Information Communication Technology Use among Students in Inclusive Classrooms

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Abstract—Inclusion has brought diversity into 21st-century classrooms and introduced challenges for teachers who must adapt their teaching to diverse groups of children. Related research findings indicate that information and communication technology (ICT) can be used to provide personalized learning and support inclusion. Our research compared the school- and leisure-related computer use of students in inclusive classrooms. The frequency of computer use, types of ICT-supported activities, and attitudes toward computer use were examined. Consistent with those of previous studies, our findings show that students with special needs (SN) and their peers use computers more frequently for leisure activities than for school activities. Compared with their peers, students with SN use computers less frequently and are more resistant to computer use. No correlation was found between the presence of SN and a student's desire to use a computer or a student's opinion on whether computer use improves learning success. A comparison of male and female students revealed that boys use computers more frequently, and have a stronger belief that computer use improves learning success. This study discusses ICT integration in inclusive classrooms for personalized learning in all domains of learning, the cognitive, affective–social, and psychomotor domains. The main conclusions derived from the study inform teachers in planning their ICT integration for cognitive, social and emotional scaffolding of students in inclusive classrooms.

Keywords—information and communication technology (ICT), inclusive class, students with special needs

1   Introduction

The use of information and communication technology (ICT) has proliferated in education and learning design; the classrooms of the 21st century are undergoing rapid transformations resulting in innovative learning environments that are connected, flexible, and collaborative [1].

Another important change is the shift toward inclusive education, which aims to educate all children regardless of their learning differences or other characteristics [2]. The proportion of children with special needs (SN) enrolled in regular primary schools in Slovenia is increasing, and in the school year 2017/2018, it has reached 6.18% of all primary school students [3]. Inclusive classes are therefore becoming a rule rather than an exception.

Inclusive classes pose several challenges for teachers and school staff worldwide [4]. Teachers must use different teaching methods to best reach students with varying learning abilities and facilitate their learning progress.

ICT can be a good tool for adapting teaching to children with different abilities and characteristics [5]; this has been demonstrated in previous research proving that the use of ICT benefits cognitive development [6] and motivation [7] in students with SN and their peers, as well as improves the literacy [8], communication [5], [9] and social skills [10], [11], [12], [13] of students with different types of SN. Research findings indicate progress in the cognitive and affective–social domain and correlate it with motivation, collaboration, flexible time management, diversity of learning methods, and autonomy in learning.

2   Student's ICT use in school and leisure activities

ICT integration is examined in terms of enhancing the quality of education [14] and contributing to the cognitive, affective–social, and psychomotor domains of learning [15]. The requirements in these domains as also expected motivational effects [16] have encouraged the more systematic use of ICT in school-related activities. Students have therefore increasingly utilized ICT, which was previously limited to leisure and home use (for example, as a social media tool), in school settings, as well.

The use of technology in school settings might not be equally effective for all students, depending on their learning and technology preference [17], as well as their attitudes toward technology use; the latter are related to the extent to which they perceive the computer as a learning tool [18].

Male and female students seem to differ in their learning preference [19] and in the technology they prefer to use [20], [21]. However, data on gender differences are not conclusive because of changes in the attitudes toward ICT as a result of increased ICT universality in society [22]. An important aspect that should be considered in inclusive education is the characteristics of students with different SN and the factors requirements that affect their ICT use. Therefore, special attention is required when choosing the appropriate ICT tools to support the learning of different groups of stu-

dents with SN [23], as certain particularities can directly affect the ICT use (e.g., poor vision, hearing, language understanding).

School- and leisure-related activities both affect students' ICT experience and knowledge, emotions, competencies, and attitudes related to ICT use. These aspects are important to consider when planning ICT-supported teaching.

2.1   Gender and ICT use

Researchers studying the differences between ICT use of male and female students have focused on the impact of gender on attitudes related to ICT use [24], [25], [26], resistance to ICT use [22], [27], frequency of ICT use [22], [28], and types of activities using ICT [29].

Differences between male and female students' learning preferences [19], types of ICT-supported activities [28], and ICT attitudes and opinions [24], [27] are reported. Male students are more often interested in ICT use [25], and use the computer more often for leisure activities [28]. They consequently hold more positive beliefs about their digital skills [26]. By contrast, female students are found to be less skilled in ICT use than males are [26].

Gender differences were also found in school-related ICT activities, in which males exhibit a more positive attitude than females do [24]. Similarly, Conti-Ramsden et al. [27] found that females exhibit greater fear and discomfort in ICT use. Nevertheless, some authors emphasized that gender differences in ICT use decrease with time and that male and female students do not significantly differ in their attitudes toward computers, amount of time spent using computers, or degree of self-reported computer anxiety [22].

2.2   Importance of the characteristics of students' ICT use in inclusive classrooms

Inclusive classrooms, in which children with SN attend school with their peers, bring benefits to all students but pose challenges for teachers who need to be flexible and adaptable in recognizing the needs of students and in tailoring the learning process to these students' learning abilities. ICT use was found to benefit students with learning disabilities [30], [31], [32], [33], dyslexia [6], [34], [35], Down syndrome [36], autism [9], [11], [12], [13], mental disorders, and cerebral palsy [4]. ICT has a great potential that can be adequately exploited in education only with appropriate awareness and consideration of the individual characteristics of children in terms of ICT use [21].

Previous research on students' ICT use in inclusive classrooms has investigated different areas, such as the following:

- frequency of ICT use [29],
- types of activities using ICT [29], [37],
- home access to computers and/or the internet of students with SN and their peers [28], [33],
- reluctance to use ICT [27].

Most students have access to computers [28], [38] and the internet at home [38]. However, the majority of students with SN have greater home access to [33] and use computers at home more than their peers do; their peers tend to be more engaged in other free-time activities [29]. ICT use by students with SN improves their interactions with their peers [29].

The belief that learning with computers is more interesting and enables better learning conditions is shared by both students with SN [27], [37] and their peers [24]. However, the belief that ICT improves educational conditions and personal development is more pronounced in students with SN, although they experience more ICT-related anxiety than their peers do [27].

Gender [17], [21], [24], [27] and the presence of SN [27] may influence differences in students' attitudes, experiences, and preferences in ICT and should be considered when using ICT to facilitate differentiation and individualization [21]. This study aims to explore the differences between the ICT use of students in an inclusive classroom. In particular, the following three research hypotheses are explored:

H1: Frequency of computer use is gender specific and varies depending on SN status.

H2: Gender and presence of SN influence differences in the types of ICT-supported activities of students.

H3: Attitude toward computer use is gender specific and varies depending on SN status.

3 Methods

3.1 Research design

A quantitative survey was conducted in an inclusive classroom to examine the school- and leisure-related computer use of students with and without SN.

3.2 Participants

In recruiting the participants, 47 Slovenian elementary schools were randomly selected by choosing 10% of the schools in each of the 12 Slovenian regions. Next, 1,880 students who are attending inclusive classes in the third part of their elementary education (grades 7 through 9) were selected from the participating schools. Of the selected students, 602 (32% response rate) completed the questionnaire. The participants included 116 (19.3%) students with SN and 486 students without SN. Of the participating students with SN, 79 (68.1%) were males and 37 (31.9%) were females. Of the participating students without SN, 216 (44.4%) were males and 270 (55.6%) were females. For more detailed data on the participants and their classes, see Table 1.

Table 1. Students with SN and their peers by grade

		Students with SN		Peers		Total	
		N	*%*	*N*	*%*	*N*	*%*
Grade	Grade 7	50	43.1	172	35.3	222	36.8
	Grade 8	32	27.6	128	26.3	160	26.5
	Grade 9	34	29.3	187	38.4	221	36.7
Total		116	100	486	100	602	100

3.3 Data analysis

Univariate, bivariate, and multivariate analyses were conducted to investigate the computer use of students with SN and their peers. The data analysis used descriptive statistics relating to frequency distributions, percentages, Spearman rank correlation coefficients, the Mann-Whitney U test, and factor analyses. All data processing was conducted using the SPSS statistical package.

3.4 Instrument

Data were collected through a questionnaire with nine questions. The first question collected information on demographic variables, whereas the other eight questions explored computer access, frequency of ICT use, and school- and leisure-related computer activities. The eighth question comprised 18 statements with Likert-type scales to assess the students' attitudes toward ICT use. Some of these statements were derived from the Computer Attitude Questionnaire [39]. The ninth question collected information on the students' free-time activities and comprised a list of yes–no sub-questions.

Both the validity and the reliability of the questionnaire were evaluated. Reliability was confirmed by calculating the Cronbach's alpha (which, at 0.74 for students' opinions that computer use improves learning progress, 0.86 for resistance to computer use, and 0.67 for the desire to use computers in school, indicated good internal reliability). Construct validity was confirmed with a factor analysis. Specifically, the following four factors were extracted with variables related to Table 2: students' opinions that computer use improves learning progress, students' fear of using computers, students' well-being when using computers, and students' desire to use computers in school. The first factor explained more than 20% of the variance.

Factors 3 and 4 were merged, and the reverse-scored items were re-coded. These adjustments yielded the following three dimensions that were measured in relation to computer use:

─ students' opinions that computer use improves learning success (variables 1, 2, 3, 4, 5, 6, 7, and 8);
─ students' resistance to computer use (variables 9, 10, 11, 12, 13, 14, 15, and 16);
─ students' desire to use computers in school (variables 17 and 18).

The content validity of the instrument was ensured by formulating the questions in a comprehensive and understandable way. The questionnaire used clear expressions; simple questions; and clear, unambiguous, and concrete instructions.

Objectivity was ensured through closed-ended questions and clear, unambiguous written instructions. The researchers were not present during the completion of the questionnaires, so they had no subjective influence on the respondents' responses.

Table 2. Rotated factor matrix for students' attitudes toward IT use

	Variables	Factor			
		1	*2*	*3*	*4*
1	If I learn using a computer, I get a better grade.	.761			
2	Computers can improve my learning.	.740			
3	If I use my computer, I can learn more.	.721			
4	When I can use a computer for learning, I try harder.	.672			
5	I would learn more if I could use a computer.	.661			
6	I can learn more easily with a computer.	.581			
7	When I use a computer, learning is more interesting.	.542			
8	I can learn more from books than from a computer.	-.435			
9	Using a computer is very difficult for me.		.600		
10	Computers are difficult to use.		.568		
11	I am not interested in computers.		.527		
12	Using computers makes me nervous.		.523		
13	I am tired of using computers.		.399		
14	Computers enable me to learn new things.			.497	
15	I like to use computers.			.462	
16	I am not afraid to use computers.			.435	
17	The more often a teacher uses a computer, the more I enjoy the class.				.626
18	I would like to use computers in school more often.				.565

Note: Extraction method: principal axis factoring; rotation method: Varimax with Kaiser normalization.

4 Results

Data on the students' home access to computers and the internet are presented in Table 3. The results show that a very high percentage of all students (98.8%) have computers at home and that slightly more students with SN (99.1%) (98.8%) have access to computers at home. A high percentage of all participants (96.2%) were also found to have home internet access, although students with SN are slightly less likely to have internet access (93.1%) than their peers are (96.9%).

With regard to time spent in front of a computer, the majority of the students (38.3%) reported using computers between one and four hours per week. Some students (2.6%) replied that they do not spend any time in front of computers, whereas 22.2% reported spending more than 10 hours per week in front of a computer. Students with SN reported spending less time than their peers did in front of a computer.

Table 5 shows the students' most common ICT-supported activities. The data indicate that children with and without SN have the same popular and unpopular ICT-supported activities. Both groups of children most often browse the internet, listen to music, and chat. The least popular ICT-supported activity for both groups is doing homework.

Table 3. Home access to a computer and the internet

		Students with SN		Peers		Total	
		N	*%*	*N*	*%*	*N*	*%*
Do you have a computer at home?	Yes	115	99.1	481	98.8	596	98.6
	No	1	.9	6	1.2	7	1.2
Do you have internet at home?	Yes	108	93.1	472	96.9	580	96.2
	No	8	6.9	15	3.1	23	3.8

Table 4. Time spent using a computer

		Students with SN		Peers		Total	
		N	*%*	*N*	*%*	*N*	*%*
How many hours per week do you use a computer?	0 hours per week	4	3.5	12	2.5	16	2.7
	1–4 hours per week	63	54.8	167	34.4	23	38.3
	5–10 hours per week	27	23.5	194	40.0	221	36.8
	More than 10 hours per week	21	18.3	112	23.1	133	22.2

Table 5. ICT-supported activities of students with SN and their peers

	Students with SN		Peers		Total	
	N	*%*	*N*	*%*	*N*	*%*
I watch movies on the computer.	75	65.2	391	80.5	466	77.5
I listen to music on the computer.	99	86.1	454	93.2	553	91.9
I download music/movies from the internet.	68	59.1	375	77.0	443	73.6
I surf the internet.	102	87.9	472	97.1	574	95.3
I use webmail.	66	57.4	372	76.4	438	72.8
I look online for information I need in school.	91	78.4	411	84.7	502	83.5
I do my homework with the computer.	62	53.4	305	62.6	367	60.9
I use social networks (e.g., Facebook).	91	78.4	421	86.4	512	84.9
I play computer games.	82	71.3	335	68.8	417	69.3
I chat through the computer (e.g., by email or Facebook).	93	80.2	435	89.3	528	87.6

Each student's attitude toward computer use was determined by assessing the following:

‒ the student's opinion that computer use helps improve learning success,
‒ resistance to computer use,
‒ desire to use computers.

As can be seen in Table 6, a low level of agreement (mean = 3.36) was found for items suggesting that computer use improves learning success. The students agree most with the claim that learning is more interesting when they use computers (mean = 3.36) and that they can learn more from books than from a computer (mean = 3.30). For both items, students with SN show lower levels of agreement than their peers do. Students with SN agree least with the claim that they would get better grades if they learned with a computer (mean = 2.32). Their peers, however, agree least with the assertion that they would learn more if they could use a computer (mean = 2.35).

In general, both groups of students expressed the desire to use computers in school. They agreed (mean = 3.53) that they would like to use computers more often in school. Again, however, students with SN expressed somewhat less agreement (mean = 3.39) than their peers did (mean = 3.49).

Table 6. Attitudes toward computer use

	Students with SN		Peers		Total	
	M	*SD*	*M*	*SD*	*M*	*SD*
I like to use computers.	4.16	1.18	4.38	1.02	3.94	1.06
Computers give me the chance to learn new things.	3.57	1.30	4.03	1.13	3.94	1.18
I learn more easily with computers.	2.70	1.38	2.86	1.36	2.83	1.37
I would learn more if I could use a computer.	2.83	1.52	2.35	1.43	2.44	1.46
I would like to use computers more often in school.	3.49	1.55	3.54	1.50	3.53	1.51
The more often a teacher uses a computer, the more I enjoy the lesson.	2.92	1.50	3.06	1.47	3.03	1.48
If I am studying with a computer, I get a better grade.	2.32	1.36	2.41	1.34	2.39	1.34
I am not afraid to use computers.	3.82	1.59	4.19	1.30	4.12	1.36
I can learn more when I use computers.	2.90	1.47	2.83	1.32	2.84	1.35
Learning is more interesting when I use computers.	3.24	1.51	3.39	1.41	3.36	1.43
Computers can improve my learning.	2.63	1.38	2.66	1.30	2.65	
When I can learn with a computer, I try harder.	2.69	1.31	2.65	1.42	2.66	1.40
Using a computer with friends is more fun than using it alone.	3.48	1.44	3.83	1.36	3.76	1.38
I am tired of using computers.	1.97	1.33	2.02	1.21	2.01	1.24
I do not use computers when it is not necessary.	2.85	1.55	2.79	1.53	2.80	1.53
I am not interested in computers.	1.46	1.13	1.36	.88	1.38	.93
Using computers makes me nervous.	1.62	1.16	1.58	1.11	1.59	1.12
Computers are difficult to use.	1.49	1.09	1.34	.86	1.36	.91
I can learn more from books than from a computer.	3.09	1.47	3.35	1.37	3.30	1.39
Using a computer is very tiring for me.	1.59	1.08	1.35	.86	1.39	.91
Those who often use computers have fewer friends.	2.06	1.38	2.05	1.34	2.05	1.35

The responses concerning resistance to computer use show that neither students with SN nor their peers are averse to computer use. Both disagreed with claims that computer use is difficult, causes nervousness, and is uninteresting. Both also ex-

pressed feeling neither tired nor scared of using computers. However, although both groups expressed similar opinions, students with SN had higher scores, meaning that they experience more effort, nervousness, and fear when using computers.

The results suggest that students like to use computers in school, find learning with computers interesting, and are unafraid of using computers. Nevertheless, students do not consider computer use to be important for learning success.

Table 7 presents the results related to students' free-time activities. Most of the students with SN reported watching television (90.5%), listening to music (90.5%), and socializing with friends (87.9%) during their free time. Their peers most often socialize with friends (91.6%), listen to music (95.1%), and watch television (91.6%). The less-frequent activities were also similar for both groups. Children with SN and their peers were least likely to dance in a dance group, play an instrument, or engage in fine art. In all of the mentioned activities, students with SN had lower scores than their peers had.

Table 7. Leisure activities of students with SN and their peers

	Students with SN		Peers		Total	
	N	*%*	*N*	*%*	*N*	*%*
I watch television.	105	90.5	446	91.6	551	91.4
I listen to music.	105	90.5	463	95.1	568	94.2
I hang out with friends.	102	87.9	470	96.5	572	94.9
I do my homework and study.	87	75.7	391	80.6	478	79.7
I read books or magazines.	59	50.9	318	65.3	377	62.5
I do sports.	81	69.8	394	81.1	475	78.9
I do housework.	78	67.2	389	80.7	467	78.1
I draw or create art.	44	37.9	198	40.7	242	40.2
I take care of animals.	93	80.2	332	68.3	425	70.6
I play an instrument.	27	23.3	147	30.2	174	28.9
I dance in a dance group.	11	9.5	74	15.2	85	14.1

4.1 Frequency of computer use, types of ICT activities, and attitudes toward computer use in relation to gender

Two new indices that combine questions measuring the same phenomena were created to examine the correlations between frequency of computer use, types of ICT activities, and attitudes toward computer use and gender. The leisure activities index comprised the following variables: "I watch movies on the computer," "I listen to music on the computer," "I download music/movies from the internet," "I surf the internet," "I use webmail," and "I use social networks." The school activities index comprised "I look online for information I need in school" and "I do my homework with the computer."

Table 8 shows that on average, students use ICT more for leisure activities (M = 6.51) than for school activities (M = 1.44).

Table 8. Characteristics of students' leisure and school activity indices

	Leisure activities using ICT	School activities using ICT
N	603	603
Mean	6.519	1.441
Median	7.000	2.000
Modus	8.000	2.000
SD	1.677	.658
Asymmetry	-1.500	-.765
Kurtosis	2.352	-.496
Minimum	.000	.000
Maximum	8.000	2.000

The variables measuring students' attitudes toward computer use were found to include the following four dimensions:

— the opinion that computer use improves learning progress,
— fear of using computers,
— well-being when using computers,
— desire to use computers in school.

The variables fear of using computers and well-being when using computers were grouped into one index, the resistance to computer use index, to further analyze computer use. Table 9 presents the characteristics of the three created indices. The data show that students do not feel resistant toward computer use (M = 1.67) and are neutral concerning the benefits of computer use for learning success (M = 2.73) and their desire to use a computer in school (M = 3.28).

Table 9. Attitudes toward computer use

	Opinion that computer use improves learning success	Resistance to computer use	Desire to use computers in school
N	603	603	603
Missing	0	0	0
M	2.732	1.669	3.282
Median	2.750	1.500	3.500
Modus	3.0	1.0	5.0
SD	.9774	.6168	1.2934
Asymmetry	.238	1.278	-.243
Kurtosis	-.601	1.762	-1.102
Minimum	1.0	1.0	1.0
Maximum	5.0	4.4	5.0

As the distribution deviated from the norm, gender differences were calculated using the Mann-Whitney U test (Table 10). The results show the following:

— Males use computers for more hours per week (U = 38968.5, p = 0.003).

— Males use computers for more leisure activities (U = 39734.5, p = 0.007).
— Females use computers for more school activities (U = 39465.5, p = 0.002).
— Males believe more strongly that using a computer improves their learning achievement (U = 38440, p = 0.001).
— Males have a greater desire to use computers in school (U = 40308.5, p = 0.019).

No statistically significant differences were found between males' and females' resistance to using computers. The data confirm that frequency of computer use, types of ICT-supported activities, and attitudes toward ICT use are all gender specific.

Table 10. Relationships between computer use frequency, types of ICT activities, and attitudes toward computer use and gender

	Mann-Whitney U	Z	P	Average ranks	
				Males	*Females*
Time spent per week using computers	38968.5	-2.951	.003	319.90	280.69
Leisure activities using ICT	39734.5	-2.695	.007	320.31	283.43
School activities using ICT	39465.5	-3.057	.002	281.78	320.45
The opinion that computer use improves learning success	38440.0	-3.210	.001	324.69	279.21
Resistance to computer use	42694.5	-1.218	.223	292.73	309.93
The desire to use computers in school	40308.5	-2.350	.019	318.36	285.30

4.2 Frequency of computer use, types of ICT activities, and attitudes toward computer use in relation to the presence of SN

Spearman's correlation coefficient was used to calculate the correlations between computer use frequency, types of ICT activities, and attitudes toward ICT use and the presence of SN in students (Table 11). The results show that compared with their peers, students with SN

— spend less time using computers (r_s = -0.132, p = 0.001);
— use computers in fewer leisure (r_s = -0.209, p <0.001) and school activities (r_s = -0.086, p = 0.034); and
— have greater resistance to computer use (r_s = 0.124, p = 0.002).

No statistically significant differences were found between students with SN and their peers with respect to the opinion that computer use improves learning success or the desire to use a computer.

Students with SN and their peers differed in ICT use. Specifically, students with SN spent less time in front of computers, used ICT for fewer activities, and exhibited more resistance to ICT use than their peers did. However, the two groups of students share a similar desire to use computers and similar opinions on whether computer use improves learning success.

Table 11.   Relationships between computer use frequency, types of ICT activities, and attitudes toward computer use and the presence of SN in students

	Presence of SN
Time spent per week using computers	-.132**
Leisure activities using ICT	-.209**
School activities using ICT	-.086*
The opinion that computer use improves learning success	.025
Resistance to computer use	.124**
The desire to use computers in school	-.056

* $p < 0.05$, ** $p < 0.01$

5   Discussion

This study examined the use of computers in the leisure and school activities of seventh- to ninth-grade students enrolled in inclusive elementary school classrooms in Slovenia. The impacts of gender and the presence of SN on computer use frequency, types of ICT-supported activities, and attitudes toward ICT use were investigated.

The availability of a computer and internet at home affects students' ICT use and was therefore examined. Our data show the very high accessibility of computers and internet to both SN students and their peers. Of the students with SN, 99.1% have home access to a computer, and 93.1% have internet access. Similarly, 98.8% of their peers have a computer at home, and 96.9% have internet access. The accessibility reported by other authors is lower. Hakkarainen and colleagues [28] found that 82.9% of all students in their study have home access to a computer, and more than half have internet access at home. An even lower percentage (69.2%) was reported by Vekiri and Chronaki [38]. Between the two tested groups, no significant differences in home access to a computer and internet were found in the current study. By contrast, Eden and Heiman [33] found that all students with SN in their study, compared with only 38.9% of their peers, have access to computers at home. Hakkarainen and colleagues [28] suggested that home internet and computer access depends on schools' promotion of ICT-supported activities. Our study reveals a very high home computer and internet access among Slovenian students (SN and non-SN) in inclusive classrooms. We suggest that this finding is due partially to ICT use in schools and mainly to students' ICT-supported leisure activities.

In this part, we summarize the results of the current study in relation to the three research hypotheses. The first hypothesis states gender- and SN status-related differences in the frequency of computer use. The students with SN included in our study reported spending between one and four hours per week in front of a computer. Their peers reported a much higher computer use, which exceeded 10 hours per week. However, a minority of the respondents (3.5% of the students with SN and 2.5% of their peers) also reported no computer usage at home. Our findings show a different trend in the frequency of computer use among pupils with SN and their peers and suggest that children with SN use computers less often than their peers do. Ari and Inan [37] reported a higher frequency of computer use among students with SN, with

all of them using computers and more than half of them exceeding 5 hours of use per week. Lidström and colleagues [29] found that physically handicapped children use computers at home more often than their peers do because the latter are more engaged in sports and other outdoor activities. Differences in computer use duration were also found between male and female students. Consistent with the findings of previous research [28], we also found that male students use computers for a longer time per week than females do. Hakkarainen et al. [28] suggested that male students use computers more because of their generally better computer knowledge and, consequently, their higher motivation to use computers.

The second research hypothesis explores students' engagement in ICT-supported activities focusing on the influence of gender and SN. Consistent with the findings of previous studies [28], we found that Slovenian students with SN and their peers are more likely to use computers for leisure activities than for school activities. Possibly, students do not usually have schoolwork requiring computer use, so they are not sufficiently motivated to use ICT for school-related activities. The comparison of school- and leisure ICT-supported activities suggests that most students use computers to browse the internet and listen to music. Similarly, Ari and Inan [37] found that most children with SN watch movies and browse the internet on computers. Lidström and colleagues [29] reported that most Swedish students with SN and their peers chat online and play computer games to connect with friends. We can conclude that students with SN and their peers in Sweden use ICT more for developing and establishing social contacts than do Slovenian students, who typically use ICT for individual activities at home. Concerning the use of ICT for social purposes, our data show that in Slovenia, students without SN use social networks and webmail more often than students with SN do. Therefore, Slovene students without SN likely have more social contacts than Slovene students with SN have. This assumption is confirmed by the analysis of other common ICT-supported activities, as most respondents with SN reported watching television and listening to music in their free time, whereas most of their peers hang out with friends (a finding supported by other studies [29]).

Insights into students' resistance to computer use, desire to use computers in school, and opinions that computer use improves learning success were obtained to explore the third research hypothesis. This hypothesis indicates the influence of gender and SN on attitudes related to computer use.

According to our data, students are not resistant to computer use. Consistent with the findings of previous studies [27], fear of computer use was found to be more common among students with SN than their peers. Ari and Inan [37] suggested that a possible reason could be a lack of ICT skills among students with SN. Students with SN are generally less skilled and less confident, so they tend to feel more afraid of using things that they have not fully mastered [37]. In the future, this fear of ICT use among students with SN should be reduced through better preparation.

Our results show neutral opinions of students on the use of computers in school. The desire to use computers in school was found to be more common among male students than among female students, a result that is consistent with those of previous studies [24]. The reason may be the better computer skills of male students and, thus, their greater motivation to use computers. Volman and colleagues [40] reported a

greater desire of computer use in school, expressed by 68.1% of the students in their study. Our findings may indicate that ICT is no longer a significant motivator for Slovenian students.

The students in our research did not attribute particular importance to computer use in schools and expressed neutral opinions on the impact of computer use on improved learning. Approximately half (50.8%) of them fully or partially agreed that learning with a computer is more interesting than learning without one; among these children, the majority were without SN. Hakkarainen and colleagues [28] made a similar observation; they found that only 34.6% of the students in their research agreed that computers can improve learning. On the other hand, Kubiatko and Haláková [24] reported a higher percentage of students (82%) who believed that learning with a computer is more interesting than learning without one. The authors concluded that learning with a computer is more interesting and more motivating for adolescents [24]. Basing on the results of the current study, we conclude that ICT is not a significant motivator for learning among Slovenian children.

No correlation was found between students' opinions that computer use improves learning success or their desire to use computers in schools and the presence of SN. All students expressed neutral opinions on computer use in school and do not consider it important for learning success.

Slovene teachers have been found to have neutral attitudes toward ICT use in inclusive education and to believe that they lack sufficient competence in ICT-supported learning and assistive technologies [41]. Our research provides useful information on ICT integration in inclusive classrooms for personalized learning. It helps teachers in planning their ICT use for cognitive scaffolding and for social and emotional scaffolding. However, the data presented in this study should be interpreted with caution because all students with SN in this study were combined in a single group. The results may be different from those of a study that includes only those children with SN for whom ICT is an essential learning tool.

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7 References

[1] Caspary, M. and Booth, D., The Global Impact of the Proliferation of ICT: a Multi-National Study. 8th International Conference ICT for language learning, Pixel, November 12-13 2015, Florence, Italy, pp 261-264.

[2] Angelides, P. et al. Preparing teachers for inclusive education in Cyprus. Teaching and Teacher Education, 2006, vol. 22, pp. 513-522. https://doi.org/10.1016/j.tate.2005.11.013

[3] Ministrstvo za izobraževanje, znanost in šport RS http://www.mizs.gov.si/fileadmin/mizs.gov.si/pageuploads/podrocje/posebne_potrebe/pdf/Tabela_ucenci_s_posebnimi_potrebami.pdf

[4] Reis, M. G. A. D. et al. Using information technology based exercises in primary mathematics teaching of children with cerebral palsy and mental retardation: a case study. TOJET, 2010, vol. 9(3), pp. 106-118.

[5] Bishop, J. The Internet for educating individuals with social impairments. Journal of Computer Assisted Learning, 2003, vol. 19, pp. 546-556. https://doi.org/10.1046/j.0266-4909.2003.00057.x

[6] Magnan, A. and Ecalle, J. Audio-visual training in children with reading disabilities. Computers & Education, 2006, 46, pp. 407–425. https://doi.org/10.1016/j.compedu.2004.08.008

[7] Singleton, C. and Simmons, F. An evaluation of Wordshark in the classroom. British Journal of Educational Technology, 2001, vol 32(2), pp 317-330. https://doi.org/10.1111/1467-8535.00201

[8] Midouser, D. The learning value of computer-based instruction of early reading skills. Journal of Computer Assisted Learning, 2000, vol. 16, pp. 54-63. https://doi.org/10.1046/j.1365-2729.2000.00115.x

[9] Parsons, S. et al. Thee use of ICT by adults with learning disabilities in day and residential services. British Journal of Educational Technology, 2006, vol. 37(1), pp. 31–44. https://doi.org/10.1111/j.1467-8535.2005.00516.x

[10] Ditcharoen, N. et al. SignMT: An alternative language learning tool. Computers & Education, 2010, vol. 55, pp. 118–130. https://doi.org/10.1016/j.compedu.2009.12.009

[11] Chen, M. et al. Thee effect of different representations on reading digital text for students with cognitive disabilities. British Journal of Educational Technology, 2009, vol. 40(4), pp. 764–770. https://doi.org/10.1111/j.1467-8535.2008.00869.x

[12] Cheng, Y. and Ye, J. Exploring the social competence of students with autism spectrum conditions in a collaborative virtual learning environment – The pilot study. Computers & Education, 2010, vol. 54, pp. 1068–1077. https://doi.org/10.1016/j.compedu.2009.10.011

[13] Mintz, J. et al. Key factors mediating the use of a mobile technology tool designed to develop social and life skills in children with Autistic Spectrum Disorders. Computers & Education, 2012, vol. 58, pp. 53–62. https://doi.org/10.1016/j.compedu.2011.07.013

[14] Selinger, M. Developing and using content in technology enhanced learning environments. In Globalisation trends in science, mathematics and technical education, I. P. A. Cheong et al. Ed. Gadong: Universiti Brunei Darussalam, 2004, pp. 24–37.

[15] Volk et al. Tablet-based cross-curricular maths vs. traditional maths classroom practice for higher-order learning outcomes. Computers & Education, 2017, vol. 114, pp. 1–23. https://doi.org/10.1016/j.compedu.2017.06.004

[16] Osborne, J. and Hennessy S. Literature Review in Science Education and the Role of ICT: Promise, Problems and Future Directions. NESTA, 2003, Futurelab Research report. https://telearn.archives-ouvertes.fr/hal-00190441/document

[17] Admiral, W. et al. Gender-inclusive game-based learning in secondary education. International Journal of Inclusive Education, 2014, vol. 18(11), pp. 1208–1218. https://doi.org/10.1080/13603116.2014.885592

[18] Teo, T. Attitudes toward computers: A study of post-secondary students in Singapore. Interactive Learning Environments, 2006, vol. 14(1), pp. 17–24.

[19] Arnup, J. et al. Cognitive style and gender differences in children's mathematics achievement. Journal Educational Studies, 2013, vol. 39(3), pp. 355-368. https://doi.org/10.1080/03055698.2013.767184

[20] Luik, P. Would Boys and Girls Benefit from Gender-specific Educational Software? British Journal of Educational Technology, 2011, vol. 42 (1), pp. 128–144. https://doi.org/10.1111/j.1467-8535.2009.01005.x

[21] Heemskerk, I. et al. Inclusiveness of ICT in secondary education: students' appreciation of ICT tools. International Journal of Inclusive Education, 2012, vol. 16(2), pp. 155-170. https://doi.org/10.1080/13603111003674560

[22] Popovich P. M. et al. Comparing attitudes towards computer usage by undergraduates from 1986 to 2005. Computers in Human Behavior, 2008, vol. 24(3), pp. 986–992. https://doi.org/10.1016/j.chb.2007.03.002

[23] Istenic Starcic, A. and Bagon, S., ICT-supported learning for inclusion of people with special needs: Review of seven educational technology journals, 1970–2011. British Journal of Educational Technology, 2014, vol. 45(2), pp. 202-230. https://doi.org/10.1111/bjet.12086

[24] Kubiatko, M. and Halakova, Z. Slovak high school students' attitudes to ICT using in biology lesson. Computers in Human Behavior, 2011, vol 25(3), pp. 743-748. https://doi.org/10.1016/j.chb.2009.02.002

[25] Dix, K. Are learning technologies making a difference? A longitudinal perspective of attitudes. International Educational Journal, 2005, vol. 5, 15–28.

[26] Kuhlemeier, H. and Hemker, B. The impact of computer use at home on students' Internet skills. Computer & Education, 2007, vol. 49, 460–480. https://doi.org/10.1016/j.compedu.2005.10.004

[27] Conti-Ramsden, G. et al. Computer anxiety: A comparison of adolescents with and without a history of specific language impairment (SLI). Computers and Education, 2010, vol. 56(1), pp. 136-145. https://doi.org/10.1016/j.compedu.2009.07.015

[28] Hakkarainen, K. et al. Students' skills and practices of using ICT: results of a national assessment in Finland. Computers & Education, 2011, vol. 34(2), pp. 103-117. https://doi.org/10.1016/S0360-1315(00)00007-5

[29] Lidström et al. The influence of ICT on the activity patterns of children with physical disabilities outside school. Child: care, health and development, 2011, vol. (3), pp. 313–21.

[30] Wright, A. and Anderson, M. Does a Computer System Help to Teach a Sight Vocabulary to Children with Svere Learning Difficulties? British Journal of Educational Technology, vol. 1(18), pp. 52-60.

[31] Seo, Y. and Woo, H. Thee identification, implementation, and evaluation of critical user interface design features of computer-assisted instruction programs in mathematics for students with learning disabilities. Computers & Education, 2010, vol. 55, pp. 363–377. https://doi.org/10.1016/j.compedu.2010.02.002

[32] Chambers, P. IV and SEN: Using interactive video with special education needs pupils. British Journal of Educational Technology, 1997, vol. 28(1), pp. 31–39. https://doi.org/10.1111/1467-8535.00004

[33] Eden, S. and Heiman, T. Computer Mediated Communication: Social Support for Students with and without Learning Disabilities. Educational Technology & Society, 2011, vol. 14 (2), pp. 89–97.

[34] Dimitriadi, Y. Evaluating the use of multimedia authoring with dyslexic learners: a case study. British Journal of Educational Technology, 2001, vol. 32(3), pp. 265–275. https://doi.org/10.1111/1467-8535.00197

[35] Sung Y. et al. Improving children's reading comprehension and use of strategies through computer-based strategy training. Computers in Human Behavior, 2008, vol. 24(4), pp. 1552-1571. https://doi.org/10.1016/j.chb.2007.05.009

[36] Ortega-Tudela, J. M. and Gómez-Ariza C. J. Computer-assisted teaching and mathematical learning in Down Syndrome children. Journal of computer assisted learning, 2006, vol. 22(4), pp. 298–307. https://doi.org/10.1111/j.1365-2729.2006.00179.x

[37] Ari, I. A. and Inan, F. A. Assistive technoogies for student with disabilities: A survey of access and use in Turkish Universities. The Turkish Online Journal of Educational Technology, 2010, vol. 9(2), pp. 40-45.

[38] Vekiri, I., Chronaki A. Gender issues in technology use: Perceived social support, computer self-efficacy and value beliefs, and computer use beyond school. Computers and Education, 2008, vol. 51(3), pp.1392-1404. https://doi.org/10.1016/j.compedu.2008.01.003

[39] Computer Attitude questionnaire (CAQ). http://courseweb.unt.edu/gknezek/studies/

[40] Volman, M. et al. New technologies, new differences. Gender and ethnic differences in pupils' use of ICT in primary and secondary education. Computers & Education, 2005, vol. 45(1), pp. 35-55. https://doi.org/10.1016/S0360-1315(04)00072-7

[41] Bagon, S. and Istenic Starcic, A. Attitudes towards inclusion by Slovenian teachers in the context of findings from other countries. Education and Self Development, 2016, vol. 3(49), pp. 6-27.

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