Associate Professor Eunika Baron-Polańczyk,PhD, https://orcid.org/0000-0002-8163-5491
Department of edia and information Tehnology
Institute of Pedagogy
Faculty of Social Sciences
University of zielona Góra

Correlation between Pupils' and Teachers' Opinions regarding the Spheres and Effects of ICT Use by Children and Teenagers (Research Report)

Korelacja opinii uczniów i nauczycieli w zakresie obszarów i skutków korzystania przez dzieci i młodzież z narzędzi ICT (raport z badań)

Abstract: The article presents a fragment of diagnostic-correlative research of a mixed character, identifying pupils' information literacy in the use of ICT methods and tools in the context of new technological trends and accompanying civilisation changes. The authors aim to answer the question: What is the relationship between pupils' opinions and teachers' observations regarding the spheres and effects of ICT use by children and teenagers? For this purpose, the method of diagnostic survey (questionnaire and interview) and statistical methods were used. Together, 2510 pupils and 1110 teachers (in Poland) were involved. The interpretation of the strength of relationship between the co-existent variables – based on the obtained values of correlation (r) and determination (r^2) coefficients – in general allows for stating that: 1) a noticeable dissonance exists between pupils' opinions and teachers' observations regarding the spheres and effects of ICT use by children and teenagers; 2) the identified differences (the minus/negative correlations in 6 cases) and similarities (the plus/ positive correlations in 4 cases) between pupils' and teachers' opinions indicate a significant "separation" between the world of children and teenagers ("Us") and the world of teachers ("Them"); 3) in three categories, an obvious relationship (a very high level of dependence) exists between pupils' and teachers' observations as to the spheres and effects of ICT use by children and teenagers, namely "working with information" ($r^2 \cong 0.79$; $r \cong 0.89$), "network communication" ($r^2 = 0.78$; $r \cong 0.88$), and "preparing for classes" ($r^2 \cong 0.70$; $r \cong -0.84$).
Keywords: media pedagogy, diagnostic-correlative studies, information literacy, the use of ICT methods and tools, correlation between opinions.

Abstrakt: Artykuł przedstawia fragment badań, diagnostyczno-korelacyjnych o charakterze ilościowo-jakościowym, ustalających kompetencje informacyjne uczniów w zakresie wykorzystywania metod i narzędzi ICT w kontekście nowych trendów technologicznych i towarzyszącym im przemianom cywilizacyjnym. Rozważane zagadnienia poszukują odpowiedzi na pytanie: Jaki jest związek pomiędzy opinią uczniów a spostrzeżeniami nauczycieli w zakresie obszarów i skutków stosowania ICT przez dzieci i młodzież? Zastosowano metodę sondażu diagnostycznego (ankietę i wywiad) oraz metody statystyczne. Zbadano 2510 uczniów i 1110 nauczycieli (w Polsce). Interpretacja siły związku pomiędzy współwystępującymi zmiennymi – na podstawie uzyskanych wartości współczynników: korelacji (r) i determinacji (r^2) – w ogólnym ujęciu pozwalają stwierdzić m.in., że: 1) zauważalny jest pewien rozdźwięk między opinią uczniów a spostrzeżeniami nauczycieli w zakresie obszarów i skutków stosowania ICT przez dzieci i młodzież;

2) ustalone różnice (korelacja ujemna/ negatywna w 6 przypadkach) i podobieństwa (korelacja dodatnia/ pozytywna w 4 przypadkach) poglądów uczniów i nauczycieli wskazują na znaczące „odseparowanie" świata dzieci i młodzieży („My") od świata nauczycieli („Oni"); 3) wyraźny związek (bardzo wysoki stopień zależności) pomiędzy opinią uczniów a spostrzeżeniami nauczycieli w zakresie obszarów i skutków stosowania ICT przez dzieci i młodzież, istnieje w trzech kategoriach: „operowanie informacją" ($r^2 \cong 0.79$; $r \cong 0.89$), „komunikacja sieciowa" ($r^2 = 0.78$; $r \cong 0.88$) oraz „zajęcia lekcyjne" ($r^2 \cong 0.70$; $r \cong -0.84$).
Słowa kluczowe: badania diagnostyczno-korelacyjne, kompetencje informacyjne, , korelacja opinii, pedagogika medialna, wykorzystywanie metod i narzędzi ICT.

Introduction

The ICT era (*Information and Communication Technology*) places ever-newer and higher demands on pupils and teachers, oriented at shaping new spheres of information literacy (Van Deursn, Van Dijk, 2014, pp. 43-62). It determines new directions of development and of undertaken, school and extra-curricular, tasks. Accordingly, this study aimed to establish pupils' information literacy in using ICT methods and tools in the context of new technological trends and accompanying civilisation changes. The authors investigated the scope of knowledge, understanding, as well as activities and attitudes revealed in children and teenagers' approaches to new ICT trends. Besides pupils' opinions, teachers' views turned out to be equally interesting, particularly, those regarding the spheres and effects of ICT use by the young generation.

Accordingly, two issues had to be established as regards educational practice: 1) the spheres of ICT use, i.e., the authors identified the purposes and tasks for which children and primarily teenagers use modern technology, the tools preferred by them, the hierarchy of digital instruments used and the spheres of activity in which pupils engage; 2) effects of using ICT tools, i.e., the authors determined broad effect areas of modern technology and classified the effects ("impact") of new media.

The comparison between the information obtained from students and teachers (expressed through the level of dependence, correlation between opinions) revealed differences and similarities as regards the needs, expectations, and aspirations of the education agents, i.e., pupils and teachers. These findings are significant for the understanding of the teaching-learning process, particularly, in the context of the eternal inter-generational conflict ("mismatch") expressed through the "Us" (pupils) versus "Them" (teachers) opposites (Baron-Polańczyk, 2018).

1. Research assumptions

The theoretical stance adopted in the article is determined by: 1) concepts in critical pedagogy that assumes "persistent resistance to the obvious", visions and goals open to

social dialogue; 2) postmodernist approach that involves multi-dimensional emancipation – "ambiguous modernity" and "liquid modernity"; 3) promotion of self-education, self-realisation, self-determination and open education (Bauman, 2011, 2015; Melosik, Szkudlarek, 2010; Szkudlarek, Śliwerski, 2009); 4) proposal to shape and develop information literacy, which links the fundamentals of education to constructivist theory (with particular consideration for socio-cultural perspective) and implies a particular way of thinking about creating knowledge, namely learning about ICT methods and tools via ICT (Henson, 2015); 5) optimistic visions of future in which media and technologies can be used effectively to support learning and sound development (Berdik, 2020). When establishing the educational practice in schools, the authors attempted to collate the educational reality with the currently dominant scientific theories that lay out the picture of the "new pupil". This pupil exists successfully and self-realises in cyberspace, in the world of "new new media" (Levinson, 2013), which enable multisensory transfer of information and multisensory learnings, is constantly online and has unlimited possibilities to use new spaces in e-learning. The authors assumed that the path of development is determined by the global cultural imperative to participate in the process of constructing and negotiating symbols, values, meanings, and in which the pupil is partnered primarily by technologies, machines, and tools (Gabriel, Röhrs, 2017). It was also assumed that the pupil is said to be successful only when they are approved of and know that their problems are noticed and understood. Then, their mind "opens" – the pupil can fully use the potential with which he/she entered the school (Rasfeld, Breidenbach, 2014, pp. 109-115).

At the conceptual stage, the authors assumed that the research would take the form of diagnostic-correlative studies (Ferguson, Takane, 1989, pp. 32, 226-246; Rubacha, 2008, p. 29) of a mixed character (Dróżka, 2010, p. 125), framed mostly within media pedagogy. Two methods were used: questionnaire and open interview (Frankfort-Nachmias, Nachmias, DeWaard, 2015, pp. 240-265). Besides quantitative research, the authors implemented the procedures and techniques incorporating elements of analysis and qualitative explanation with quantitative aspects. The triangulation allowed for learning more about and presenting the research problem (verging between education, technique and information technology) from two different perspectives (Furmanek, 2016, pp. 21, 28). The conducted statistical calculations – using the chi-square test for independence and the Pearson correlation coefficient (King, Minium, 2003, pp. 165-181, 458-478) – helped establish the relationship between pupils' opinions and teachers' observations and identify the factors that diversify the researched phenomena.

The core study (the survey), involving teachers of various courses[1] and pupils at four stages of education[2], were conducted in chosen educational establishments in Lubuskie and

---

[1] The teachers enumerated a total of 23 subjects they taught – apart from the basic general education subjects, also in the upbringing and professional spheres.

the three neighbouring voivodships[3] (in Poland). The interview involved 40 pupils attending schools in Zielona Góra and nearby towns (10 persons were chosen at each stage of education). The interview, directed by a card with instructions for an individual, face-to-face interview was introduced in order to qualitatively reveal the analysed phenomenon. The narrative focused on the respondents' opinions on the spheres and effects of ICT use by young people. The sample group comprised 2510 pupils and 1110 teachers.

The following research questions were asked: What is the hierarchy of importance ICT tools use (in pupils' and teachers' opinions) by children and teenagers in the following spheres: 1) computer games (PC games, online, RPGs…); 2) network communication (electronic mail, chats, communicators: Skype, Facebook Messenger, Snapchat, WhatsApp, Discord, Hangouts, etc.); 3) searching for interest-based information; 4) preparing for classes (doing homework); 5) spending leisure time ("wasting" time)?, and To what extent (in pupils' and teachers' opinions) does ICT use by children and teenagers: 1) improve their reaction time and manual coordination; 2) shape creativity and cooperative skills; 3) has influence on how quickly they search for, select and evaluate information; 4) improve their ability to concentrate and ignore distractions; 5) cause chaos and information "confusion"? The results presented in the article answer the question establishing the relationship between students' opinions and teacher's observations regarding the spheres and effects of the use of ICT by children and teenagers.

2. Results

The question regarding the primary purposes for which children and teenagers use ICT was answered by 2490 (99.2%) pupils and 1110 (100.0%) teachers. On the other hand, the question about what children and teenagers gain from using ICT was answered by 2456 (97.8%) pupils and 1061 (95.6%) teachers. Both groups provided only the relevant answers (out of five possible indications for spheres and effects of ICT use respectively) ordered by descending importance from the most important (1) to the least important (5). This way, the authors identified the hierarchy of importance illustrating students' and teachers' choices and views on: 1) ICT-related activities, indicating how important particular tools and activities based on them are; 2) the impact of modern technology, indicating how relevant particular effects are, what are the consequences of using new media. The established frequency distributions (numeric and weighted values) are presented in the form of aggregate hierarchy (Table 1).

---

[2] The stages of education in Poland at the time of the research: 1) integrated education (ages 7-10; one teacher running alone all the subjects); 2) primary school (ages 11-13); 3) junior high school (Pol. gimnazjum, ages 14-16); 4) high school (ages 17-20).
[3] Voivodship (Pol. województwo) – a political and administrative division of Poland, forming the chief unit of local administration.

Table 1. Spheres and effects of ICT use by children and teenagers – aggregate hierarchy (in pupils' and teachers' opinions)

Aggregate hierarchy				
Activities in the ICT environment/ impact of ICT	Number of pupils		Number of teachers	
	weighted*	numeric (zero weight)	weighted	numeric (zero weight)
Aggregate hierarchy of children and teenagers' activity in chosen spheres of ICT				
Computer games	1420	141	965	49
Network communication	1765	138	875	71
Searching for information	1590	157	492	277
Classes	1525	159	375	327
Leisure time	923	282	417	390
Aggregate hierarchy of ICT impact on children and teenagers in selected spheres of ICT				
Reaction time and manual coordination	1414	248	565	315
Creativity and coordination	1585	215	462	408
Working with information	1837	116	790	159
Concentration	1302	280	319	539
Chaos and information 'confusion'	728	352	365	454

(*) Since the calculations and interpretations were conducted on a five-point linear scale (0-5), adequate weights were assigned to the numeric values obtained at particular levels of importance: level 0 = weight 0; 5 = 0.2; 4 = 0.4; 3 = 0.6; 2 = 0.8; 1 = 1.0.

Source: Author's research.

To calculate how strong the relationship (Lewicki, 1998, p. 107) between the two examined (coexistent) variables is, the authors used the coefficient of determination (r^2) and the Pearson correlation coefficient (r) (Ferguson, Takane 2016, pp. 142-143; Juszczyk, 2006, pp. 166-171; Konarzewski, 2002, pp. 190-93; Nowaczyk, 1995, pp. 98-105). The obtained numeric measures and the corresponding labels assigned to the degrees of dependence – by Andrzej Góralski (1987, p. 38) and Joy Paul Guilford (1964, p. 157) – are presented in Table 2.

Table 2a. Correlation between pupils' opinions and teachers' observations on the spheres and effects of using ICT tools by children and teenagers (significance level p = 0.1)

Correlation between pupils' opinions and teachers' observations				
Activities in the ICT environment/ Effects of ICT	Pearson's coefficients and interpretation			
	coefficient of determination (r^2)	correlation coefficient (r)	Degree of dependence	
			by A. Góralski	by J.P. Guilford

Table 2b. Correlation between pupils' opinions and teachers' observations on the spheres and effects of using ICT tools by children and teenagers (significance level p = 0.1)

Spheres of using ICT tools by children and teenagers				
Computer games	0.236388594	0.486198101	average correlation; plus (positive)	moderate correlation
Network communication	0.782167667	0.884402435	very high correlation; plus (positive)	high correlation
Searching for information	0.003496935	-0.059134886	slight correlation; minus (negative)	slight correlation
Classes	0.704424888	-0.839300237	very high correlation; minus (negative)	high correlation
Leisure time	0.004096195	-0.064001523	slight correlation; minus (negative)	slight correlation
Effects of using ICT tools by children and teenagers				
Reaction time and manual coordination	8.25682E-05	-0.009086705	slight correlation; minus (negative)	slight correlation
Creativity and cooperation	0.001208117	-0.034757972	slight correlation; minus (negative)	slight correlation
Working with information	0.791386977	0.889599335	very high correlation; plus (positive)	high correlation
Concentration	0.013455254	-0.115996786	weak correlation; minus (negative)	slight correlation
Chaos and information "confusion"	0.082755189	0.287672017	weak correlation; plus (positive)	low correlation

Source: Author's research.

Pearson correlation coefficients with a positive sign (4 cases) indicate that the slope of regression lines is positive, i.e., the correlation adopts the plus sign (is positive) and both variables go up in the same direction (Mikrut, 2001, p. 87; Pilch, Bauman, 2010, p. 133). This means that as the values of pupils' self-assessment (levels of importance ascribed by children and teenagers) increase, the values of assessment by teachers (levels of importance indicated by teachers) increase, too. On the other hand, the obtained correlation coefficients with negative signs (6 cases) indicate that the slope of regression lines is decreasing, i.e., the correlation is negative. The negative values mean that pupils' self-assessment within particular categories, i.e., spheres or effects of ICT use, gets lower, while the values ascribed

by teachers in the same categories increase. It is necessary to emphasize that the data obtained in order to calculate the correlations (in the undertaken overview research) provide only indications on whether the values of variables are related. These values can correlate, even though this does not imply causation (Ferguson, Takane 2016, p. 143; Konarzewski, 2002, pp. 191, 193).

Given the obtained results (self-assessment by 2490 pupils and opinions of 1110 teachers on the **spheres** of ICT use by children and teenagers) and the interpretation of the strength of relationship between the coexistent variables, based on the value of the correlation coefficient (r) and coefficient of determination (r^2), one can state that the correlation between pupils' opinions and teachers' observations regarding the frequency with which children and teenagers use:

1)   computer games is average (r $\cong$ 0.49). The correlation adopts the plus sign (is positive) and it indicates that the changes in both analysed variables move in the same direction. Thus, 24% of the variability in children and teenagers' convictions about the importance of games and playing can be predicted based upon the variability in teachers' opinions in this sphere ($r^2 \cong 0.24$);

2)   network communication is very high (r $\cong$ 0.88). The correlation adopts the plus sign (is positive) and it indicates that changes in both analysed variables move in the same direction. As much as 78% of variability in children and teenagers' convictions about the importance of ICT tools can be predicted based upon the variability in teachers' views on this sphere of activity among contemporary pupils ($r^2 \cong 0.78$);

3)   digital tools to search for interest-based information is slight (r $\cong$ -0.06). The correlation adopts the minus signs and it expresses opposing changes in both variables. Regarding the variability in pupils' convictions on the importance of ICT use to search for digital information, barely 3‰ of it can be predicted from the variability in teachers' views on this activity sphere among children and teenagers ($r^2 \cong 0.003$);

4)   ICT tools to prepare for classes (to do homework) is very high (r $\cong$ -0.84). The correlation adopts the minus sign (is negative) and it indicates that changes move in opposite directions in both analysed variables. As much as 70% of variability in pupils' convictions about the level of importance of ICT use to perform school duties and do homework can be predicted based upon variability in teachers' views on this sphere of activity ($r^2 \cong 0.70$);

5)   ICT as a form of spending leisure time ("wasting time") is slight (r $\cong$ -0.06). The correlation adopts the minus sign (is negative) and it indicates opposing changes in both analysed variables. Barely 4‰ of the variability in pupils' convictions about the importance of enjoying leisure time in the digital world can be predicted based upon the variability in teachers' views on such leisure time activities among children and teenagers ($r^2 \cong 0.004$).

Given the established results (self-assessment by 2456 pupils and opinions of 1061 teachers on the **effects** of ICT use by children and teenagers) and the interpretation of the

strength of relationship between the correlated variables, based on the value of the correlation coefficient (r) and coefficient of determination (r^2), it can be stated that the correlation between pupils' and teachers' opinions on the effects of ICT use by children and teenagers as to:

1) improving reaction time and manual coordination is slight (r $\cong$ -0.009). The correlation adopts the minus sign (is negative) and it expresses opposing changes in both analysed variables. It is therefore impossible to predict the variability in pupils' opinions based upon the variability in teachers' opinions regarding the influence of new media on children and teenagers ($r^2 \cong 8.26E$-05);

2) shaping creativity and ability to cooperate is slight (r $\cong$ -0.03). The correlation adopts the minus sign (is negative) and the changes in both analysed variables move in opposite directions. Barely 1‰ of variability in pupils' convictions as to the importance of the impact of ICT on the development of creativity and cooperation can be predicted based upon the variability in the corresponding views among teachers ($r^2 \cong 0.001$);

3) the influence on how quickly pupils search for, select and evaluate information is very high (r $\cong$ 0.89). The correlation adopts a positive sign (is positive) and indicates that the changes in both analysed variables move in the same direction. As much as 79% of variability in pupils' beliefs about the impact of ICT on their work with information can be predicted based upon the variability in teachers' views regarding such effects ($r^2 \cong 0.79$);

4) improving the ability to concentrate and ignore distractions is weak (r $\cong$ -0.12). The correlation adopts the minus sign (is negative) and it expresses opposing changes in both variables. Only 1% of variability in pupils' convictions about the importance of ICT for concentration development can be predicted based upon the variability in teachers' views on the importance of this effect among children and teenagers ($r^2 \cong 0.01$);

5) causing chaos and "information" confusion is weak (r $\cong$ 0.29). The correlation adopts the plus sign (is positive) and it expresses changes that go in the same direction in both variables. 8% of variability in pupils' convictions on the role of ICT in causing information chaos and mayhem (information overload and disorder) can be predicted based upon the variability in teachers' views as to this effect among children and teenagers.

Therefore, an obvious relationship between pupils' opinions and teachers views on the analysed spheres and effects of ICT use by children and teenagers can be observed only in three categories: 1) the sphere of activities in network communication; 2) the sphere of preparation for classes (doing homework); 3) effects of media-based activities, related to working with information. Since over half the variance in one variable (self-assessment by pupils) can be predicted based upon the variance in the second variable (teachers' views), it is possible to speak here about a significant relationship; and in the clearly distinctive cases (when $r^2 > 0.70$), even about a very strong correlation (a very high degree of dependence).

3. Interpretation and discussion

The results (establishing: the hierarchy of cyberspace activities, the level of importance of ICT effects, and the correlation) draw attention to differences and similarities between students' and teachers' views. These are expressed through the degree of dependence in Graph 1.

Spheres and effects of ICT use by children and teenagers		
"US" (pupils' opinion)	**Differences and similarities** (strength of relationship)	**"THEM"** (teachers' opinion)
hierarchy of activities / level of importance of ICT effects		hierarchy of activities / level of importance of ICT effects
	What unites us?	
1 (ranked first) – the highest weight – the highest-importance impact	Influence on how quickly pupils search for, select, and evaluate information [*Effect*] correlation: plus sign, very high [$r^2 \cong 0.79$; $r \cong 0.89$]	1 (ranked first) – the highest weight – the highest-importance impact
1 (ranked first) – the highest weight – the highest-importance activity	Network communication [*Sphere*] correlation: plus sign, very high [$r^2 = 0.78$; $r \cong 0.88$]	2 (ranked second) – very high weight – very high-importance activity
4 (ranked fourth) – low weight – low-importance activity	Computer games [*Sphere*] correlation: plus sign, average [$r^2 \cong 0.24$; $r \cong 0.49$]	1 (ranked first) – the highest weight – the highest-importance activity
5 (ranked fifth) – the lowest weight – the lowest-importance impact	Causing chaos and information "confusion" [*Effect*] correlation: plus sign, weak [$r^2 \cong 0.08$; $r \cong 0.29$]	4 (ranked fourth) – low weight – low-importance impact
	What divides us?	
3 (ranked third)	Improving reaction time and manual	2 (ranked second)

– high weight – significant-importance impact	coordination [*Effect*] correlation: minus sign, slight [$r^2 \cong 8.26E\text{-}05$ (~0); $r \cong -0.009$]	– very high weight – very high-importance impact
2 (ranked second) – very high weight – very high-importance impact	Shaping creativity and ability to cooperate [*Effect*] correlation: minus sign, slight [$r^2 \cong 0.001$; $r \cong -0.03$]	3 (ranked third) – high weight – high-importance impact
2 (ranked second) – very high weight – very high-importance activity	Searching for interest-based information [*Sphere*] correlation: minus sign, slight [$r^2 \cong 0.003$; $r \cong -0.06$]	3 (ranked third) – high weight – important activity
5 (ranked fifth) – the lowest weight – the lowest-importance activity	Spending leisure time ("wasting time") [*Sphere*] correlation: minus sign, slight [$r^2 \cong 0.004$; $r \cong -0.06$]	4 (ranked fourth) – low weight – low-importance activity
4 (ranked fourth) – low weight – low-importance impact	Improving the ability to concentrate and ignore distraction factors [*Effect*] correlation: minus sign, weak [$r^2 \cong 0.01$; $r \cong -0.12$]	5 (ranked fifth) – the lowest weight – the lowest-importance impact
3 (ranked third) – high weight – high-importance activity	Preparing for classes [*Sphere*] correlation: minus sign, very high [$r^2 \cong 0.70$; $r \cong -0.84$]	5 (ranked fifth) – the lowest weight – the lowest-importance activity

Graph 1. Differences and similarities between pupils' opinions and teachers' observations on the spheres and effects of using ICT tools by children and teenagers
Source: Author's research.

Comparing pupils' self-assessment and teachers' opinions, the highest correlation of opinions (very high degree of dependence) can be indicated in two areas: 1) the sphere of using ICT for network communication; 2) the effect of using new media visible in how quickly pupils search for, select, and evaluate information (work with information). Since ICT by definition involves "information" and "communication", one could have expected that opinions concerning the frequency of using "network communication" and the improvement of literacy in "working with information" would be similar. These two

categories ranked highest in the identified hierarchy of importance (Table 1). Improving children and teenagers' ability to 'work with information' (effect of their presence in the cyberspace) ranked first (as the highest impact of ICT) among both pupils and teachers. In turn, "network communication" ranked highest among pupils, who declared it to outweigh other activities they are engaged in in the media. Teachers ranked it as the second in importance, thus, undertaken to a lesser extent.

Both groups' opinions on the role of computer games and the frequency of their use by pupils in everyday activity in cyberspace, also, converge, though to a lesser degree (an average strength of the relationship). However, the ranks attributed to games (playing games) by pupils and teachers differ and reveal differences in how both groups perceive them. As shown in the aggregate hierarchy of importance, games and plays are of "low importance" to pupils, who rank them only as the fourth. Teachers, on the other hand, think that pupils rank this sphere of activity as the first, as the most important and most frequently engaged into. They are fully convinced that for their pupils the ICT world is primarily the game world.

It is rather surprising what the researched think of the role of ICT in generating chaos and "information" confusion among young users of cyberspace. This consistency of views (weakly, but still positively correlated) may indicate that both researched groups are, even though to a various degree, aware of numerous dangers and negative social effects of using the new media. However, teachers (who rank this effect as the third in importance), compared with pupils (who rank it as the fifth), regard the somewhat harmful influence of ICT to be the cause of information chaos and mayhem that prevent rational work with information.

Differences in opinions concern pupils' activities related to searching for interest-based information and the impact of ICT on improving reaction time and manual coordination as well as shaping creativity and ability to cooperate. The differences between pupils' and teachers' views in these three categories may be identified as slight, but also (due to the negative correlation) as negative. In the overall aggregate hierarchy of importance, the contrast between students' and teachers' opinions ranges within one level of importance. In these cases, the researched ranked a given sphere or effect of ICT use either as the second (very high importance) or as the third (high-importance).

The views differ more as regards the role of ICT in spending leisure time and the impact that new media have on improving the ability to concentrate and ignore distractions (slight and weak correlations, respectively). Both categories were ranked very low by the researched, namely as the fourth (low importance) by teachers and/or the fifth (the lowest importance) by pupils. Thus, the difference between both groups' opinions ranges within one level. It is noteworthy that spending leisure time (after completing their schoolwork) in front of computers is for pupils the least important activity, one that they rarely undertake

on a daily basis. On the other hand, teachers think that children and teenagers' engagement in this activity is higher. They also consider this to be time "wasting".

Pupils and teachers expressed almost completely opposing views (testified to by the minus signs, almost perfect correlation) as regards using ICT to perform school duties. Pupils ranked the sphere of functioning in education as the third, as an important activity in which they frequently engage. In their opinion, ICT is primarily a tool that helps them prepare for classes and optimizes doing homework, a means to obtain their goals and do homework. Teachers, on the other hand, express different opinions. They claim that their pupils use media network tools and resources least frequently in order to prepare for classes and to do homework. According to teachers, this sphere of engagement ranked lowest (fifth, the least important) in students' hierarchy of importance.

Given the empirical findings about the differences between pupils' and teachers' opinions, the educational indications of constructivism, as well as conclusions for practice resulting from it, one can express two-fold doubts. The first doubt is whether the researched teachers are "constructivist" enough for the modern times when it comes to making independent and multiple choices concerning qualitatively different forms of constructing reality in the world of ICT tools (Birch, 1997, pp. 63-66, 78-82, 87; Schaffer, 2006, pp. 36-37, 125-127). The second doubt is whether the teachers fulfil the premise of reflexive professionalism, i.e., engage in critical thinking in their work and reflect during and on their actions (Day, 1999; Lawrence-Wilkes, Ashmore, 2014; Schön, 1991). As social beings, children and teenagers construct theoretical and practical knowledge about the world, also (or primarily) via ICT methods and tools. They do this eagerly, without major limitations and inhibitions related to information literacy or tele-information infrastructure. They follow new technological trends, engage in and commit to cyberspace activities in various spheres. By using "natural" to them cognitive tools, pupils do not simply construct content, but learn, i.e., they do not simply accept information from the surrounding world (via social networks), but primarily interpret that information using their own experience and interactions with the virtual world (Baron-Polańczyk, 2019, pp. 29-40; Freeman, Adams Becker, Cummins, Davis, Hall Giesinger, 2017, pp. 38-39; Wendland, 2011, pp. 11, 32, 36). In light of the constructivist approach to complementary education, it is impossible to speak here about support and the broadly understood "interaction" with the teacher, who does not know their pupils' exact thoughts, needs or preferred activities, especially as regards "interaction" on the Internet, distinguished by its "digital rhetoric" (Apelojg, 2016; Eyman, 2015).

Numerous questions arise at this point, namely: To what extent can the researched teachers be "guides" and "organizers" in educational situations, showing pupils how to build up knowledge (in the new media world)? How to analyse creatively and solve problems? How to work effectively in a group? To what extent do teachers inspire to discussion and dialogue, i.e., create conditions for discussion (Gofron, 2013, p. 173) that

allows for constructing networks of positive relations (Turula, 2010, pp. 11-15), during which pupils ascribe their own meanings to the reality (also digital) they are getting to know? It is difficult to state how far teachers can help develop pupils' natural curiosity and encourage them to present their own convictions. What testifies to this difficulty are the diagnosed (and causing new anxiety) differences between pupils' and teachers' opinions on the spheres and effects of ICT use by children and teenagers. Building and accepting children and teenagers' autonomy in the media is not an easy task. It requires teachers to know and understand their pupils' needs, expectations, aspirations, and levels of competency. When they lack this knowledge, one cannot speak about the right choice of discussion topics and tasks, relevant to pupild' daily lives and problems, interesting, and unrelated to school (Kron, Sofos, 2003, p. 112). Such school should socially engage children and teenagers, give them emotional joy and satisfaction. Difficulties may occur as regards encouraging pupils to self-reflection (including the learning process and its outcomes), creativity, and lifelong learning; as a result, also to independent and conscious building up of knowledge structures about ICT via this same technology.

In general, it is also impossible to speak about "following" the pupil, i.e., about understanding geared towards their needs and capacities (Livingstone, Mascheroni, Staksrud, 2018; Rasfeld, Breidenbach, 2014, p. 195; UNESCO Office Montevideo, 2020), and acting as the "protector" against the undesirable influence of the media world (Guerrero, Barnes, Chaput, Tremblay, 2019, p. 105; Spitzer, 2015, p. 359; Twenge, Cooper, Joiner, Duffy, Binau, 2019, pp. 185-199). As regards the identified, disturbing "separation" between the world of children and teenagers ("Us") and the world of teachers ("Them"), it is noteworthy that educating and teaching "are neither simply activities a person undertakes, nor the objects or effects of activity, but something that happens in the space between two subjects. It is thus possible to observe education simultaneously from the perspectives of the two engaged parties, namely the acting subject (directly or indirectly) and the subject submitted to this activity (also directly or indirectly), to view it as one entity" (Śliwerski, 2017, p. 31). The issue takes on particular relevance in light of the findings about high-importance correlation between teachers' information literacy and school effectiveness (see: Feng, Ha, 2016). This turned out to be particularly important in the times of the coronavirus pandemic and widespread e-learning. This new and difficult situation requires finding "new" ways to solve problems related to, among others, adaptation to new social conditions, security and digital hygiene, psychological well-being, spending time (also leisure time), online and offline activities; all in order to develop positive relationships (Bailenson, 2020; Doucet, Netolicky, Timmers, Tuscano, 2020; D'Souza, 2020; Murphy, 2020; Ptaszek, Stunża, Pyżalski, Dębski, Bigaj, 2020; Pyżalski, 2020).

Conclusions

The analysis of the literature and of the gathered empirical material (from the sample group of 2510 pupils and 1100 teachers), as well as the used research methods and techniques allow for drawing the conclusions presented below.

The correlation between pupils' opinion and teachers' observations as to the spheres and effects of ICT use by children and teenagers indicates both similarities and differences between their views.

Similarity of views (identified through the plus sign (positive) correlation expressing changes that go in the same direction in both analysed variables) was established within:

− improving how fast pupils search for, select and evaluate information – how they work with information (*effect*); the strength of the relationship is very high ($r \cong 0.89$; $r^2 \cong 0.79$);

− network communication – tools of Internet communication (*sphere*); the strength of the relationship is very high ($r \cong 0.88$; $r^2 \cong 0.78$);

− games and playing computer games (*sphere*); the strength of the relationship is average ($r \cong 0.49$; $r^2 \cong 0.24$);

− causing chaos and information "confusion" – creating information chaos and mayhem, information overload and disorder in working with it (*effect*); the strength of the relationship is weak ($r \cong 0.29$; $r^2 \cong 0.08$).

Differences in views (identified through the minus sign (negative) correlation expressing changes that go in opposite directions in both analysed variables) were established when it comes to:

− preparing for classes (doing homework) – fulfilling school duties (*sphere*); the strength of relationship is very high ($r \cong -0.84$; $r^2 \cong 0.70$);

− improving ability to concentrate and ignore distractions (*effect*); the strength of the relationship is weak ($r \cong -0.12$; $r^2 \cong 0.01$);

− forms of spending leisure time ("wasting" time) – taking advantage of free time in the digital world (*sphere*); the strength of the relationship is weak ($r \cong -0.06$; $r^2 \cong 0.004$);

− searching for interest-based information (*sphere*); the strength of the relationship is slight ($r \cong -0.06$; $r^2 \cong 0.003$);

− shaping creativity and ability to cooperate (*effect*); the strength of the relationship is slight ($r \cong -0.03$; $r^2 \cong 0.001$);

− improving reaction time and manual coordination (*effect*); the strength of the relationship is slight ($r \cong -0.009$); in this case (when: $r^2 \cong 8.26E-05$), one cannot predict the variability in pupils' views based upon teachers' opinions.

The general methodological assumptions adopted in this article propose hypotheses linked to the dependence-based research problems that assume an "obvious relationship". By referring to these assumptions, one can state that an obvious relationship between students' and teachers' opinions on the spheres and effects of ICT use by children and teenagers exists in three categories: "network communication", "working with information" (both spheres reveal almost consistent opinions), and "classes" (sphere with opposing opinions). A very high correlation ($r^2 > 0.70$), i.e., a very high dependence between pupils and teachers' opinions, was identified only in these cases.

The results (identifying the correlation) in general draw attention to a dissonance between students' and teachers' views as regards numerous spheres of ICT activities and the impact the new media have on the young generation. The results outline a range of pupils' and teachers' beliefs on the topic; reveal similar views (identified through the positive correlation that testifies to what "joins" them), but also opposing views (identified through the negative correlation that testifies to what "divides" them). The opposing views revealed, thus, a disturbing "separation" between the world of children and teenagers ("Us") and the world of teachers ("Them"). Given the empirical findings on the differences between pupils' and teaches' views (on the spheres and effects of using ICT), the educational indications of constructivism and the practical conclusions resulting from it, one can develop (justified) doubts whether the researched teachers are "constructivist" enough for the ICT era. The question is whether the teachers know their pupils' needs and understand the reasons for which pupils engage in new media on a daily basis (Baron-Polańczyk, 2019). Differences in convictions and expectations of the parties (subjects) involved in school education take on a particular relevance during the COVID-19 pandemic. In these times, an effective implementation of e-learning tools has become a *sine qua non* condition for the fulfilment of the educational process.

Bibliography:

Apelojg, B. (2016). *Process-Oriented Didactics, Ideas for the Advancement of Teaching and Learning, For the Cowboy on the Right Path*, from: bit.ly/2NZ69i6, Process-orientedDidactics_online.pdf, (access: 13.07.2021).

Babbie, E. (2016). *Practice of Social Research*, 14th. Ed., Boston: Cengage Learning.

Bailenson, J. (2020). *Why Zoom Meetings Can Exhaust Us*. Retrieved 13 July 2021 from: https://www.wsj.com/articles/why-zoom-meetings-can-exhaust-us-11585953336.

Baron-Polańczyk, E. (2018). *My i Oni. Uczniowie wobec nowych trendów ICT* [Us and Them. Pupils towards New ICT Trends], Zielona Góra: Oficyna Wydawnicza Uniwersytetu Zielonogórskiego.

Baron-Polańczyk, E. (2019). *Reasons for Using ICT by Children and Adolescents in their Daily Practice (Research Report)*, Zielona Góra: Oficyna Wydawnicza Uniwersytetu Zielonogórskiego.

Baron-Polańczyk, E. (2019). Sources of Pupils' ICT Knowledge and Skills – Differentiating Factors, *The New Educational Review*, *2* (56), 29-40, https://doi.org/10.15804/tner.2019.56.2.02.

Bauman, Z. (2011), *Kultura w płynnej nowoczesności* [The Culture of Liquid Modernity], Warszawa: Agora.

Bauman, Z. (2015). *Intimations of Postmodernity*, London: Routledge, https://doi.org/10.4324/9780203414934.

Berdik, Ch. (2020). *Future of Childhood: Revisiting the Potential Uses of Media in Children's Education*, The Joan Ganz Cooney Center at Sesame Workshop – The Report that Started It All, from: https://joanganzcooneycenter.org/wp-content/uploads/2020/03/jgcc_revisitingpotential.pdf, (access: 13.07.2021).

Birch, A. (1997). *Developmental Psychology: From Infancy to Adulthood*, 2nd edition, London: Palgrave Macmillan.

Day, Ch. (1999). *Developing Teachers. The Challenges of Lifelong Learning*, Bristol PA: Taylor & Francis.

Doucet, A., Netolicky, D., Timmers, K., Tuscano, F.J. (2020). *Thinking about Pedagogy in an Unfolding Pandemic: An Independent Report on Approaches to Distance Learning During COVID19 School Closures*, from: https://issuu.com/educationinternational/docs/2020_research_covid-19_eng, (access: 13.07.2021).

Dróżka, W. (2010). Triangulacja badań. Badania empiryczne ilościowo-jakościowe [Triangulation in Research. Mixed Empirical Research], (in:) S. Palka (ed.), *Podstawy metodologii badań w pedagogice,* [Essentials of Research Methodology in Pedagogy], 124-135), Gdańsk: GWP.

D'Souza, K. (2020). *Distance Learning Stokes Fears of Excessive Screen Time*. Adolescent Brain Cognitive Development (ABCD) – A long-term study of children's brain development and health in the United States, National Institutes of Health, from: https://edsource.org/2020/distance-learning-stokes-fears-of-excessive-screen-time/644165, (access: 13.07.2021).

Eyman, D. (2015). *Digital Rhetoric: Theory, Method, Pactice*, Michigan: University of Michigan Press, https://doi.org/10.3998/dh.13030181.0001.001.

Feng, L., Ha, J.-L. (2016). Effects of Teachers' Information Literacy on Lifelong Learning and School Effectiveness, *Eurasia Journal of Mathematics, Science &Technology Education*, *12*(6), 1653-1663, https://doi.org/10.12973/eurasia.2016.1575a.

Ferguson, G.A., Takane, Y. (1989). *Statistical Analysis in Psychology and Education*, 6th Ed., New York: McGraw-Hill.

Ferguson, G.A., Takane, Y. (2016). *Analiza statystyczna w psychologii i pedagogice,* [Statistical Analysis in Psychology and Education], Trans. M. Zagrodzki, Warszawa: PWN.

Frankfort-Nachmias, Ch., Nachmias, D., DeWaard, J. (2015). *Research Methods in the Social Sciences*, 8th ed., New York: Worth Publishers, a Macmillan Education Company.

Freeman, A., Adams Becker, S., Cummins, M., Davis, A., Hall Giesinger, C. (2017). *NMC/CoSN Horizon Report: 2017 K-12 Edition*, Austin. Texas: The New Media Consortium.

Furmanek, W. (2016). Metodologiczne trudności badań z pogranicza edukacji, techniki i informatyki [Methodological Difficulties Studies Border Issues of Education, Technology and Computer Science, *Edukacja – Technika – Informatyka, 4* (18), 21-28, https://doi.org/ 10.15584/eti.2016.4.1.

Gabriel, R., Röhrs, H.-P. (2017). *Social Media. Potenziale, Trends, Chancen und Risiken*, Berlin: Springer, https://doi.org/10.1007/978-3-662-53991-0.

Gofron, B. (2013). *Konstruktywistyczne ujęcie procesu uczenia się* [Constructivist Approach to the Learning Process], *Periodyk Naukowy Akademii Polonijnej*, *1* (7), 159-173, https://doi.org/10.23856/32.

Góralski, A. (1987). *Metody opisu i wnioskowania statystycznego w psychologii i pedagogice,* [Methods of Statistical Description and Inference in Psychology and Pedagogy], Warszawa: PWN.

Guerrero, M.D., Barnes, J.D., Chaput, J.-P., Tremblay M.S. (2019). Screen Time and Problem Behaviors in Children: Exploring the Mediating Role of Sleep Duration, *International Journal of Behavioral Nutrition and Physical Activity*, *16*(1), 105, https://doi.org/10.1186/s12966-019-0862-x.

Guilford, J.P. (1964). *Podstawowe metody statystyczne w psychologii i pedagogice,* [Fundamental Statistics in Psychology and Education], Trans. J. Wojtyniak, Warszawa: PWN.

Henson, K.T. (2015). *Curriculum Planning. Integrating Multiculturalism, Constructivism, and Education Reform*, USA: Waveland Press.

Juszczyk, S. (2006). *Statystyka dla pedagogów. Zarys wykładu,* [Statistics for Educationalists: the Outline of Lecture], Toruń: A. Marszałek.

King, B.M., Minium, E.W. (2003). *Statistical Reasoning in Psychology and Education*, Fourth Edition. USA: John Wiley & Sons.

King, B.M., Minium, E.W. (2020). *Statystyka dla psychologów i pedagogów,* [Statistical Reasoning in Psychology and Education], Trans. M. Zakrzewska, Warszawa: PWN.

Konarzewski, K. (2002). *Jak uprawiać badania oświatowe. Metodologia praktyczna,* [How to Do Research in Education: Practical Methodology], Warszawa: WSiP.

Kron, F.W., Sofos A. (2003). *Mediendidaktik: Neue Medien in Lehr- und Lernprozessen*, [Educational Media: New Media in Teaching and Learning], München/Basel: Reinhardt.

Lawrence-Wilkes, L., Ashmore, L. (2014). *The Reflective Practitioner in Professional Education*, Basingstoke: Palgrave Macmillan, https://doi.org/10.1057/9781137399595.

Levinson, P. (2013). *New New Media*, 2th Ed., Boston: Pearson.

Lewicki, C. (1998). *Zbiór zadań ze statystyki dla pedagogów*, [A Set of Statistical Tasks for Pedagogues], Rzeszów: "Fosze".

Livingstone, S., Mascheroni, G., Staksrud, E. (2018). European Research on Children's Internet Use. Assessing the Past and Anticipating the Future, *New Media and Society*, *20 (*3), 1103-1122, https://doi.org/10.1177/1461444816685930.

Melosik, Z., Szkudlarek T. (2010). *Kultura, tożsamość i edukacja. Migotanie znaczeń*, [Culture, Identity and Education. Flicker of Meanings], Kraków: "Impuls".

Mikrut, A. (2001), *Wybrane metody statystyki opisowej dla pedagogów*, [Selected Methods of Descriptive Statistics for Pedagogues], Kraków: Wydawnictwo Naukowe Akademii Pedagogicznej.

Murphy, K. (2020). *Why Zoom is Terrible*, The New York Times, 2020-05-04, from: https://nyti.ms/35hnfN7, (access: 13.07.2021).

Nowaczyk, C. (1995). *Podstawy metod statystycznych dla pedagogów*, [Essentials of Statistical Methods for Pedagogues], Jelenia Góra: "AVIS".

Pilch, T., Bauman, T. (2010). *Zasady badań pedagogicznych. Strategie ilościowe i jakościowe*, [Rules of Pedagogical Research. Quantitative and Qualitative Strategies], Warszawa: "Żak".

Ptaszek, G., Stunża, G.D., Pyżalski, J., Dębski, M., Bigaj, M. (2020). *Edukacja zdalna – co się stało z uczniami, ich rodzicami i nauczycielami?* [E-learning: What Happened with Pupils, their Parents, and Teachers?], Gdańsk: GWP.

Rasfeld, M., Breidenbach, S. (2014). *Schulen im Aufbruch. Eine Anstiftung*, [The Call for the Wakening of School], München: Kösel-Verlag.

Rubacha, K. (2008). *Metodologia badań nad edukacją*, [Methodology of Research in Education], Warszawa: Wydawnictwo Akademickie i Profesjonalne.

Schaffer, H.R. (2006). *Key Concepts in Developmental Psychology*, London, Thousand Oaks, New New Delhi: SAGE Publications Ltd.

Schön, D.A. (1991). *The Reflective Practitioner. How Professionals Think in Acton*, New York: Ashgate Publishing Group.

Schunk, D.H. (2014). *Learning Theories. An Educational Perspective*, Sixth Edition, Boston: Paerson.

Spitzer, M. (2015). *Cyberkrank!: Wie das digitalisierte Leben unsere Gesundheit ruiniert*, [Ill with the Cyberspace! How our Health Becomes Damaged from Digitalised Life], München: DROEMER.

Szkudlarek T., Śliwerski B. (2009). *Wyzwania pedagogiki krytycznej i antypedagogiki,* [Challenges in Pedagogy and Anti-pedagogy], Kraków: "Impuls".

Śliwerski, B. (2016). Czy sieć zastąpi szkołę i rodziców w edukacji i wychowaniu? – nowe wyzwania dla rodziców i systemu edukacji, [Will the Net Replace School and Parents in Education and Parenting?: New Challenges for Parents and Education System], (in:) M. Tanaś (ed.), *Nastolatki wobec Internetu,* [Teenagers and the Internet], 27-40, Warszawa: NASK.

Turula, A. (2010). Classroom Dynamics of Virtual Learning Environments: A Humanistic Perspective, *CALL Review*, 2, 11-15.

Twenge, J.M., Cooper, A.B, Joiner, T.E, Duffy, M.E., Binau, S.G. (2019). Age, Period, and Cohort Trends in Mood Disorder Indicators and SuicideRelated Outcomes in a Nationally Representative Dataset, 2005-2017, *Journal of Abnormal Psychology*, *3* (128), 185-199, https://doi.org/10.1037/abn0000410.

UNESCO Office Montevideo (2020). Children, adolescents and the use of the Internet in São Paulo and Buenos Aires: studies from a gender equality perspective, *Communication and Information Discussion Notebooks*, *19*(32), 5-41.

Van Deursn, A., Van Dijk J. (2014). *Digital Skills: Unlocking the Information Society*, New York: Palgrave Macmillan.

Wendland, M. (2011). *Konstruktywizm komunikacyjny,* [Communicative Constructivism], Poznań: Wydawnictwo Naukowe Instytutu Filozofii Uniwersytetu im. Adama Mickiewicza.