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Online Safety as a New Component of Digital Literacy for Young People

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Introduction. Digital literacy refers to the skills required to achieve digital competence, the confident and critical use of information and communication technology for learning, leisure, communication and future work of young people. Digital competence has a dual nature. First of all, it is the technical ability to operate programs, pages, equipment. Secondly, it is also the ability to use digital media safely. Both perspectives are important in the educational perspective, i.e. media education and socialisation.

Materials and Methods. The paper presents the attempts to measure digital literacy in the area of threats resulting from using the new media in the group of upper-secondary school students (fourth educational cycle). The study was carried out using a diagnostic test with 18 questions. The research was conducted in the group of 1693 youths aged 15–21. The research was designed based on traditional methods of testing knowledge and skills.

Results. The findings showed that the weakest digital literacy component was the copyright-related knowledge and the strongest area was online shopping and financial operations. All digital literacy components are interrelated. The improvement in one area leads to the development of other digital literacy elements. Despite this correlation, digital literacy is a heterogeneous concept. There are also differences regarding certain digital literacy components, determined by gender – girls obtained higher test results in terms of the soft competencies whereas boys were better with the technical aspects of digital literacy. Based on the cluster analysis, we noticed that 41.41% of the students obtained good and very good results from the competence test. More than half of the students require further education in most of the analysed areas.

Discussion and Conclusion. For educational decision-makers, the findings highlight the importance of designing training programs aimed at developing students' digital literacies, with a special focus on new topics as sexting, piracy and cyberbullying.

Keywords: digital literacy, cybersafety, youth, protection of image, cyberbullying, sexting, digital piracy, hoax, measure, Poland

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Онлайн-безопасность как новый компонент цифровой грамотности молодежи

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Введение. В статье проанализированы данные об уровне цифровой грамотности в области новых средств массовой информации и угроз, связанных с их использованием, среди учащихся старших классов средней школы (четвертый образовательный цикл).

Материалы и методы. Для изучения проблемы был проведен диагностический тест, содержащий 18 вопросов. В нем приняли участие 1 693 человека в возрасте 15–21 год. Исследование было разработано на основе традиционных методов тестирования знаний и навыков.

Результаты исследования. По итогам проведенного тестирования выявлено, что наиболее слабым компонентом цифровой грамотности являются знания, связанные с авторским правом, сильной областью – онлайн-покупки и финансовые операции. Были определены различия в отношении некоторых компонентов цифровой грамотности, определяемых гендерным фактором: девочки получили более высокие результаты тестов с точки зрения «мягких» навыков, мальчики показали лучшие познания в технических аспектах цифровой грамотности. По итогам кластерного анализа отмечено, что у 41,41 % учащихся хорошие и очень хорошие результаты теста на компетентность. Однако большинство студентов нуждаются в дальнейшем образовании по анализируемым областям.

Обсуждение и заключение. Материалы данной статьи будут полезны руководителям образовательных организаций. Полученные выводы могут способствовать качественному преобразованию учебных программ по информационным технологиям.

Ключевые слова: цифровая грамотность, кибербезопасность, молодежь, защита изображений, кибербуллинг, секстинг, цифровое пиратство, мистификация, мера, Польша

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Introduction

The rapid development of information and communication technologies (ICT) has had considerable and dramatic impact on contemporary educational practice [1–5]. Digital competence has become increasingly important for social environment and individuals since 20th century [6; 7]. Therefore, many countries recognized the importance of incorporating ICT in education.

Internet penetration by country, household equipment with ICT, and experience with ICT use at home, at school and further at work, or in leisure are very important prerequisites for a lot of everyday activities and life in today society. Digital literacy (DL) has become essential in many occupations and without DL students can hardly continue to study at the university. Schools play a key role in providing ICT education. It is generally recognized that DL has positive effects on students' skills

that are essential for successful learning. To practice and promote students to be digitally literate also in new developing topics is an essential responsibility of schools.

The concept of digital competencies and digital literacy has undergone long-term development. Among the most prominent views of digital literacy, today, is that digital literacy may be understood as an inter-related set of skills or competencies necessary for success in the digital age [8]. The new topics are preferred such as cyberbullying or digital piracy. New topics require development of new skills and this research is aimed at digital safety among youth in the selected areas with special focus on mentioned new topics and new skills.

The purpose of this research is to identify the level of DL among the upper-secondary school students in Poland and to understand how students really use ICT and to assess whether these students are really



ready to participate in different domains of today's society in the 21st century using ICTs. The next section first defines the concept of DL and discusses various frameworks of digital competencies including new areas of interest.

Literature Review

ICT literacy is often called “digital literacy”, and in this research both terms are used in the same meaning. Competences of using and dealing with ICT are considered a prerequisite for DL development [9]. We are in line with Guzmán-Simón, García-Jiménez & López-Cobo, who define competence as the set of knowledge, skills and attitudes that are necessary for personal and professional development in different contexts, and we also consider experience as a very important part of competence [10].

The importance of digital competence was recognised by the European Parliament and the European Council in 2006. Digital competence was identified as one of the eight key competences for lifelong learning and involves the confident and critical use of Information Society Technology (IST) for work, leisure, learning and communication¹.

Computer and information literacy is described as students' achievements with technology in different contexts, as an “ability to use computers to investigate, create and communicate in order to participate effectively at home, at school, in the workplace, and in society” [11, p. 17]. DL comprises the abilities to process digital information, communicate with others, and solve given problems. DL was operationalised by Fraillon et al. as two strands with seven aspects [12]. The first strand is “Collecting and managing information”

and second is “Producing and exchanging information”. It is obvious, that development of DL requires more than fundamental technical knowledge and skills. The International DL Panel states that DL enables individuals to use “digital technology, communication tools, and/or networks to access, manage, integrate, evaluate and create information in order to function in a knowledge society”². The OECD defined DL as “the interest, attitude and ability of individuals to appropriately use digital technology and communication tools to access, manage, integrate and evaluate information, construct new knowledge, and communicate with others in order to participate effectively in society”³. ECDL Foundation (2015) defines the term “digital literacy” as follows: “Digital literacy – basic set of skills required to participate in essential ICT user activities”⁴. This definition outlines two different digital skills areas – computing/computer science and digital literacy. Attention is also paid to programming/coding. Not other approaches emphasize this area.

On the other hand, a holistic and comprehensive framework of digital literacy covers most of the cognitive competencies that users or learners employ while working in digital environments [13; 14].

Some authors prefer the term “digital literacy”. For example, Rambousek, Štípek, & Vaňková [15] apply in their research on digital literacy at schools framework of digital literacy by Ferrari [16] from project DIGCOMP. This framework contains 5 areas: Information, Communication, Content creation, Safety and Problem solving. The main objective of their research was to recognize the current state and identify key features and processes of digital compe-

¹ Measuring Digital Skills across the EU: EU wide indicators of Digital Competence [Electronic resource]. 2014. Available at: <https://ec.europa.eu/digital-single-market/en/news/measuring-digital-skills-across-eu-wide-indicators-digital-competence> (accessed 25.03.2020).

² International Literacy Panel. Educational Testing Service. Digital Transformation: A Framework for DL. Princeton; 2002. Available at: <https://www.ets.org/Media/Research/pdf/ICTREPORT.pdf> (accessed 25.03.2020).

³ OECD. Feasibility Study for the PISA DL assessment: Report to network A. Paris: OECD; 2003.

⁴ ECDL Fondation Report: Computing and Digital Literacy – Call for a Holistic Approach [Electronic resource]. Available at: <https://www.ics.ie/news/computing-and-digital-literacy-call-for-a-holistic-approach> (accessed 25.03.2020).

tence development in schools in the Czech Republic. As we mentioned above, digital competences are prerequisite for digital literacy development [9].

According to Hatlewik, Gudmundsdóttir & Loi digital competence contains the skills, knowledge and attitudes that make students able to use digital media for participation, work and problem solving, independently or in collaboration with others in a critical, responsible and creative manner [17]. Digital competence is developed in various domains (at home, at school, among peers, in professional or leisure time settings) that interact with each other [10]. Of course, for students it is essential to use ICT at home, at school or during their leisure time.

Wilson, Scalise, and Gochyev argue that the definition of DL is deliberately variable with respect to technological developments over time – this will involve changes both in the technologies themselves, and also in the range of human activities that are facilitated by those technologies [7]. They describe transition of DL to a broad set of skills in school settings and discuss the impact of the social media on DL. New framework of DL is developed toward increasing competency of students in the area of virtual skills, knowledge, awareness, and use of social media.

The concept of digital competencies and digital literacy has undergone long-term development. The ability to recognize the ICT-related problems in the area of cyberbullying is one of more important parts of DL. The current literature suggest the following critical components in this area: cyberbullying, sexting and protection of image [18–21]. Also online safety and digital piracy are counted into new areas⁵. The above-mentioned sources were taken into account when preparing this research and the assessment tool.

In this paper, DL are presented holistically as the technical skills of using the digital media and the ability to respond to the digital threats (including anticipation

of the e-threats). Thus, DL is not only the technical expertise but also soft components connected with the ability to use the digital media including: applications, hardware and e-services.

Materials and Methods

Objective of the research. The objective of the research was to diagnose the level of digital literacy in the area of e-threats among the upper-secondary school students (fourth educational cycle) in Poland. Due to the vast scope of the possible threats, the commissioning institution – Cities on the Internet Association from Tarnów which conducted the study for the Ministry of National Education – narrowed the scope of the research down to 6 components: The research were diagnostic and the results are supposed to help to evaluate the level of knowledge, skills and attitudes related to online safety. Based on the data collected, non-formal educational activities (competitions, lectures, workshops) addressed to students were designed. The research go beyond the hitherto measurements of DL which were based on self-declarations.

The research problems have taken the following form:

1. What are the results achieved by adolescents in the various areas of digital security?
2. Do sociodemographic variables differentiate the results from the test measuring the level of digital competence?
3. To what extent do digital security variables interact with each other?
4. How many non-homogeneous groups can be distinguished on the basis of collected results?

Research tool. Siddiq et al. systematically review literature on assessment instruments of primary and secondary school students' DL [22]. They conclude that most of the tests target lower secondary students, comprise multiple-choice item designs, and are evaluated by quantitative methodology. The majority of them tests measure facets such as searching, retrieving, and evaluating digital information, and technical skills.

⁵ Belleflamme P., Peitz M. Digital Piracy. In: J. Backhaus (ed.). Encyclopedia of Law and Economics. Berlin: Springer, 2014. p. 1-8.



Conceptual frameworks for DL are, in fact, compilations of several partial different literacies [8; 10; 13].

For the purpose of this research, new assessment tool was developed to measure the selected components of DL with special focus on mentioned new topics and new skills.

The assessment tool was inspired by the Literacy Panel (2002), OECD (2003), ECDL Foundation (2015) and by tools developed before to measure DL [11; 16; 22]. In the area of area of digital safety follows research by Tomczyk, Srokowski, and Wąsiński [21] and Kopecký, Szotkowski, and Krejčí [23]. The instrument design meets recommendations by Gray [24]. DL assessment tool with focus on digital safety among youth consists of six dimensions.

Data collection was conducted through a questionnaire with 18 questions. The tool was built for a project financed by the Polish Ministry of Education. The tool was created by specialists in media education. The same people were responsible for preparing the final report for the contracting authority. The selection of variables was made by persons dealing with the subject of digital security and media pedagogy. The tool was subject to external control (among others through pilot studies). A separate tool was prepared for each group – due to the specificity of ICT use in the group of teachers, adolescents or their parents. On the basis of the collected results, the directions of preventive activities were determined. The research tool was divided in two parts. The first part served to obtain the socio-demographic data and the characteristics of digital safety in the family environment. The other part measured the DL level regarding digital safety in the following 6 areas [21]:

- unaware creation of personal image in the Internet (awareness of how Google archives the audiovisual content, how advertisements are targeted and how the accounts in social media and comments left by other users influence one's personal image);
- sexting and invasion of privacy (knowledge about legal consequences of identity theft, infringement of image and technical aspect of data protection, remov-

ing photos indexed by the most popular search engine in Poland);

- infringement of copyright (knowing terminology related to illegal software, legal consequences of illegal film downloading and digital piracy, and competencies in assessing the legality of software);

- credibility of online information (awareness of the mechanisms of creating the most popular online encyclopedia, ability to assess the reliability of the source of information and the sellers in online stores);

- cyberbullying (awareness of the mechanisms connected with cyberbullying, types of cyberbullying and ability to secure the evidence thereof);

- financial operations in the Internet (awareness of the solutions securing the computer, online safety and creating strong passwords, knowledge about the safety in the Internet).

For each of the six areas, the students could provide 100% of correct answers which were calculated based on the three questions diagnosing respondents' knowledge about the digital safety. The correctness of answers was checked by means of an internal key, defined at the beginning by the authors of the tool. Research is pioneering in the global dimension. In the literature, such empirical diagnoses are rare. The measurement of digital competence is rarely measured through competence tests. The results provide a basis for further in-depth research, including longitudinal research (measuring how knowledge and skills will change over the years – with the development of the information society). All the results were averaged and formed a global variable as the general end result (the percentage value of the DL level in the area of digital safety). The tool ensures the correct level of internal coherence at the level $\text{Alpha} = 0.71$.

Sampling and sample characteristics. Sampling was random, nation-wide and conducted by the external research agency NAVIGO specializing in the long-term educational research. The respondents were students of the upper-secondary schools (fourth educational cycle). The research was conducted in the second half of 2016. The

competence test was filled in by 1693 students aged 15–21 (average = 16.8, SD = 1.17). The sample consisted of 848 girls (50.1%) and 845 boys (49.9%). The respondents were students of the following types of schools: high school (40.7%), technical school (40.7%), vocational school (17.85) and other (1.1%). More than half of the respondents (50.5%) lived in a village, 23.7% in a town up to 50,000 residents, 11.2% in a town with population 50,000–100,000, 9.55 in a city of more than 200,000 and 5.2% in a city with population of 100,000–200,000. In terms of financial situation, half of the group declares their families live: at average level (53.6%), wealthy (39.7%), modestly (6.7%).

Research procedure. The research was conducted within the project Cyfrowo Bezpieczni (*Digitally Safe*) which is part of the government action Bezpieczna+ (*Safety+*). Representatives of the Cities on the Internet Association (Stowarzyszenie Miasta w Internecie) were responsible for the implementation of the project. Technology and methods were secured by the research and training agency NAVIGO which was responsible for the development of the diagnostic tools and conducted the survey. Sampling was provided by NAVIGO whereas the content of the tests was designed by the author of this paper. The tool was tested in a pilot study. Each of the respondents had the right to refuse to participate in the test and the results were anonymous. This is the first research in Poland of such a scale which allows to generalise the data collected.

Results

The average value of the competence test in all the above listed areas was 52.36 points out of 100 (with SD = 16.36 and median = 16.36). The differentiation of the average values depends on several factors. The higher results were obtained by the students: of high schools and technical schools $F(3, 1689) = 70.793, p = 0.0000$; with the best behaviour grades $F(5, 1687) = 18,576, p = 0.0000$; with the average and high standard of living $F(2, 1690) = 9.6167, p = .00007$; living in bigger cities $F(4, 1688) = 3.6887, p = .00537$ (adoles-

cents living in villages show visibly lower rate of correct answers) and evaluating their level of DL in the area of using mobile devices $F(5, 1687) = 31.351, p = 0.0000$ and stationary digital devices $F(5, 1687) = 27.303, p = 0.0000$ as high and very high.

It is interesting that gender does not determine the average general results of the competence test $F(1, 1691) = 2.3822, p = .12292$. A slightly bigger dispersion of the correct and negative answers can be found in the group of boys. The detailed distribution is presented on Figure 1.

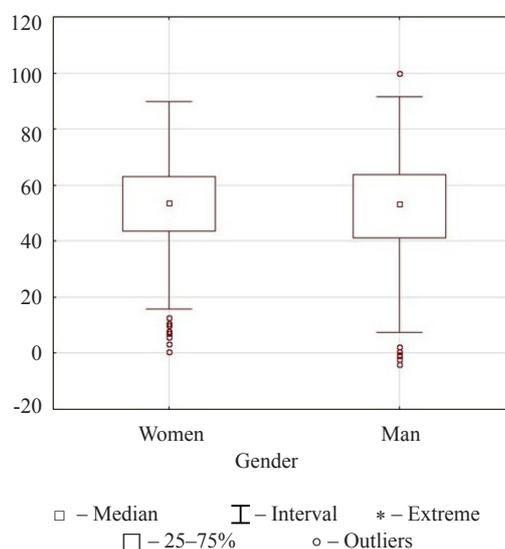


Fig. 1. Results in relation to gender

Additionally, there were no significant differences due to the nature of the school environment. For example, the results in schools where a serious incident of infringement of the digital safety had happened in the past are similar to the outcomes in schools classified as more digitally safe $F(2, 1690) = 2.9228, p = .05405$. Also, schools which have implemented programs to improve the level of DL in terms of safety have similar results as those where such programs have not been introduced $F(2, 1690) = 2.2753, p = .10308$.

The dependency between the test results and the principles of using the digital media in family environment is more complicated in the analysed age group. There is a hardly noticeable difference in the average results

between the adolescents with established rules and borders, and students who are allowed to use media in whatever way (Fig. 2). These differences are observed much earlier, in younger groups [21].

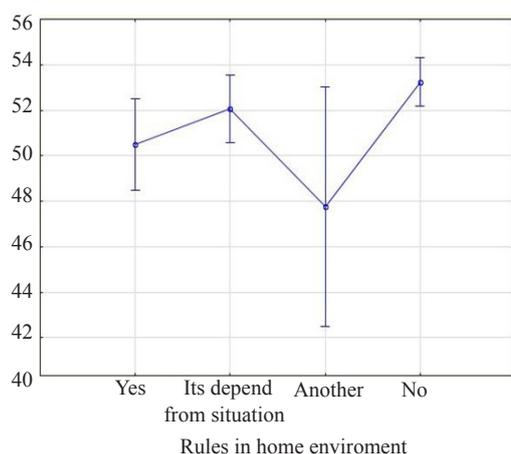


Fig. 2. Test results and the principles of using media in family environment

The competence test results are diverse due to many factors. First, there are differences in the level of correct answers for the proposed DL components. For example, the lowest result (the mean value of correct answers) in the competence test was for the questions regarding the copyrights and assessment of information credibility. On the other hand, the area of financial online operations received the relatively high scores. The detailed comparison of the average results, median and standard deviation are presented in Table 1.

The detailed analysis of the DL components related to the digital safety reveals that gender influences the knowledge and skills for the certain elements. Girls obtained slightly higher results in the soft areas like sexting, information credibility and cyberbullying. Boys, in turn, have more knowledge of the technical issues like protection of intellectual property and safety of financial operations.

There was a noticeable correlation between the DL components in each area (see Table 2). Every DL component is related to others so an increase in the knowledge and skills in one area leads to a growth of competence level for other DL component. Of course, the strength of this relations (Pearson’s linear correlation coefficient) varies. It is visible the most in the area of financial operations (including mainly technical skills of securing the hardware and ability to recognize online frauds).

In order to determine the correlations between the DL indicators, we used the cluster analysis method. For this purpose, the graph of k-means using the Euclidean algorithm was created. The detailed analysis of the graph confirmed that there are three clusters. On this basis, using the k-means method we have selected 3 groups. They are presented in Figure 3.

The cluster analysis enables the selection of the specific groups according to the intensity of certain features – in this case, test results. There are at least three areas where the groups differ from one another.

Table 1. DL components in the area of digital safety

Variables	Creation of image	Sexting and privacy	Piracy	Information credibility	Cyberbullying	Financial operations
Mean value	60.80	55.10	32.72	41.67	58.74	65.19
Median	66.66	66.66	33.33	38.88	61.11	72.22
SD	23.88	29.45	27.35	28.18	23.04	26.92
Gender	No difference $F = .84694$, $p = .35755$	Girls higher score $F = 18.606$, $p = .00002$	Boys higher score $F = 7.2528$, $p = .00715$	Girls higher score $F = 13.312$, $p = .00027$	Girls higher score $F = 14.407$, $p = .00015$	Boys higher score $F = 6.5940$, $p = .01032$

Table 2. Relations between DL components

	1. Creation of image	2. Sexting and invasion of privacy	3. Piracy	4. Information credibility	5. Cyberbullying	6. Financial operations
1.	1.0000	–	–	–	–	–
2.	.1877***	1.0000	–	–	–	–
3.	.2293***	.1746***	1.0000	–	–	–
4.	.2208***	.1654***	.2401***	1.0000	–	–
5.	.2582***	.2065***	.2235***	.3438***	1.0000	–
6.	.3022***	.2114***	.3353***	.3715***	.4338***	1.0000

Note: * < 0.05, ** < 0.001, *** < 0.0001.

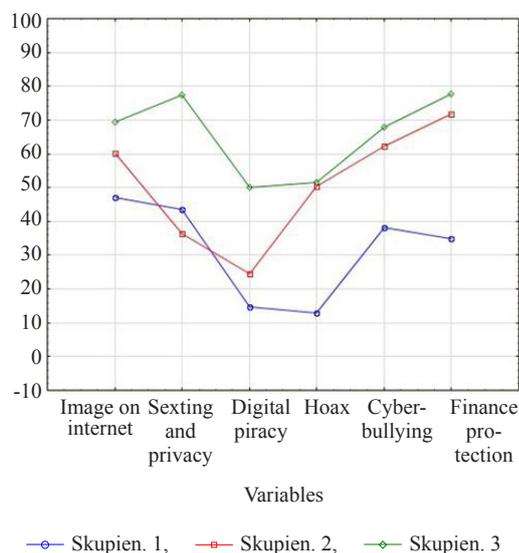


Fig. 3. Cluster analysis: Groups of students according to their test results

Cluster 1 (24.57%) are the respondents with the lowest results in almost every area, who did not exceed the level of 40% of correct answers in four areas. This is the group which requires particular educational support. Cluster 2 (34.02%) consists of the respondents who obtained satisfactory results in 4 areas but they lack sufficient knowledge regarding the consequences of neglecting the protection of privacy

and sexting, and protection of intellectual property. Cluster 3 are the students who provided more than 50% of correct answers in every area. This is 41.41% of the respondents who deal with digital threats relatively well, know the mechanisms and e-threats, as well as preventive and protective measures. The detailed cluster distribution is presented in Table 3.

Discussion and Conclusion

Digital literacy as a set of skills outlines a pragmatic approach for facilitating students’ digital literacy development and capture the digital experiences of today’s students [8]. However, the updating of the concept and the inclusion of new areas of research (Safety +) represent the necessary ongoing innovation as the changing practice demands.

The data collected allow us to estimate the level of knowledge of the digital safety among youth in the six areas. We are aware that the proposed methodology is limited by the number of indicators in each area and the great scope of existing e-threats [23]. Limiting each e-threat to 3 indicators was dictated by the length of the research tool, while narrowing down the threats to 6 areas was connected with the goals set in the Ministry project Bezpieczna+ (Safety+)

Table 3. The number of respondents in clusters (n = 1 693)

	Cluster 1	Cluster 2	Cluster 3
Count	416	576	701
Count in %	24.57	34.02	41.41



and expert selection. The research provides the first analyses of this type in Poland, that is, measurements of DL not based on self-assessment [21]. The evaluation of the DL level is characterised by a high variability as for the duration of the survey, because the nature of the e-threats is very dynamic. On the one hand, with the development of the information society there is a slow growth in the knowledge and skills regarding the digital safety [25; 26], on the other hand, new threats have been emerging, like misinformation, scams, thefts and all kinds of online frauds. Thus, in the context of digital safety DL is one of the priorities in media pedagogy.

This text presents the results of the research among the adolescents. This group shows the advanced level of DL in comparison to people at their earlier stages of education but at the same time, due to their age, these respondents are exposed to additional e-threats [27–29]. The nature of this developmental stage requires strengthening of DL, especially in the areas where the test results were the lowest, like the copyrights [30]. This area refers mainly to downloading and sharing music, videos, software or e-books. Technical competencies include also knowledge and ability to recognize different types of user licenses and functioning of selected protocols like P2P, warez services or file repositories. Another issue which requires educational support is disinformation, information noise and data smog [31]. Despite the relatively high level of digital literacy, teenagers have limited awareness of how to assess the credibility of information they come across. In the age of too much data, the ability to discern truth from false on information websites is also useful [32]. Strengthening competencies useful in the online world translates into other abilities useful offline [33]. We also noticed that parental control or established rules of using the new media in the family environment does not contribute directly to strengthening DL. The factors connected with educational restrictions in using the electronic media do not ensure the increase

of the digital safety level during adolescence [34].

The results also differ depending on the gender. Girls show much more advanced knowledge regarding the soft areas of DL whereas boys know more about the technical aspects. Gender-based differentiation is also noticeable in the areas of the styles of use of digital devices among the young people. The example of such discrepancies are Polish results of the EU KIDS Online study, showing that girls and boys use websites and digital services, and share their knowledge about the digital safety differently [35]. The differences are also connected with the place of living. The general test result were much lower in the rural areas than in the cities. This may be caused by many factors which are hard to identify based on the data collected. However, we can notice that, compared to cities, the offer of non-formal education focused on the development of digital literacy is much more reduced in the rural regions.

Another differentiating factor is the heterogeneity of the group. Fewer than half of the respondents provided more than 50% of correct answers regarding all areas. It is commonly believed that DL among the young ICT users is at high level. This is partially true. First of all, young people are highly literate in the area of entertainment, communication and information search [36–38]. Digital safety issues usually does not lay within the scope of interests of the young ICT users. Nevertheless, high results obtained, for example, in the area of online financial operations may suggest that activities young people perform frequently (like searching for information about sellers, shopping, sending secure money transfers) are the basis for building up knowledge in this area (as proved by the results of our research).

During the detailed data analysis we noticed that improvements in every area of DL are interrelated. Thus, strengthening one area leads to the increase in knowledge and skills in another. The data obtained confirm the complexity of the DL concept [4; 39]. DL components are interrelated but the

correlations are not strong enough to allow us to speak about the full internal coherence. DL involves many technical (using hardware and software) and soft (connected with information processes and influence of technologies on users' behaviour) skills. The results of our research contribute to the discussion on the unambiguous definition of DL [40; 41].

In contrast to previous studies that tended to focus on different types of digital competencies, this research explored the set of digital literacies based on the DL framework with new topics suggested by Kopecký [23] and Tomczyk [30]. The current research extended some aspects of the DL with special focus on sexting, piracy and cyberbullying.

ICT competencies and DL have become an essential aspect of the teaching and learning toolkit in the 21st century. In the last two decades have also witnessed the dynamic inclusion of ICT in education systems in new EU countries. The obtained results confirmed that young people are not a homogenous group of ICT users in all areas of DL [42].

For educational decision-makers, the findings highlight the importance of designing training programs aimed to develop students' digital literacies, with a special emphasis, e.g. on gender differences in some areas of DL, or on special topics like the copyrights.

In the age of the growing number of ever more complex e-threats, the ability to use ICT is not enough. Thus, the DL concept expands dynamically with the

development of the necessary skills and expertise needed to protect privacy, data and image and avoid cyberbullying and addictions. In the light of the increasing problematic Internet use, DL also means the ability to exercise self-control over the use of the digital media. Thus, DL becomes a new, dynamically transforming construct used to describe the changes occurring in the information society. The groups most vulnerable to the threats posed by the digital world are individuals with the low level of DL and individuals at the specific developmental stages and thus, showing the specific characteristics. Considering the frequency of using ICTs among the studied group of adolescents, the myths about the DL level in this population and the research results, the group should also be provided with the educational support in the area of e-threats. The holistic development of DL involves not only effective communication, information search or using the entertainment services, which are the typical activities teenagers engage in. They should also be able to anticipate social and technical threats resulting from the high saturation of their lives with the services typical for the information society.

Future studies may continue exploring the contribution of other new areas that will certainly bring the development of ICT. In future studies, it could be of importance to examine changes in digital literacies over time and in the context of different new educational contents.

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