence of the theoretical framework to assess the DL levels refers not only to the family environment but also to teachers, children and youths.
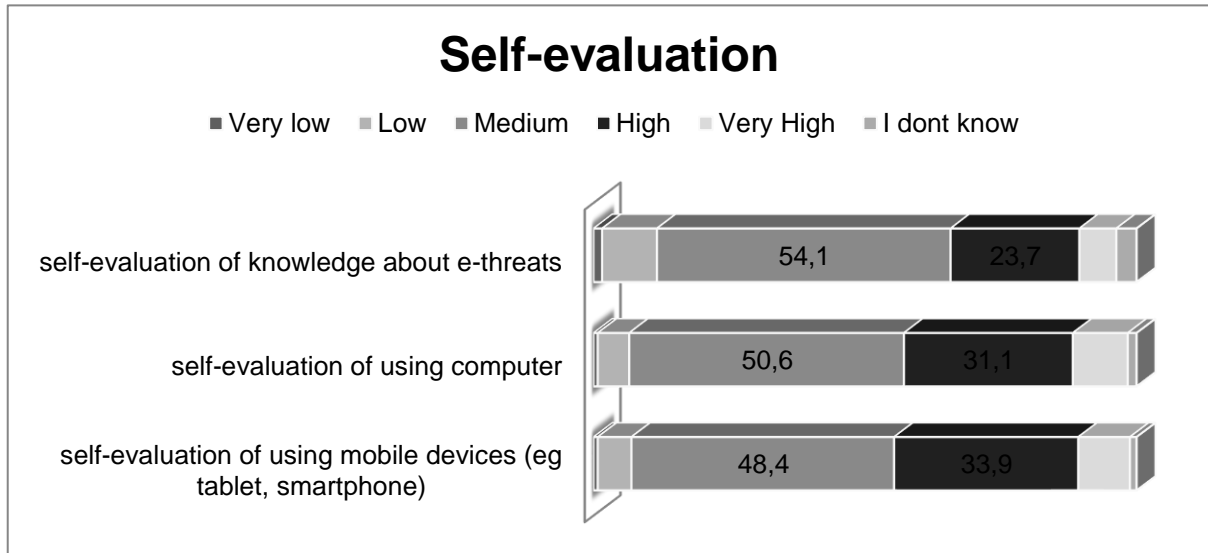
Figure 3 Self-evaluation: Computer literacy, using mobile devices and knowledge about e-threats

A detailed analysis of the research outcomes revealed that the parents' self-evaluation as related to their knowledge about e-threats was directly related to their competence test results. The parents who declared that their knowledge was at a low or at a very high level obtained similar results in the competence test (Figure 4). Similar correlations were found between the self-evaluation of DL in the area of e-threats and the ability to use mobile devices and computers.
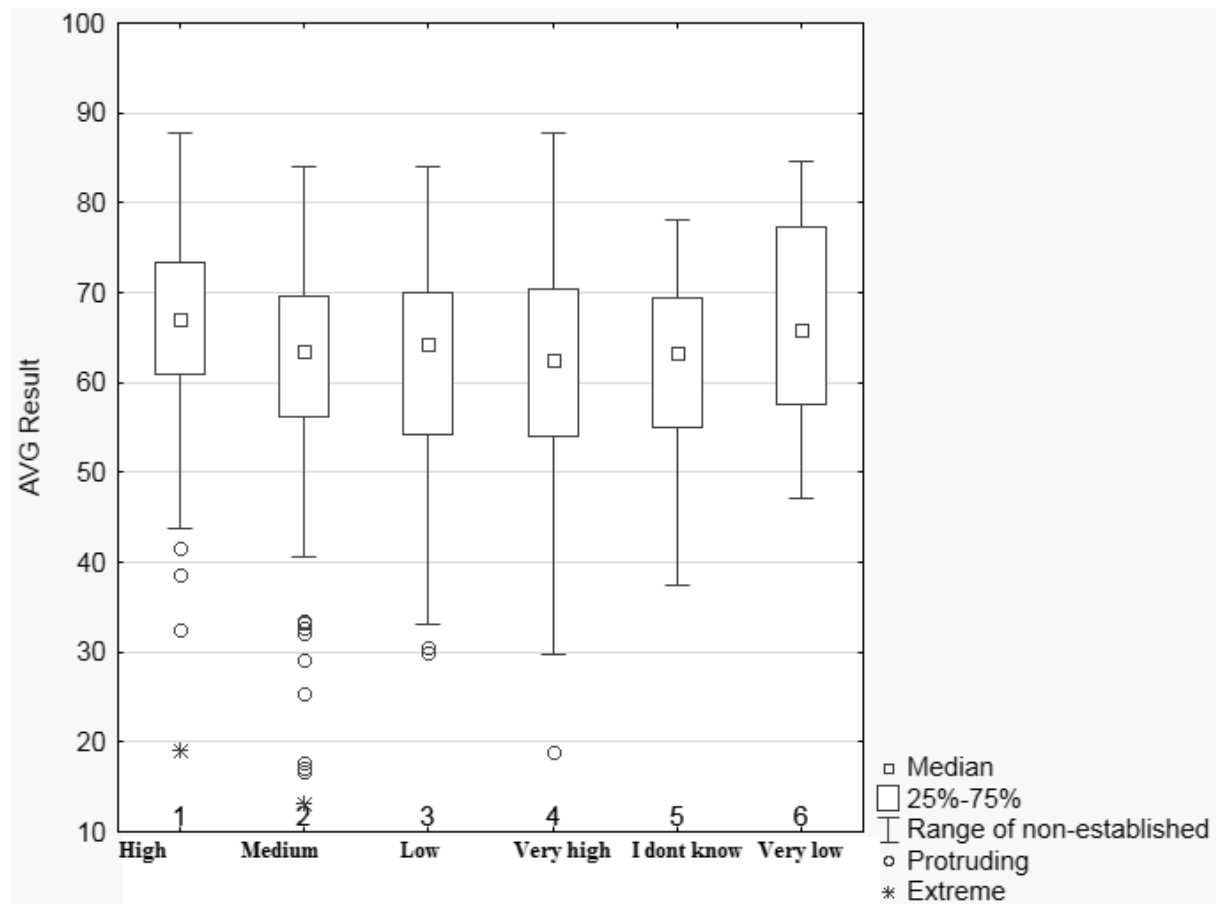

Figure 4 Self-evaluation of knowledge about e-threats and competence test results

During the detailed analysis of the correlations between the indicators we noticed that each variable was in a positive relationship with the others. This was due to the fact that skills and knowledge in one area overlap with literacy in other areas related to the safe use of ICT. However, these correlations did not exceed the average value of Pearson's linear correlation coefficient. This may indicate the high inner diversity of the DL components, including those related to digital safety. Even though each of the selected DL components was in a positive relation with itself, the results did not allow us to link certain elements with one another. However, based on the analysis of the results in Table 3, we can see that technical knowledge and skills typically coexist with each other the most among the parents (for example, protection against viruses and safe logins and passwords, or ergonomics).

Table 3 Correlations between DL components related to digital safety

	1. Ergonomics	2. Credibility of information	3. Advertisements	4. Interactions with others	5. Passwords and logins	6. Protection against viruses
2.	.15**	1.00				
3.	.31**	.11*	1.00			
4.	.19**	.14*	.29*	1.00		
5.	.22**	.13*	.20*	.12*	1.00	
6.	.29**	.18**	.25**	.16**	.32**	1.00

Note. *< 0.001, **< 0.0001.

Considering the heterogeneity of the DL concept and the different levels of DL among the parents, we grouped the results. For this purpose, we used the *k*-means method. This method of analysis allows (based on the individual characteristics) the identification of homogeneous clusters, depending on the results obtained in certain categories. We identified five main clusters (Figure 5 and Table 4). Group 3 obtained the highest results in the competence test, and Group 5 required particular educational support because they scored below 50% in each category. Based on the results, we can see that 6.2% of the parents required educational support, especially in the area of technical security of their devices (virus protection). A detailed analysis of Figure 5 revealed that the greatest heterogeneity occurred in the area of anti-virus software (spread up to 40% and more). For other areas the sample heterogeneity was also visible, as the results oscillated between several points up to 20 and more. More than one in five parents obtained very good results in every area (Group 1).
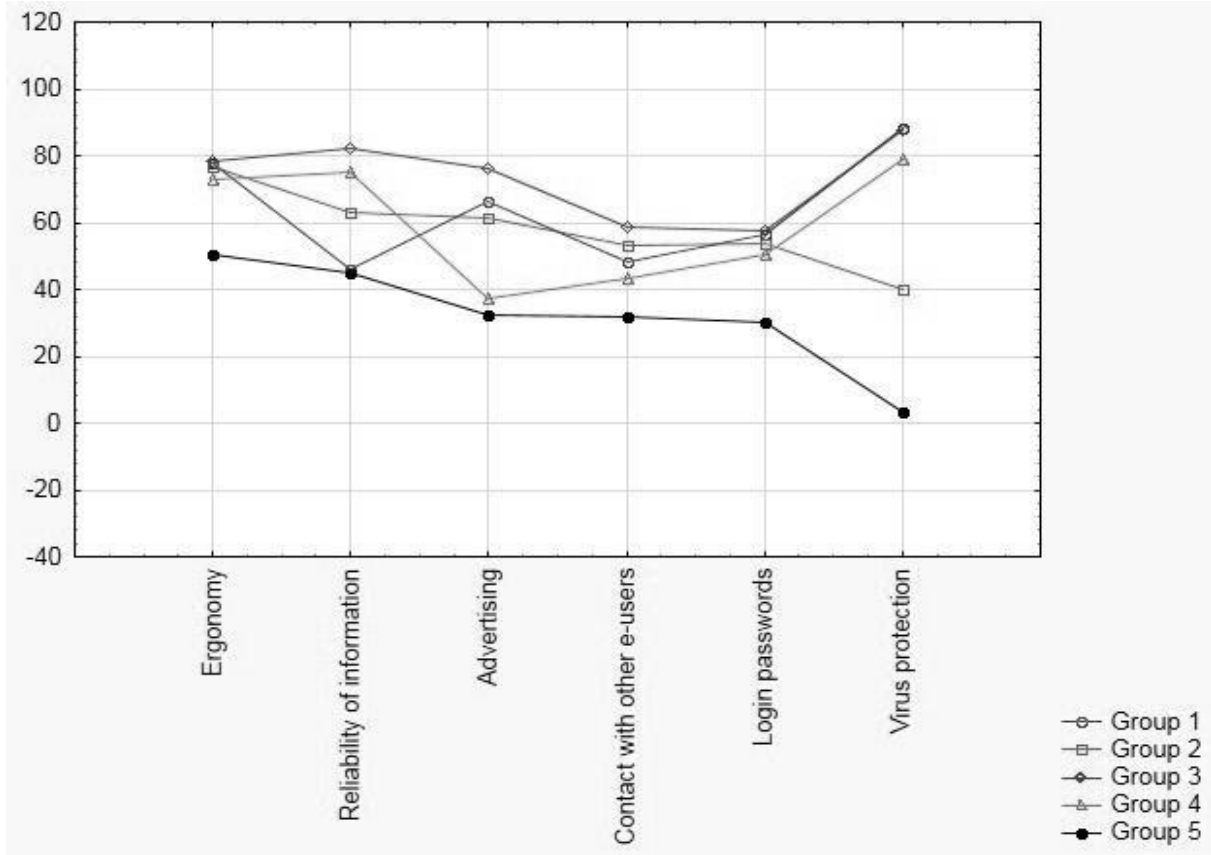
Figure 5 *K*-means cluster analysis according to the results obtained in each category

Table 4 presents the percentage distribution of the clusters. We noticed that groups 1 to 4 obtained similar results in two areas: ergonomics, and secure passwords and logging-in. As for the remaining four areas, there was a noticeable differentiation of the competence test results. More than one fourth of the respondents belonged to the group with the highest scores. Over 70% showed a satisfactory but diverse level of knowledge about four DL components.

Table 4 Cluster analysis – five main groups

	Respondents *N* = 514				
	Group 1	Group 2	Group 3	Group 4	Group 5
Size	113	112	151	106	32
Percentage	22.0%	21.8%	29.4%	20.6%	6.2%

Discussion

Parents bear particular responsibility for their children's digital safety (Davis, 2012; Harrison & McTavish, 2018). It is in the family environment where appropriate habits related to the use of ICT are developed. Behaviour is shaped at home, both intentionally and incidentally. Socialisation and media education depend on the level of DL possessed by parents (Kordrostami, Vijayalakshmi & Laczniak, 2018; Milenkova, Peicheva & Marinov, 2018). Appropriate knowledge about the use of ICT, including the ability to anticipate e-threats, not only allows adults to avoid danger but is also a factor in the protection of the youngest family members (McDougall, Readman & Wilkinson, 2018). Parents' contributions are of particular significance during the first stages of education (Mark & Nguyen, 2017). In light of the decreasing age of digital initiation, parents are the ones primarily responsible for protecting the youngest children against typical e-threats (Kalmus, 2004) (e.g. preventing exposure to inappropriate content, understanding data collection mechanisms, understanding the influence of advertising, monitoring interactions with strangers, the protection of confidential data, and the technical security of digital devices). Thus, DL among parents involves not only fluency in managing media but also soft skills which empower parents to protect those e-users who do not yet have advanced DL – the children themselves (Notten & Kraaykamp, 2009; Vaičiulė, 2017). DL is a complex construct of skills, knowledge and attitudes, which determine how ICTs are used. Theoretical and practical DL aspects evolve together with the development of the

information society – that is with the emergence of the new digital services or threats. Thus, the DL indicators change dynamically and must be constantly updated by the persons playing crucial roles in the education process (Macuh, Raspor, Sraka & Kovačič, 2018).

Based on the results obtained, we noticed that parents showed different levels of DL. The variations in their fluency in using ICT and their knowledge related to e-threats was typical for the information society (Ziemba, 2016, 2019). The parents obtained the highest competence test results in the areas of the ergonomic use of digital media (Ahmed & Shaukat, 2018; Senn, 2019). This is positive information because awareness in this area helps to correct bad habits among children (related to lighting, correct posture or time spent using digital media) (Bayraktar, 2017). The results in the area of technical security (logging-in, the selection of logins and passwords) and protection against malware were unsatisfactory (Kopecký, 2016). The ability to secure hardware against malware is particularly important if both adults and children use the same devices (Pappas, 2004). Insufficient protection may result in stolen logins and passwords to e-services such as banking that require a higher level of data security (Kopecky, Jejsek, Kusá, Řeřichová & Marešová, 2015). Strengthening this area seems one of the top priorities for practical media pedagogy realised in the form of non-formal and informal education (Frania, 2014).

During the detailed analysis we noticed that more than two thirds of the respondents gave more than 50% correct answers. Out of the total, 22% provided more than 60% correct answers in each category. Only 6.2% obtained very low results. This data prove that the population of parents is diverse when it comes to their DL level. It is noticeable that people with higher education, who are from big cities, live at a high or satisfactory standards, or are active e-citizens (using, for example, e-administration services) scored better. The above-mentioned factors are, to a great extent, in line with the determinants of the digital divide (Brandtzæg, Heim & Karahasanović, 2011; Stanimir, 2016). The selected socio-demographic variables also provide the basis from which to design DL strengthening activities for the selected groups of parents (Wang & Xing, 2018). We need to remember that the data obtained do not reflect the situation fully due to some methodological limitations (the size of the tool and the selection of indicators) and the dynamic development of the information society (with new e-threats always emerging).

The DL level in the area of digital safety is related to control over the use of digital media by children (Glüer & Lohaus, 2018; Kordrostami et al., 2018). Parents who scored better in the competence test recognised the need to set boundaries regarding the duration, time and means by which their children use digital media much better than parents who obtained lower results. Knowledge about e-threats translated into the components of educational styles (Nikken & Jansz, 2014). This relationship provides a practical opportunity for redefining the holistic view of digital safety in both the school and family environments, where parents are the key element in the media socialisation and education process (Bartau-Rojas, Aierbe-Barandiaran & Oregui-González, 2018; Tomczyk & Wąsiński, 2017).

During the analyses, we also observed the Dunning-Kruger effect (Mahmood, 2016). The parents who scored lowest in the competence test very often overestimated their DL level. The respondents who declared that they had very low competencies obtained results above the arithmetic mean. This is partly due to the lack of a clear definition of DL, the standardisation of this concept, the dynamic nature of the changes occurring in the information society, and the lack of reference points available for parents. The correlation is also a starting point in the discussion on the development of quantitative research determining DL levels based on self-declarations.

There was a positive linear correlation between the DL components. This can be explained as being a result of the overlapping technical knowledge and skills related to the use of ICT (Tomczyk, 2018). Still, the research results provide the grounds for further discussion on the heterogeneous character of DL. This conclusion is based on the high diversification of DL components, which require advanced technological knowledge and are related to the soft aspects of ICT's impact on human behaviour (Plichta & Pyżalski, 2016). The results clearly confirm the assumption that the DL concept is heterogeneous and must be further explored and delineated in the course of specialised analysis, e.g. in the field of media pedagogy.

Conclusion

The complex interaction of family and environmental factors, of which not all may promote safe online behaviour, influences the lifestyle and types of online activities preferred by children. Sometimes parents use different strategies to improve their children's safety, but they do so intuitively, without recourse to expert advice. Our study showed that parents mostly obtained low results from the competence test and tended to overestimate their DL level. Excessive control, offering rewards and imposing punishments did not yield positive effects like, for example, safe patterns of behaviour. Parents have their cognitive preferences and different interests, which are reflected in their attitudes and the way they use

ICT. On the other hand, they also have a great influence on their children's behaviour, and family time may be a good occasion to model good habits related to the use of digital technologies. The results presented should inform educators about the role of parents in shaping the awareness and attitudes of children (even in their early childhood). Effective preventive programmes should provide guidance for parents on how to model certain behavioural patterns, which activities to promote among their children, and how to help their children develop critical thinking regarding different sources of information.

Acknowledgements

Authors' Contributions

ŁT and KP wrote the manuscript and provided data for the results section. ŁT conducted the research, and all statistical analyses. All authors reviewed the final manuscript.

Notes

i. Published under a Creative Commons Attribution Licence.
ii. DATES: Received: 5 March 2019; Revised: 29 November 2019; Accepted: 1 February 2020; Published: 28 February 2021.

References

Ahmed I & Shaukat MZ 2018. Computer users' ergonomics and quality of life – evidence from a developing country. *International Journal of Injury Control and Safety Promotion*, 25(2):154–161. https://doi.org/10.1080/17457300.2017.1415361

Allen K & Rainie L 2002. *Parents online*. Available at https://www.pewresearch.org/internet/2002/11/17/parents-online/. Accessed 12 February 2019.

Bakó RK & Tőkés GE 2018. Parental mediation and Romanian young children's digital practices. *Revista Română de Sociologie*, 29(1–2):23–36. Available at https://www.researchgate.net/profile/Rozalia_Klara_Bako2/publication/326398880_PARENTAL_MEDIATION_AND_ROMANIAN_YOUNG_CHILDREN'S_DIGITAL_PRACTICES/links/5b4a0e2f0f7e9b4637d84571/PARENTAL-MEDIATION-AND-ROMANIAN-YOUNG-CHILDRENS-DIGITAL-PRACTICES.pdf. Accessed 25 January 2021.

Baran M & Maranowski P 2018. *Ewaluacja projektu „Cybernauci" – raport końcowy* [Evaluation of the "Cybernauts" project - final report]. Available at https://cybernauci.edu.pl/wp-content/uploads/2018/12/CYBERNAUCI_RAPORT-KOŃCOWY.pdf. Accessed 12 February 2019.

Barr D, Harrison J & Conery L 2011. Computational thinking: A digital age. *Learning & Leading with Technology*, 38(6):20–23. Available at https://files.eric.ed.gov/fulltext/EJ918910.pdf. Accessed 25 January 2021.

Bartau-Rojas I, Aierbe-Barandiaran A & Oregui-González E 2018. Mediación parental del uso de Internet en el alumnado de Primaria: Creencias, estrategias y dificultades [Parental mediation of the Internet use of primary students: Beliefs, strategies and difficulties]. *Revista Científica de Educomunicación*, 26(1):71–79. https://doi.org/10.3916/c54-2018-07

Basińska A 2012. *Odkrywanie świata. O aktywności poznawczej dziecka w przestrzeni edukacyjnej środowiska* [Discovering the world. About the cognitive activity of a child in the educational space of the environment]. Poznań, Poland: Wydawnictwo Naukowe UAM.

Bayraktar F 2017. Online risks and parental mediation strategies comparison of Turkish children/adolescents who live in Turkey and Europe. *Education and Science*, 42(190):25–37. https://doi.org/10.15390/eb.2017.6323

Brandtzæg PB, Heim J & Karahasanović A 2011. Understanding the new digital divide—A typology of Internet users in Europe. *International Journal of Human-Computer Studies*, 69(3):123–138. https://doi.org/10.1016/j.ijhcs.2010.11.004

Calvani A, Cartelli A, Fini A & Ranieri M 2008. Models and instruments for assessing digital competence at school. *Journal of e-Learning and Knowledge Society*, 4(3):183–193. Available at https://www.learntechlib.org/p/43442/. Accessed 25 January 2021.

Cheminais R 2012. *Children and young people as action researchers: A practical guide to supporting pupil voice in schools*. Maidenhead, England: Open University Press.

Cholewa P 2016. Wirtualne zagrożenia dla rozwoju dzieci (na podstawie badań własnych) [Virtual threats to the development of children (on the basis of own research)]. *Dydaktyka Informatyki*, 11:45–51. https://doi.org/10.15584/di.2016.11.6

Davis V 2012. Interconnected but underprotected? Parents' methods and motivations for information seeking on digital safety issues. *Cyberpsychology, Behavior, and Social Networking*, 15(12):669–674. https://doi.org/10.1089/cyber.2012.0179

Druin A 2002. The role of children in the design of new technology. *Behaviour & Information Technology*, 21(1):1–25. https://doi.org/10.1080/01449290110108659

Eshet Y 2004. Digital literacy: A conceptual framework for survival in the digital era. *Journal of Multimedia and Hypermedia*, 13(1):93–106.

Facer K 2011. *Learning futures: Education, technology and social change*. London, England: Routledge.

Ford JE 2017. *Student-teacher relationships are everything*. Available at http://blogs.edweek.org/teachers/teacher_leader_voices/2017/01/relationships_are_everything.html?cmp=SOC-SHR-FB. Accessed 19 January 2021.

Frania M 2014. Selected aspects of media literacy and new technologies in education as a challenge of Polish reality. *Perspectives of Innovations,*

Economics & Business, 14(2):109–112.
https://doi.org/10.15208/pieb.2014.13

Gilster P 1997. *Digital literacy*. New York, NY: John Wiley.

Giordan A 2018. *Le smartphone, un outil d'apprentissage…* [The smartphone, a learning tool…]. Available at https://www.educavox.fr/accueil/debats/le-smartphone-un-outil-d-apprentissage. Accessed 18 January 2021.

Glüer M & Lohaus A 2018. Elterliche und kindliche Einschätzung von elterlichen Medienerziehungsstrategien und deren Zusammenhang mit der kindlichen Internetnutzungskompetenz [Parents' and children's perspectives of parental mediation strategies in association with children's Internet skills]. *Praxis der Kinderpsychologie und Kinderpsychiatrie*, 67(2):181–203. https://doi.org/10.13109/prkk.2018.67.2.181

Greenhow C, Robelia B & Hughes JE 2009. Learning, teaching, and scholarship in a digital age: Web 2.0 and classroom research: What path should we take *now*? *Educational Researcher*, 38(4):246–259. https://doi.org/10.3102%2F0013189X09336671

Harrison E & McTavish M 2018. 'i'Babies: Infants' and toddlers' emergent language and literacy in a digital culture of iDevices. *Journal of Early Childhood Literacy*, 18(2):163–188. https://doi.org/10.1177/1468798416653175

Kajee L 2018. Teacher education students engaging with digital identity narratives. *South African Journal of Education*, 38(2):Art. # 1501, 9 pages. https://doi.org/10.15700/saje.v38n2a1501

Kalmus V 2004. What do pupils and textbooks do with each other?: Methodological problems of research on socialization through educational media. *Journal of Curriculum Studies*, 36(4):469–485. https://doi.org/10.1080/00220270310001630670

Knol-Michałowska K 2012. Rola rodziny w interwencji i profilaktyce zagrożeń w internecie [The role of the family in the intervention and prevention of threats on the Internet]. *Studia Edukacyjne*, 23:301–327. Available at https://repozytorium.amu.edu.pl/bitstream/10593/5913/1/studia_eduk_23_s_301-328.pdf. Accessed 16 January 2021.

Kopecký K 2016. Czech children and Facebook – A quantitative survey. *Telematics and Informatics*, 33(4):950–958. https://doi.org/10.1016/j.tele.2016.02.008

Kopecky K, Jejsek L, Kusá L, Řeřichová V & Marešová H 2015. Specifics of children communication and online aggressors within the online assaults on children (analysis of selected utterances). In *SGEM2015 Conference Proceedings* (Vol. 1). https://doi.org/10.5593/sgemsocial2015/b11/s1.026

Kordrostami M, Vijayalakshmi A & Laczniak RN 2018. Children's media socialisation: Parental concerns and mediation in Iran. *Journal of Marketing Management*, 34(9-10):819–840. https://doi.org/10.1080/0267257X.2018.1515784

Kowalski RM & Limber SP 2007. Electronic bullying among middle school students. *Journal of Adolescent Health*, 41(6):S22–S30. https://doi.org/10.1016/j.jadohealth.2007.08.017

Kupidura T 2013. Kompetencje kluczowe w społeczeństwie informacynym i edukacji informatycznej społeczności lokalnej [Key competences in information society and computer education of local community]. *Edukacja Ustawiczna Dorosłych*, 1(80):145–153. Available at http://cejsh.icm.edu.pl/cejsh/element/bwmeta1.element.desklight-6f0adce2-5abb-46b5-b155-f1322067d36e/c/Kompetencje_kluczowe_w_spoleczenstwie.pdf. Accessed 12 February 2019.

Jayakumar R & Janaki T 2017. Role of media in child development. *Media and Child Development*, 1:247.

Lipszyc J (ed.) 2012. *Cyfrowa przyszłość: Edukacja medialna i informacyjna w Polsce – raport otwarcia* [Digital future: Media and information education in Poland] (Opening Report). Warszawa, Poland: Fundacja Nowoczesna Polska. Available at https://nowoczesnapolska.org.pl/wp-content/uploads/2012/01/Raport-Cyfrowa-Przysz%C5%82o%C5%9B%C4%87-.pdf. Accessed 26 January 2021.

Macuh B, Raspor A, Sraka M & Kovačič A 2018. Media exposure and education of first to six grade children from Slovenia - parent opinions. *International Journal of Cognitive Research in Science, Engineering and Education*, 6(3):49–57. https://doi.org/10.5937/ijcrsee1803049M

Maden S 2018. Digital reading habits of pre-service Turkish language teachers. *South African Journal of Education*, 38(Suppl. 2):Art. #1641, 12 pages. https://doi.org/10.15700/saje.v38ns2a1641

Mahmood K 2016. Do people overestimate their information literacy skills? A systematic review of empirical evidence on the Dunning-Kruger Effect. *Communications in Information Literacy*, 10(2):199–213. https://doi.org/10.15760/comminfolit.2016.10.2.24

Mark LK & Nguyen TTT 2017. An invitation to Internet safety and ethics: School and family collaboration. *Journal of Invitational Theory and Practice*, 23:62–75. Available at https://files.eric.ed.gov/fulltext/EJ1184559.pdf. Accessed 6 January 2021.

Marsh J 2016. The digital literacy skills and competences of children of pre-school age. *Media Education: Studi, Ricerche, Buone Practice*, 7(2):197–214. https://doi.org/10.14605/MED721603

Marsh J, Hannon P, Lewis M & Ritchie L 2017. Young children's initiation into family literacy practices in the digital age. *Journal of Early Childhood Research*, 15(1):47–60. https://doi.org/10.1177%2F1476718X15582095

Martin A 2006. The Landscape of Digital Literacy (DigEuLit project). *Journal of eLiteracy*, 2(2):130–136.

McDougall J, Readman M & Wilkinson P 2018. The uses of (digital) literacy. *Learning, Media and Technology*, 43(3):263–279. https://doi.org/10.1080/17439884.2018.1462206

McPake J, Plowman L & Stephen C 2013. Pre-school children creating and communicating with digital technologies in the home. *British Journal of Educational Technology*, 44(3):421–431. https://doi.org/10.1111/j.1467-8535.2012.01323.x

Meyers EM, Erickson I & Small RV 2013. Digital literacy and informal learning environments: An introduction. *Learning, Media and Technology*, 38(4):355–367. https://doi.org/10.1080/17439884.2013.783597

Midoro V 2007. Quale alfabetizzazione per la società della conoscenza? [What literacy for the knowledge society?]. *Tecnologie Didattiche*, 15(2):47–54.

Milenkova V, Peicheva D & Marinov M 2018. Towards defining media socialization as a basis for digital society. *International Journal of Cognitive Research in Science, Engineering and Education*, 6(2):21–32. https://doi.org/10.5937/ijcrsee1802021M

Moreno López NM, González Robles AC, Torres Gómez AC & Araya Hernández J 2017. Alfabetización digital a padres de familia en el uso de las redes sociales [Digital literacy to parents in the use of social networks]. *Alteridad*, 12(1):22–33. https://doi.org/10.17163/alt.v12n1.2017.01

Ng W 2012. Can we teach digital natives digital literacy? *Computers & Education*, 59(3):1065–1078. https://doi.org/10.1016/j.compedu.2012.04.016

Nikken P & Jansz J 2014. Developing scales to measure parental mediation of young children's internet use. *Learning, Media and Technology*, 39(2):250–266. https://doi.org/10.1080/17439884.2013.782038

Notten N & Kraaykamp G 2009. Parents and the media: A study of social differentiation in parental media socialization. *Poetics*, 37(3):185–200. https://doi.org/10.1016/j.poetic.2009.03.001

Pappas ML 2004. Management matters. Safety in a digital environment. *School Library Media Activities Monthly*, 21(4):40, 49.

Plichta P & Pyżalski J 2016. Narażenie uczniów ze specjalnymi potrzebami edukacyjnymi na hazard tradycyjny i internetowy oraz inne zachowania ryzykowne [The involvement of students with special educational needs in traditional and online gambling and other risk behaviours]. *Niepełnosprawność. Dyskursy Pedagogiki Specjalnej* [Disability. Discourses of Special Education], 24:222–242. https://doi.org/10.4467/25439561.np.16.015.6841

Plowman L 2015. Researching young children's everyday uses of technology in the family home. *Interacting with Computers*, 27(1):36–46. https://doi.org/10.1093/iwc/iwu031

Plowman L, McPake J & Stephen C 2010. The technologisation of childhood? Young children and technology in the home. *Children & Society*, 24(1):63–74. https://doi.org/10.1111/j.1099-0860.2008.00180.x

Postman N 2011. *Technopoly: The surrender of culture to technology*. New York, NY: Vintage.

Potyrała K 2017. *iEdukacja. Synergia nowych mediów i dydaktyki. Ewolucja – antynomie - konteksty* [iEducation. Synergy of new media and didactics. Evolution – antinomy - contexts]. Kraków, Poland: Wydawnictwo Naukowe Uniwersytetu Pedagogicznego.

Prensky M 2001. Digital natives, digital immigrants Part 1. *On the Horizon*, 9(5):1–6.

Punie Y 2007. Learning spaces: An ICT-enabled model of future learning in the knowledge-based society.

European Journal of Education, 42(2):185–199. https://doi.org/10.1111/j.1465-3435.2007.00302.x

Scaglioni S, Arrizza C, Vecchi F & Tedeschi S 2011. Determinants of children's eating behavior. *The American Journal of Clinical Nutrition*, 94(Suppl):2006S–2011S. https://doi.org/10.3945/ajcn.110.001685

Senn E 2019. Districts love laptops but ignore their ergonomics. *Education Digest*, 84(5):57–59.

Stanimir A 2016. Pomiar wykluczenia cyfrowego - Zagrożenia dla pokolenia y [Measurement of the digital divide – Risks for Generation Y]. *Prace Naukowe Uniwersytetu Ekonomicznego We Wroclawiu* [Research Papers of the Wroclaw University of Economics], 426:194–205. https://doi.org/10.15611/pn.2016.426.20

Stunża GD 2017. Edukacja wersja beta. Pokolenie Z i pokolenie Alfa a kompetencje uczestnictwa w kulturze [Education beta version. Generation Z and the Alpha generation and competences of participation in culture]. *Kultura Popularna*, 1(50):86–94. https://doi.org/10.5604/01.3001.0010.0046

Stunża GD 2018. *Wyzwania kultury i edukacji uczestnictwa: Pokolenie Z i pokolenie Alfa* [The challenges of culture and participation education: Generation Z and the Alpha generation]. Wydawca: Edukator Medialny. Available at http://edukatormedialny.pl/wp-content/uploads/2018/04/Wyzwania-kultury-i-edukacji-uczestnictwa.pdf. Accessed 26 January 2021.

Tadeusiewicz R 2014. Nowe szanse, nowe wyzwania i nowe zagrożenia dla edukacji związanej z rosnącą imersją uczniów w cyberprzestrzeni [New opportunities, new challenges and new threats to education related to the growing immersion of students in cyberspace]. *Edukacyjne*, 33:69–93. Available at https://repozytorium.amu.edu.pl/handle/10593/13615. Accessed 20 March 2019.

Tomczyk Ł 2018. Digital competences of parents in the matter of electronic threats. In E Masal, I Önder, H Çaliskan & Ş Beşoluk (eds). *SHS Web of Conferences* (Vol. 48). Les Ulis, France: EDP Sciences-Web of Conferences. https://doi.org/10.1051/shsconf/20184801004

Tomczyk Ł, Srokowski Ł & Wąsiński A 2016. *Kompetencje w zakresie bezpieczeństwa cyfrowego w polskiej szkole* [Digital competence in Polish school] (Research report). Tarnów, Poland: Stowarzyszenie Miasta w Internecie.

Tomczyk Ł & Wąsiński A 2017. Parents in the process of educational impact in the area of the use of new media by children and teenagers in the family environment. *Education and Science*, 42(190):305–323. https://doi.org/10.15390/eb.2017.4674

Tornero JMP 2004. *Promoting digital literacy* (Final Report EAC/76/03). Available at http://www.gabinetecomunicacionyeducacion.com/sites/default/files/field/adjuntos/comprender_dl.pdf. Accessed 12 February 2019.

Vaičiulė R 2017. Socialinių medijų pozicija individų socializacijos procesų kontekste [The position of social media in the context of individuals' socialization processes]. *Regional Formation &*

Development Studies, 3(23):203–211. https://doi.org/10.15181/rfds.v23i3.1596

Van Dijk JAGM & Van Deursen AJAM 2014. *Digital skills: Unlocking the information society*. New York, NY: Palgrave Macmillan.

Veteška J 2016. *Přehled andragogiky: Úvod do studia vzdělávání a učení se dospělých* [Overview of andragogy: Introduction to the study of adult education and learning]. Praha, Slovakia: Portál.

Wang X & Xing W 2018. Exploring the influence of parental involvement and socioeconomic status on teen digital citizenship: A path modeling approach. *Educational Technology & Society*, 21(1):186–199.

Wojtasik Ł 2009. Rodzice wobec zagrożeń dzieci w Internecie – teoria, badania, praktyka [Parents regarding the threats of children on the Internet - theory, research, practice]. *Dziecko Krzywdzone: Teoria, Badania, Praktyka*, 8(1):1–10. Available at http://www.dzieckokrzywdzone.fdds.pl/index.php/DK/article/view/725/579. Accessed 10 November 2020.

Zbigniew F 2018. Educating together in the digital age: An alliance between parents and teachers. *Educația Plus*, 21(3):403–409.

Ziemba E 2016. Factors affecting the adoption and usage of ICTs within Polish households. *Interdisciplinary Journal of Information, Knowledge, and Management*, 11:89–113. Available at http://www.ijikm.org/Volume11/IJIKMv11p089-113Ziemba2524.pdf. Accessed 10 November 2020.

Ziemba E 2019. The contribution of ICT adoption to sustainability: Households' perspective. *Information Technology & People*, 32(3):731–753. https://doi.org/10.1108/itp-02-2018-0090

Appendix A

1) How many hours a day can student in grades 1 to 3 spend in front of the screen without great risk to their health?

       Up to 1 hour
       Up to 2 hours
       Up to 3 hours
       Up to 5 hours

2) Select which of the following threats may be a direct effect of extended use of digital tools by children in grades 1 to 3. Select several answers.

       Spinal curvature
       Asthma
       Hearing problems
       Mood disorders
       Genetic defects
       Excessive hair loss due to exposure to radiation
       Vision defects

3) Do you think that the following statements are true or false?

	True	False
It is better that the computer is in the child's bedroom rather than in the living room or other rooms.		
Too much time spent using new media may lead to obesity.		
Regardless of what children watch on TV [television], it always negatively impact their development.		

4) Does anyone verify the reliability of information found on Wikipedia?

       Nobody verifies it
       It is verified by the online community
       It is verified by experts

5) Imagine that your children found information online which surprised them. How would you advise your child to check whether the information is true?

       See if this information also shows up in Google search engine.
       See if this information is confirmed by at least one other website.
       Check in some other source, other than the internet.
       Use your common sense to assess if this can be true.

6) Arrange the following services from the most to the least reliable. To move a service up or down the list, drag it with the mouse.

Sciaga.pl: _ _ _ _ _ _ _ _ _
Wikipedia.org: _ _ _ _ _ _ _ _ _
Zadane.pl: _ _ _ _ _ _ _ _ _
Facebook: _ _ _ _ _ _ _ _ _
Onet.pl: _ _ _ _ _ _ _ _ _

7) What are the possible negative consequences if a child clicks on an advertisement displayed on the internet?

       The child will be interested in buying something they do not need.
       A small amount of money will be deducted from the parents' account.
       The so-called cookies might be remembered and this add will be showing up more often.
       If the child clicks the next button a few times, they may purchase something.
       The store will be automatically notified about the child's identity and the parents will receive unwanted adds via e-mail [electronic mail].

8) Advertisements on the internet may be displayed:

       in YouTube services, before the videos
       in YouTube services, during the videos
       in Wikipedia services, half-way through the article
       on legal websites with computer games
       on illegal websites with computer games

9)   Can watching advertisements on TV and on the internet affect the child's eating habits?

No, new media have actually no influence in this area.
Yes, it leads to a decreases appetite because children move less.
Yes, it causes a change in eating habits to less healthy.
Yes, it causes a change in eating habits to more healthy.

10) Which of the following activities may directly encourage children to interact with strangers on the internet? You may select more than one answer.

Online gaming
Using online networked services
Reading Wikipedia
Watching and commenting on YouTube videos

11) What do you think, which of the following advice would be most helpful for children aged 7 to 9?

Never talk to anyone on the internet
You can talk to strangers but if anything makes you anxious, disconnect immediately
You can freely talk to other people via the internet, you just cannot meet them face to face

12) Which of the following services enable easy interaction with other, anonymous users?

Samosia.pl
Facebook
Zapytaj.com.pl
Ask.fm

13) The best passwords to protect important data on the internet are:

Name and year of birth
Name of your child or pet
Long sequence of numbers and letters, with no logical sense
Two long words combined in a one sequence of signs
Words with spelling mistakes

14) How much do you agree with the following statements?

	I agree	I partially agree, partially not	I disagree
It is good to have just one password to all internet services			
htttps:// in a website address means this website is more dangerous than others			
Banks sometimes send e-mails requesting your user password			
Hackers only break into the accounts of famous and rich people – ordinary users are free from such threats			
When you type your password in a Facebook comment to someone's post, the system will format it automatically as stars and no one except of you will be able to see it.			
It is worth using a rarely used word as a password – this reduces the chance that a hacker will guess it			

15) Good protection against viruses involves:

Installing anti-virus software
Enabling Windows firewall
Regularly cleaning up the dashboard
Visiting only trusted websites
Downloading files with .exe extension only

16) Drag the following statement into one of the columns: true or false.

	True	False
A computer virus may also attack your mobile.		
Anti-virus software guarantees a 100% safety.		
Installing software downloaded from the internet may infect your computer with a virus.		
Malware, e.g. viruses, may be removed only by IT specialists.		

17) Students in grades 1 to 3:

> are too small to download a virus to a computer
> may download a virus but only a harmless one
> may infect the computer with a virus and cause serious problems

18) Are any rules regarding use of the internet (e.g. time, installed software, visited sites) set and followed in your family?

> Yes
> No
> Depends on the situation
> I am not able to control my child's online activity
> Other