
UNDERSTANDING DIGITAL COMPETENCES OF TEACHERS IN CZECH REPUBLIC

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Abstract

The aim of this study is to identify the importance of environment and of the users (teachers) in the development of digital literacy, including age, gender and socio-economic status, which can be considered as important predictors of digital competences. For example, research on gender relations and access to the Internet also shows that men use digital technologies more often and participate in Internet activities in comparison to women. The aim of this study is therefore to identify factors influencing one of the educational process areas in the information society and to give insight into how these processes are influenced by predictors diversity in the context of a digital society, from the viewpoint of teachers, their thinking, skills and behaviour.

Keywords: self-sufficiency, cultural, linguistic, diversity, anxiety

1. Introduction

Nowadays, different factors contribute to the human beings quality of life, and in its assessment from a socio-pedagogical point of view, the quality of the environment where a person has been conceived, where they live, work and are educated, has a significant place. Humans are not a passive part of the environment, they act on it with their activity and they can change it or modify it, but they can also devastate it.

The mentor of individuals in an environment that surrounds them and which they are also part of, is a teacher. In a globalising digital world, it is not possible to pass only ethnocentric cultural patterns of culture in the educational process without respecting the cultural dimension of citizenship. In a society based on information and digitisation it is not possible to pass only knowledge, but also attitudes and basic patterns for life in global digital society. The view of information technology in relation to humans is often limited to monitoring the social consequences of these technologies, and these are also often the subject of

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media or communication studies. The concepts of information or communication and diversity can't fully capture the whole area of technological acceleration, affecting society, culture and the everyday lives of all of us. This leads to deepening globalisation processes, faster intertwining of cultures, transfer of cultural formulas and dissemination of ideologies [1]. One possible a guide through this chaotic world can be the teacher?

Therefore, the question is how to describe and explore the developmental characteristics of information technology in relation to human beings, and are teachers ready to do so? For example, possible answers could be media studies that connect people with technologies. Media are often just at the interface of technology, art, Philosophy and other sciences, and they have the nature of a permanent scientific experiment as well as artwork or communication theory. Philosophy and art are combined in the media with their ability to change the natural world, social reality and also other intuitive concepts with their technology. As an example Manuel Castells states that: Connecting people, computers and the environment, in the context of media networks, is unable to organize or interpret our world, but serves 'only' to regroup and create 'new worlds' [2].

Modern technologies dominate the contemporary world. Pupils, students use tablets at school, they take notes directly onto their laptops, etc. What is the situation in our schools? From our own experience, we can say that the potential of digital technologies and the media in general is not being used in schools as much as it could be [Česká školní inspekce, *Využití digitálních technologií v mateřských, základních, středních a vyšších odborných školách. Tematická zpráva*, ČSI, Praha, 2017, http://www.csic.cz/html/tz_digitechnologie/html5/, accessed 23.07.2018].

Education in the Central European region belongs to the more conservative part of the continent, but that doesn't mean that it doesn't reflect this situation. On the contrary, out of roughly tens of thousands of primary schools, at least several hundred to thousands are intensely looking for a way of adapting to new conditions [EDULAB, *Program podpory digitalizace škol*, <https://www.edulabcr.cz/projekty/program-podpory-digitalizace-skol>, accessed 23.07.2018]. But we can't find identical models of school transformation.

Previously, it was generally about being a literate and obedient graduate, able to understand a command and follow it without interfering with it. In a hierarchically structured society typical of the nineteenth and twentieth centuries, it was a key skill leading to general prosperity. However, nowadays, it is primarily about the willingness to accept responsibility and the ability to take decisions. This is increasingly important in the world where we often do not have a supervisor and we decide for ourselves on large part of our working time. Therefore, we have responsibility as well as consequences for what we do.

The development of pupils' digital competences is one of the objectives of 21st century education. At first glance, educational subjects can be very remote to digital education. But if we introduce contemporary pupils who quite commonly use digital technology in extra-curricular life, and if we imagine the

life for which school is supposed to prepare for and in which they will live their productive age, digital technologies in education of any subject can't stay on the side-lines [3].

The key to linking social sciences and digital technologies is inspiration in today's everyday life. Digital technologies are commonly used in the out-of-school environment and often in other and inspiring ways whereby school education could benefit. Of course, we also should not forget the negative aspects that may arise when using digital technologies (Internet addiction, cyber-bullying, copyright infringement, misuse of personal information, etc.)

With the development of technology and modern communication media, in the last two decades we can see the pressure on pupils' preparation, as members of the digital society [4-6]. Furthermore, these scientists argue that such claims are commonplace and concepts such as a digital society or a digital citizen will become a common part of life, reflected in the behaviour of teachers, parents, legislators and wider society. The digital society concept can be understood either as the ethical, responsible and safe use of the Internet and a range of digital technologies [7] or in a broader context, as a multi-dimensional concept with five dimensions [8]: 1) technical skills, 2) local/global awareness, 3) networking agency, 4) Internet political activism and 5) critical perspective.

We live in a world based on the digital literacy of its citizens. Digital citizens need comprehensive knowledge and technological accessibility to the Internet and digital world and teachers have a responsibility to lead them to become digital citizens. A five-factor Digital Scale model [8] shows reliability and construct validity can be used as a digital scale for teachers.

Therefore, the basis is the use of the Internet, media and digital technologies for an active and responsible life in a digital society. However, to facilitate this process, it is assumed that teachers are fully competent in these areas and that they perceive themselves like that and have the necessary skills and knowledge. Therefore, empirical research should focus on the issues of how individual areas can be measured, which factors affect different levels of digital competence, are there any psychological characteristics related to the activities affecting the competency-level, etc. This was also one of the goals of our research. The teachers' levels of digital literacy or the relationships between psychological variables (Internet self-sufficiency and Internet anxiety) and teachers' levels of digital literacy will be investigated.

2. Digital society as a multivariate concept of cultural and linguistic diversity

The concept of digital society includes the following categories: digital ethics, media literacy and information literacy, participation/engagement and critical attitude [8]. Digital ethics implies ethical and responsible online behaviour [9], awareness of political, social and cultural issues arising from access to digital technologies and global information [10] and, last but not least,

digital rights and obligations such as protection of personal information, preventing bullying over the Internet, etc. [11].

Media and information literacy includes Internet access, the use of digital technologies and the ability to search for information [12] as well as certain social-communication skills and the so-called ‘open source’ thinking [13]. Participation/engagement is then thought of as an individual engagement in public affairs, orientation in information shared over the Internet and personal interest in online communication, games and entertainment [A. Lenhart et al., *Teens, kindness and cruelty on social network sites: How American teens navigate the new world of ‘Digital Citizenship’ Pew Internet & American Life Project*, 2011, <https://files.eric.ed.gov/fulltext/ED537516.pdf>, accessed 14.04.2018]. The last is a critical attitude that relies on a critical view and an attempt to balance information, etc.

3. Factors affecting the level of digital competences – research survey

The above-mentioned studies indicate the importance of the environment - user environment/background, including age, gender and socio-economic status, which can be considered as important predictors of digital competence. It’s reported that younger people have a higher level of technical skills [14] and digital literacy [15]. Research on gender relations and access to the Internet also shows that men use digital technologies more often and participate in Internet activities in comparison to women.

On the other hand, the so-called personal variables (age, gender, level of education, income, etc.) on the digital literacy of individuals are influenced by circumstances arising from needs. Some studies further acknowledge that teachers’ competencies in the use of digital technologies such as computers, mobile devices and the Internet, significantly affect their technical skills as well as teaching [16]. In our own research, we relied on the following research questions:

1. What are teachers’ levels of digital literacy in Czech Republic?
2. What are the relationships between psychological variables (Internet self-sufficiency and Internet anxiety) and teachers’ levels of digital literacy in Czech Republic?

The sample of this study composed of primary and secondary school teachers in Czech Republic. Overall, 540 teachers were contacted, of which 351 respondents could be considered as relevant for our study. The corpus was not limited to a certain gender, age structure, or type of school. The teachers’ characteristics are summarised in Table 1. The research was carried out in 2016.

The questionnaires included questions related to the teaching professional background, gender, age, years of pedagogical practice, Internet use, use of media and digital technologies for teaching, etc.

Five groups were used to determine the level of digital competence, including areas such as technical skills, media and information literacy, engagement and critical attitude.

Table 1. Teachers' characteristics (n = 351).

Variable	Category	Number	%
Gender	male	78.0	22.2
	female	270.0	76.9
Age	up to 30	113.0	32.2
	31-50	117.0	33.3
	over 50	118.0	33.6
Length of pedagogical practice	up to 1 year	37.0	10.5
	up to 15 years	79.0	22.5
	6-10 years	74.0	21.1
	11 - 20 years	98.0	27.9
	over 21 years	60.0	17.1
Level of school	primary school	199.0	56.7
	grammar school	72.0	20.5
	secondary vocational school	77.0	21.9

The first research question was measured by the average of respondents' answers with standard deviations. The second research question was analysed by a correlation analysis of relationships between self-confidence and Internet anxiety and levels of digital competence. Subsequently, the t-Test compared the degree of competence between lower self-confidence/anxiety (below the mean value) and higher confidence/anxiety values (above the mean value).

This process allowed us to identify the factors influencing the level of digital competence in the selected sample of respondents by examining the relationships between the variables.

4. Digital competences of teachers

If we look at the averages and the standard deviations of the individual sub-groups in the measurement of digital competences (Table 2), then results can be interpreted in such a way that the respondents were most different in the answers and therefore achieved the greatest variance in Networking - online communication (N, average 4.57, deviation 1.38) and vice versa, they reached the smallest deviation for Technical Skills (TS, average 6.25, deviation 0.85), while in categories such as Internet self-confidence and Internet anxiety, the respondents also moved in the level of relatively small deviations.

The relationship between the two psychological categories (Internet self-confidence (IS) and Internet anxiety (IA) and other groups (TS, MGP, N, IA and CV) are presented in Table 3. To determine these connections, Pearson's correlation coefficient ranging from -0.28 to 0.66 was chosen. There were strong correlations between IA and N (0.53) and between IA and CV (0.54). It's also evident that IA less strongly and negatively correlate with TS, MGP and N, but IS doesn't have a significant correlation to IA. In addition, no correlation was higher than 0.70.

Table 2. Average and standard deviations of respondents' answers.

Category	n	Average	Deviation
Technical skills (TS)	4	6.25	0.85
Knowledge of the Internet (MGP)	2	5.59	1.29
Networking - on-line communication (N)	4	4.57	1.38
Internet activity (IA)	9	2.46	1.23
Critical view (CV)	7	3.72	1.19
Internet self-confidence (IS)	17	5.44	0.93
Internet anxiety (IA)	19	3.06	0.86

Table 3. Pearson correlation.

	TS	MGP	N	AI	CV	IA	IS
TD	-	0.39	0.26	0.04	0.24	0.46	-0.28
MGP		-	0.33	0.21	0.45	0.47	-0.28
N			-	0.50	0.46	0.53	-0.17
AI				-	0.66	0.30	-0.02
CV					-	0.54	-0.04
IA						-	-0.27
IS							-
p < 0.01							

Table 4. T-test results between lower IA and higher IA.

	Lower IA		Higher IA		T
	average	deviation	average	deviation	
TS	5.92	0.99	6.54	0.56	-7.08
MGP	5.08	1.35	6.05	1.02	-7.51
N	3.94	1.25	5.13	1.24	-8.90
IA	2.10	1.04	2.79	1.30	-5.54
CV	3.16	1.02	4.22	1.09	-6.33
p < 0.01					

Table 5. T-test results between lower IS and higher IS.

	Lower IS		Higher IS		T
	average	deviation	average	deviation	
TS	6.47	0.68	6.03	0.95	4.93 **
MGP	5.90	1.03	5.28	1.44	4.59 **
N	4.72	1.51	4.42	1.21	2.04 *
IA	2.44	1.28	2.49	1.18	-0.38
CV	3.74	1.31	3.70	1.06	0.30
* p < 0.05; ** p < 0.01					

Subsequently, a T-test was performed among respondents who had a lower IA/IS ratio and those who had a higher IA/IS ratio (below and above the mean value). As expected, there were statistically significant differences in all

categories with the respondents with higher IA than those with lower IA (Table 4). The respondents who have a lower level of anxiety from the Internet are likely to use the Internet more successfully, communicate online, etc. Similarly to the results of the IA/IS correlation, it has been found that there are significant differences among TS, MGP and N of teachers with lower IS than those with a higher IS (Table 5).

5. Discussion

The first research question examined the respondents' level of digital competence. According to the answers, it can be stated that teachers equipped with technical skills, equipped with knowledge from the internet world and capable of online communication, have confidence in their movement in the virtual environment, can inspire and lead their pupils and react and interpret adequately. However, they were less likely to participate in online political events and the tendency to analytically not think about bias, prejudice and injustice occurred online. Therefore, teachers fulfilled the first and second conditions of digital citizenship but did not fully meet the third condition.

The second research question examined the mutual relationships between the two psychological factors and the five dimensions of digital literacy, which led to a comparison of results between teachers with lower IA/IS and higher IA/IS. Internet self-sufficiency was positively correlated with all criteria, while internet anxiety was negatively correlated with TD, MGP and N. Internet anxiety wasn't correlated significantly with IA and CV, which means that teachers who are afraid of Internet activities are naturally afraid to actively participate in online communications, but on the other hand their critical approach to using the Internet and Internet activities is significant. Therefore, Internet anxiety has a significant relationship with IA. In addition, teachers with higher confidence in the internet and lower anxiety scores tended to have a higher level of overall digital literacy.

An unexpected but interesting result was that Internet anxiety was a positive CV predictor. Teachers who don't trust online content and information on the Internet tend to be more critical of online resources and materials.

6. Conclusions

This study briefly presents the findings of a research survey that outlines an understanding of digital literacy of teachers as a key determinant in the preparation of future generations in digital society. The presented research has examined some factors influencing the digital literacy levels, but also relations between some variables such as media relations, Internet use, globalisation and psychological issues. The results showed a positive correlation between the Internet usage and the levels of digital literacy. The assumption that variables such as the use of technology and the self-confidence of Internet users can provide the necessary skills to move around the virtual world and therefore the

skills required to 'guide' their pupils in this world using networking, communication and online collaboration and critical views of both positive and negative phenomena associated with the Internet, was confirmed.

Although the study has provided us with some results relevant to the development of teachers' digital literacy in a multi-dimensional and global way and some limitations need to be specified. Of course, there is a possibility that teachers in study do not have to form a representative sample - their number is relatively low. Another limitation may concern the choice of questions and their interpretation by the respondents, and the participants' bias may also appear. All factors and variables are not completely accurate - that is the main problem with all of the studies, but they give a relatively clear picture of society development its preparation for future challenges compared to other similar researches.

The teaching profession is a profession that requires lifelong learning. In our digital and global age, teachers should strive to be informed by fully committed digital citizens' patterns and student guides in the emerging digital society.

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