DOI: 10.46793/pctja.19.392J
UDK: 37.026:373.2]:004

Chapter XXVI

USE OF NEW TECHNOLOGIES IN EDUCATION

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Abstract: Preschool education is a very important period in the life of a child. Besides the family, the kindergarten has equivalent importance for the child's social, emotional and intellectual development. Therefore the role of the teacher is very important and requires permanent competency improvement, so that he/she might apply his/her own skills dealing with a child's holistic development. One of the basic competencies that a modern preschool teacher should possess is the use of information and communications technology (ICT). Computer literacy, as well as the ability to use ICT, contributes to the improvement of the practice and better planning in the sphere of education, as well. It leads to stronger cooperation with the family, the municipality, or educational institutions. The study aims to determine the percentage of kindergarten teachers that directly integrate new technologies for educational purposes. Also, it will present the best ways for supporting and improving the ICT competency. We selected a sample of 200 teachers employed in five kindergartens from Moravicki District (Čačak, Gornji Milanovac, Ivanjica, Lucani, Guča). The results of the research show that the competencies of the teachers of the Moravicki District for the use of new technologies is at a high level, and that there is a statistically significant difference in relation of the competence level for the use of modern digital technologies and the age and educational level of kindergarten teachers.

Keywords: *kindergarten teacher, competencies, new technologies.*

Introduction

The family as the basic, narrowest and most natural collective connected with feelings, common aspirations, interests, and perspectives is one of the most powerful educational factors.

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In addition to parents, a preschool institution, as well as an educator, plays an important role in the upbringing and raising of children. Preschool age is a period that provides more opportunities in which a child with a lot of energy, perseverance and enthusiasm masters and develops complex capacities, depending on his future abilities, his personality, and the success of his future life. The educator is also a person who takes care of children during their stay in a preschool institution that nurtures, educates, directs them on the right path from the very beginning of life, by following the overall development of the child.

The profession or the vocation of the educator is, by its very nature, very compound, multidirectional and complex - in itself, it implies a constant need to constantly reinforce beliefs in one's own professional powers by appropriate scientific and professional culture. Being a good educator, in the broadest sense of the word, means mastering pedagogical competencies in which knowledge is only one segment. Continuing education means an organized educational activity through which new knowledge is acquired.

The competence of educators is recognized in the *Strategy for the Development of Education in Serbia*, and in international documents as one of the key dimensions of the quality of education.

Respecting the specifics of educational work with preschool children, as well as the principles and long-term goals in this work, requires a special approach to the introduction of information technology into the preschool education system.

The existing framework of professional competencies of educators in terms of their digital literacy is envisaged in the current Rulebook on standards of competence for the profession of educators and their professional development (*Official Gazette RS*, No. 88/17 and 27/18). The Rulebook highlights the key digital competencies of educators, that is, knowledge about the use of digital technologies: it implements and integrates new technologies in immediate education work; it utilizes benefits, controls the shortcomings and dangers of digital technologies and develops awareness and habits for their use in both children and parents; it uses digital technologies in planning activities and conceiving the necessary materials, in monitoring, evaluating and documenting; it operates in different databases (for record keeping: about children, parents, evaluation, etc.); it applies digital information, sharing technologies with family, colleagues, associates, local community and other interested persons and institutions; it uses digital technologies for professional development.

Intensive changes in society based on the process of informatization have caused changes in educational work, which are reflected in the use of different methods, strategies and media. Informatization, which has affected society itself, carries a whole range of media tools, for which the use of certain

knowledge and skills of preschool teachers is necessary (Stanisavljević Petrović, Pavlović, Soler-Adillon 2016). The question arises: what are the necessary digital competencies of educators, what is the scope of informatics literacy of educators, and what is the representation of the use of digital competences.

Numerous studies in our country show that educators are not using enough modern technical means in educational work; they show certain inertia and fear of using them (Stošić, 2011). This is most frequently due to ignorance and lack of education of educators, since earlier generations of educators were not educated to implement modern technical means, so that their repulsion towards the application and use of modern technical means in preschool institutions is not surprising. Unlike the former education of educators, today's education program for future educators at higher education institutions provides the opportunity for students to acquire computer literacy through several study subjects, to improve and perfect them so that new generations of educators that derive from formal education come up with the knowledge of using computers, and are aware of its benefits for educating children. In other words, in higher education institutions, there is a program within the information technology area that incudes acquiring knowledge at user level (operating system, internet, word processor, drawing program, presentation program, sound and video processing, familiarization with ready educational software in the course of one or two courses of study). The use of advanced technologies is important for the development of professional competencies of future educators because they spread general knowledge, integrate theory and practice, and influence the increasing correlation between formal and informal knowledge (Janjic, Petković, Grujic, 2015; Andjelkovic, Stanisavljević Petrović, 2012).

Methodology of research

Objective and tasks of the research

The aim of this research was to examine the extent to which educators from the five preschool institutions of the Morava District apply and integrate new technologies in immediate educational work, as well as how support can be provided in order to improve this competence. The tasks of this research focused on four aspects of the use of digital technologies in educational work and the possibilities of professional development of educators in this field of competence: to examine self-assessments of educators about personal competences for the use of new technologies; to examine what are the domains of work in which the educator mostly uses new technologies; to explore to which extent the educators are familiar with and use software tools; and to establish the level of motivation of educators for additional professional development in the field of digital technology.

Research hypotheses

Based on the research goal and tasks, we also set a general hypothesis: the educational self-assessment of the level of own competencies for the use of modern digital technologies is expected to be at an enviable level with a tendency toward higher values, and a small number of educators will grade the level of competence as low or unsatisfactory. Starting from the basic hypothesis of research, the following specific hypotheses are set: it is assumed that the level of competence of educators for the use of modern digital technologies is statistically significantly conditioned by the age of the educator; it is assumed that the level of competence of educators for the application of modern digital technologies is statistically significantly conditioned by the level of education of educators.

Material and method

In order to examine the current state of the competencies of the teachers of the Morava District for the application of digital technologies in immediate educational work, a survey was conducted on a sample of 200 teachers from five preschool institutions of the Morava District (Čačak, Gornji Milanovac, Ivanjica, Lučani, and Guča). The survey technique was used. The participating teachers responded to eight closed-type questions by circling the offered answers, while one question related to the knowledge and use of software tools (programs) was used in the Likert-type rating scale in which the educators evaluated how much they govern the said software tool (program) on the scale from 1 to 5.

Quantitative data processing included the calculation of frequencies and percentages, as well as the Chi-squared test for determining statistically significant differences with respect to the observed variables, age and level of education of educators.

Starting from the age of the educators, our teachers were classified into five groups: from 20 to 30 years, from 30 to 40, from 40 to 50 years, from 50 to 60 years and over 60 years. The age of the educator is shown in Table 1.

Table 1: Age of educators

Age	ƒ	%
20–30	26	13.00
30–40	64	32.00
40–50	51	25.50
50–60	50	25.00
over 60	9	4.50
Total	200	100.

According to the level of education, we separated the educated teachers into four groups: Two-year post-secondary Degree, College, University and M.A. The level of education of educators is shown in Table 2.

Table 2: The level of education of educators

Level of education	ƒ	%
2-Year Postsecondary Education	78	39.00
College	108	54.00
University	9	4.50
M.A.	5	2.50
Total	200	100

Results of the research with the discussion

Results of the survey in relation to the age of educators

The data on whether the educators use computers in their immediate educational work are shown in Table 3.

Table 3: The use of computers

Age	YES		NO		Total	
	ƒ	%	ƒ	%	ƒ	%
20–30	26	100	0	0.00	26	100
30–40	57	89.06	7	10.94	64	100
40–50	47	92.16	4	7.84	51	100
50–60	34	68.00	16	32.00	50	100
over 60	3	33.33	6	66.66	9	100
Total	167	83.5	33	16.5	200	100

^{2} =34.51 , df = 4, $C_к$ = 0.38, C_{max} = 0.89

Through the research, we obtained data that a large percentage of educators use the computer in their immediate educational work regardless of age. Thus, 100% of educators of age from 20 to 30 use computers, 89.06% of educators aged 30 to 40 use computers, and 92.16% of educators aged 40 to 50 use computers. A significantly smaller number of educators aged 50 to 60 (68.00%) use the computer. It is interesting that educators over the age of 60 years (33.33%) use a computer in a significantly smaller percentage. Based on the data from Table 3 it is possible to determine the significance of the relation,

the level of relation, and the direction of relation. The calculated value ^{2} = 34.51 compared to the limit value of 13.277, with the corresponding number of degrees of freedom (df = 4) at the level of significance of 0.01. Since our ^{2} = 34.51 is higher we conclude that the level of competence of teachers for computer use is statistically very affected by the age of educators. The value of the contingency coefficient of Ck = 0.38 in our case is significantly lower than the maximum value of the coefficient of contingency (Cmax = 0.89); this means that the correlation between the observed phenomena is relatively poor.

The readiness of educators to acquire knowledge in the field of digital technologies is shown in Table 4.

Table 4: The readiness of educators to acquire knowledge in the field of digital technologies

Age	YES		NO		Total	
	ƒ	%	ƒ	%	ƒ	%
20-30	26	100	0	0.00	26	100
30-40	57	89.06	7	10.94	64	100
40-50	50	98.04	1	1.96	51	100
50-60	34	68.00	16	32.00	50	100
over 60	3	33.33	6	66.66	9	100
Total	170	85.00	30	15.00	200	100

^{2} =34.51 , df = 4, $C_к$ = 0.38, C_{max} = 0.89

85.00% of teachers regardless of years of service are ready to acquire knowledge in the field of digital technologies, while 15% think they are not ready. Thus, all surveyed educators from 20 to 30 years of age believe that they are fully prepared to acquire knowledge in the field of digital technologies. Also, a large percentage of educators aged 30 to 40 (89.06%), 40 to 50 years (98.04%) and 40 to 50 years (68.00%) are ready to acquire knowledge in the field of digital technologies . By contrast, 33.33% of educators over the age of 60 believe that they are not ready to acquire knowledge in the field of digital technologies. The calculated value ^{2} = 34.51 compared to the limit value of 13.277, with the corresponding number of degrees of freedom (df = 4) at the level of significance of 0.01. Since our ^{2} = 42.39 is higher, we conclude that the readiness of educators for acquiring knowledge in the field of digital technologies is statistically largely conditioned by the age of educators. The value of the contingency coefficient Ck = 0.38 in our case is significantly lower than the maximum value of the coefficient of contingency (Cmax = 0.89); this means that the correlation between the observed phenomena is relatively poor.

Table 5 shows the assessment of teachers at the five-level Likert-scale on their skills in working with MS Word, MS Excel, MS Power Point, Internet and E-twinning, EPALE.

Table 5: Educators' mastery of certain programs

MS Word														
Age	1		2		3		4		5		Unanswered		Total	
	ƒ	**%**	**ƒ**	**%**	**ƒ**	**%**	**ƒ**	**%**	**ƒ**	**%**	**ƒ**	**%**	**ƒ**	**%**
20–30	0	0.00	0	0.00	0	0.00	8	30.77	18	69.23	0	0.00	26	100
30–40	1	1.56	4	6.25	13	20.31	22	34.37	18	28.12	6	28.12	64	100
40–50	3	5.88	4	7.84	7	13.72	10	19.61	15	29.41	12	23.53	51	100
50–60	5	10.00	3	6.00	8	16.00	4	8.00	1	2.00	29	38.00	50	100
over 60	0	0.00	0	0.00	0	0.00	0	0.00	2	22.22	7	77.77	9	100
Total	9	4.50	11	5.50	28	14.00	44	22.00	54	27.00	54	27.00	200	100

^{2} =97.66 , df = 20 $C_к$=0.57, C_{max} = 0.89

MS Excel														
Age	1		2		3		4		5		Unanswered		Total	
	ƒ	**%**	**ƒ**	**%**	**ƒ**	**%**	**ƒ**	**%**	**ƒ**	**%**	**ƒ**	**%**	**ƒ**	**%**
20–30	0	0.00	2	7.69	2	7.69	12	46.15	10	38.46	0	0.00	26	100
30–40	6	6.37	9	14.06	19	29.69	13	20.31	8	12.5	9	14.06	64	100
40–50	10	19.61	3	5.88	13	25.49	5	9.8	1	1.96	19	37.25	51	100
50–60	6	12.00	3	6.00	6	12.00	2	4.00	0	0.00	33	66.00	50	100
over 60	0	0.00	0	0,00	1	11.11	1	11.11	0	0.00	7	77.77	9	100
Total	22	11.00	17	8.5	41	20.5	33	16.5	19	9.5	68	34.00	200	100

^{2} =99.74 , df = 20 $C_к$=0.57, C_{max} = 0.89

MS Power Point														
Age	1		2		3		4		5		Unanswered		Total	
	ƒ	**%**	**ƒ**	**%**	**ƒ**	**%**	**ƒ**	**%**	**ƒ**	**%**	**ƒ**	**%**	**ƒ**	**%**
20–30	0	0.00	0	0.00	2	7.69	9	34.61	15	57.7	0	0	26	100
30–40	5	7.81	4	6.25	22	34.37	16	25.00	8	12.00	9	14.06	64	100
40–50	6	11.76	3	5.88	8	1.69	12	23.53	9	17.65	13	25.49	51	100
50–60	5	10.00	5	10.00	1	2.00	5	10.00	1	2.00	33	66.00	50	100
over 60	0	0.00	0	0.00	2	22.22	0	0.00	1	11.11	6	66.66	9	100
Total	16	8.00	12	6.00	35	17.50	42	21.00	34	17.00	61	30.5	200	100

^{2} =99.44 , df = 20 $C_к$=0.58, C_{max} = 0.89

Internet														
Age	1		2		3		4		5		Unanswered		Total	
	ƒ	**%**	**ƒ**	**%**	**ƒ**	**%**	**ƒ**	**%**	**ƒ**	**%**	**ƒ**	**%**	**ƒ**	**%**
20–30	0	0.00	0	0.00	0	0.00	6	23.07	19	73.08	1	3.85	26	100
30–40	2	3.12	0	0.00	3	4.69	17	26.56	38	59.37	4	6.25	64	100
40–50	0	0.00	0	0.00	10	19.61	13	25.49	23	45.10	5	9.80	51	100
50–60	3	6.00	4	8.00	6	12.00	19	38.00	9	18.00	9	18.00	50	100
over 60	0	0.00	0	0.00	0	0.00	0	0.00	2	22.22	7	77.77	9	100
Total	5	2,50	4	2.00	19	9.50	55	27,5	91	45.50	26	13.00	200	100

2 =79.82 , df = 20 Cк =0.53, Cmax = 0.89

E-twinning, EPALE														
Age	1		2		3		4		5		Unanswered		Total	
	ƒ	**%**	**ƒ**	**%**	**ƒ**	**%**	**ƒ**	**%**	**ƒ**	**%**	**ƒ**	**%**	**ƒ**	**%**
20–30	11	42.30	4	15.38	3	11.54	2	7.69	0	0.00	6	23.08	26	100
30–40	21	32.80	6	9.37	6	9.37	1	1.56	0	0.00	30	46.87	64	100
40–50	12	23.53	1	1.96	3	5.88	1	1.96	1	1.96	33	64.70	51	100
50–60	2	4.00	1	2.00	0	0.00	0	0.00	0	0,00	47	94.00	50	100
over 60	1	11.11	0	0.00	1	11.11	0	0.00	0	0.00	7	77.77	9	100
Total	47	0.24	12	6.00	13	6.50	4	2.00	1	0.50	123	61.5	200	100

^{2} =66.82 , df = 20 $C_к$ =0.50, C_{max} = 0.89

According to Table 5, we find that younger teachers gave higher grades (grades 4 and 5) for their expertise in working with MS Word, MS Excel, MS Power Point and the Internet (see the results), as opposed to teachers from 40 to 60 year of age. We can conclude that younger educators often use these programs in the preparation and conducting of activities. The total number of surveyed teachers in relation to age presented the data of the research (summarizing grades 4 and 5): 73% of educators primarily use the Internet, 47% use MS Word, 26% of them use Ms Excel and 38% MS Power Point. Very few educators, regardless of their years of service, have any knowledge of how to use the E-twinig program, EPALE. Therefore, the obtained data shows that older educators use much less modern technology in their work than younger educators do. This data indicates that there is a problem of less motivation for older educators to adopt and implement new technical resources in educational work. By keeping in mind that a large number of teachers did not fully master the use of the above programs, it can be concluded that it would be useful to make at least two types of training for educators: for those who have mastered the basics of digital technology and for those who are yet to be trained.

The calculated value of the ^{2} test (MS Word – ^{2} = 97.66; MS Excel – ^{2} = 99.74; MS PowerPoint – ^{2} = 99.44; Internet ^{2}= 79.82; E-twinning, EPALE ^{2} =

66.82 compared to a limit value of 37.566 with an appropriate number of degrees of freedom (df = 20) at a significance level of 0.01. Since our ^{2} in all five cases is greater, we conclude that the assessment of teachers on their mastery of a certain the program is statistically significantly conditioned by the age of the educator.

Table 6 shows the results if educators have created their own mail address.

Table 6: Having a personal e-mail address

Age	YES		NO		Total	
	ƒ	**%**	**ƒ**	**%**	**ƒ**	**%**
20–30	26	100.00	0	0.00	26	100
30–40	59	92.10	5	7.90	64	100
40–50	47	92.16	4	7.84	51	100
50–60	30	60.00	20	40.00	50	100
over 60	3	33.33	6	66.66	9	100
Total	165	82.50	35	17.50	200	100

^{2} =42.49 , df = 4, $C_к$ = 0.38, C_{max} = 0.89

82.50% of all surveyed educators have their personal e-mail address, while 17.50% do not have one. All educators aged 20 to 30 have their own e-mail address. Approximately the same percentage of educators aged 30 to 50 have their e-mail address, more precisely over 90% of them. Bearing in mind that 66.66% of educators over 60 years of age do not have their own e-mail address, it can be stated that this group of educators should be trained to use e-mail.

The calculated value ^{2} = 42.49 compared to the limit value of 13.277, with the corresponding number of degrees of freedom (df = 4) at the level of significance of 0.01. Since our ^{2} = 42.49 is higher, we conclude that the readiness of teachers to use e-mail is statistically conditioned by the age of educators. The value of the contingency coefficient of Ck = 0.38 in our case is significantly lower than the maximum value of the coefficient of contingency (Cmax = 0.89); this means that the correlation between the observed phenomena is relatively poor.

It is known that digital technology resources in educational work can be used in different ways and in different domains of work. The results of research in the field of the work of educators relateing to the use of digital technologies in the exchange of information with family, colleagues and associates are presented in Table 7.

Table 7: Use of digital technologies in the exchange of information

FAMILY								
Age	YES		NO		Unanswered		Total	
	ƒ	**%**	**ƒ**	**%**	**ƒ**	**%**	**ƒ**	**%**
20–30	19	73.08	7	26.92	0	0.00	26	100
30–40	49	76.56	8	12.50	7	10.94	64	100
40–50	45	88.23	3	5.88	3	5.88	51	100
50–60	37	74.00	3	6.00	10	20.00	50	100
over 60	2	22.22	6	66.66	1	11.11	9	100
Total	152	76.00	27	13,5	21	10.50	200	100

^{2} =39.87 , df = 8 $C_к$ =0.23, C_{max} = 0.89

COLLEAGUES								
Age	YES		NO		Unanswered		Total	
	ƒ	**%**	**ƒ**	**%**	**ƒ**	**%**	**ƒ**	**%**
20–30	26	100	0	0.00	0	0.00	26	100
30–40	55	85.64	5	7.80	4	6.25	64	100
40–50	44	86.27	3	5.88	4	7.84	51	100
50–60	30	60.00	4	8.00	16	32.00	50	100
over 60	3	33.33	6	66.66	0	0.00	9	100
Total	158	79.00	18	9.00	24	12.00	200	100

^{2} =85.32 , df = 8 $C_к$ =0.23, C_{max} = 0.89

ASSOCIATES								
Age	YES		NO		Unanswered		Total	
	ƒ	**%**	**ƒ**	**%**	**ƒ**	**%**	**ƒ**	**%**
20–30	26	100	0	0.00	0	0.00	26	100
30–40	43	67.19	9	14.06	12	18.75	64	100
40–50	29	56.86	3	5.88	4	7.84	51	100
50–60	18	36.00	5	10.00	27	54.00	50	100
over 60	3	33.33	6	66.66	0	0.00	9	100
Total	119	59.50	23	11.5	43	21.5	200	100

^{2} =62.92, df = 8 $C_к$ =0.23, C_{max} = 0.89

Regarding the use of digital technologies in the exchange of information with family, colleagues and associates, it is concluded that 76% of educators exchange information with family, 79% with colleagues and 59.50% with associates, regardless of years of service. Also, we have found that 66.66% of

educators over 60 years of age rarely use digital technologies in sharing information with family, colleagues and professional associates. All 26 (100%) of surveyed teachers have stated that they use digital technologies in their work on a daily basis in the exchange of information with family, colleagues and associates.

The calculated value of the ^{2} test (family – ^{2} = 39.87; colleagues – ^{2} = 85.32 associates – ^{2} = 62.92 compared to a limit value of 20.90, with the corresponding number of degrees of freedom (df = 8) at the level of significance of 0.01. Since our ^{2} = 11.51 is higher we conclude that the use of digital technologies in the exchange of information with colleagues, family and associates is statistically conditioned by age of the educator. The value of the coefficient of contingency of Ck = 0,23 in this case is much lower than the maximum value of the coefficient of contingency (Cmax = 0.89), which means that the correlation between these phenomena is relatively poor.

The opinion of educators on the contribution of digital literacy to their comprehensive educational work is given in Table 8.

Table 8: Contribution of digital literacy to educators' work

Age	YES		NO		DOESN'T KNOW		Total	
	ƒ	%	ƒ	%	ƒ	%	ƒ	%
20–30	26	100	0	0.00	0	0.00	26	100
30–40	57	89.06	1	1.56	6	9.37	64	100
40–50	48	94.12	0	0.00	3	5.88	51	100
50–60	34	68.00	8	16.00	8	16.00	50	100
over 60	4	44.44	3	33.33	2	22.22	9	100
Total	169	84.50	12	6,00	19	9.50	200	100

^{2} =36.93, df = 8 $C_к$ =0.39, C_{max} = 0.89

From the data presented in Table 8, we can conclude that most educators have a clearly developed attitude towards the contribution of digital literacy to their comprehensive educational work, and more precisely, 84.50% of teachers gave a positive answer. All interviewed educators aged from 20 to 30 have a clear view of the contribution of digital literacy to their work. The percentage of teachers aged from 30 to 40 years (89,06) and 40 to 50 years (94,12) is also high. Less than half of the educators (44.44%) have no clear understanding of the contribution of digital literacy to their work.

The calculated value ^{2} = 36.93 compared to the limit value of 20.90, with the corresponding number of degrees of freedom (df = 8) at the level of significance of 0.01. Since our ^{2} = 36,93 is greater, we conclude that the contribution

of digital literacy in the work of educators is statistically conditioned by the age of educators. The value of the contingency coefficient Ck = 0.39 in our case is significantly lower than the maximum value of the coefficient of contingency (Cmax = 0.89); this means that the correlation between the observed phenomena is relatively poor.

The results of the research on the domains of computer use in different activities, and in relation to the age of educators, are shown in Table 9.

Table 9: Use of computers in different domains of activities

Age	Preparation of Activity		Conducting of Activity		Keeping records on educational work		Monitoring of child development and progress		Total	
	ƒ	**%**	**ƒ**	**%**	**ƒ**	**%**	**ƒ**	**%**	**ƒ**	**%**
20-30	24	35.29	17	25.00	15	22.06	12	17.65	68	100
30-40	42	32.06	39	29.77	29	22.14	21	16.03	131	100
40-50	27	31.39	26	30.23	19	22.09	14	16.28	86	100
50-60	21	24.14	15	17.24	18	20.69	24	27.59	87	100
over 60	3	25.00	2	16.66	3	25.00	4	33.33	12	100
Total	117	31.20	99	26.40	84	22,40	75	20.00	375	100

^{2} =11.51 , df = 12, $C_к$ = 0.23, C_{max} = 0.89

With regard to the use of computers in various domains of activity, with our research we have obtained data that 31.20% of teachers use the computer for preparatory activity, 26.40% for conducting of activities, 22.40% for keeping records of EW and 20.00% for monitoring of child development and promotion. We can conclude that approximately the same attitude is observed among educators regardless of their age.

By calculating the Chi-squared test (^{2} = 11.51) and the significance level of 0.01 with the degree of freedom of df = 12 (^{2} = 20.90) we found that, in relation to the independent variable (age of the respondent), there is no statistically significant difference in relation to the age of educators. Thus, the age of educators is not conditioned by the use of computers in the forefront of non-educated domains of educators' activities.

The results obtained by the survey in relation to the need for additional professional development of educators for the use of digital competences are presented in Table 10.

More than half of the educators (58.00%) gave a positive answer that the use of digital competences requires professional training, while 40.50 %

considers that it is not needed. Based on the data shown in Table 10, we can conclude that among the youngest teachers of the age 20 to 30, there is awareness of the importance of education on the use of digital competencies for additional professional development. More than half of educators aged 30 to 60 recognize the importance of applying modern technologies, as well as the need for greater attention to IT education for educators. It should also be noted that educators are generally not inclined to follow news developments in the field of technology, or they rarely do so. Also, a large number of them are not sure that their competences could be developed by reading professional literature. They agreed that teachers' competences could be somewhat improved by reading literature, but that this should be done through seminars and exchange of experiences with colleagues.

Table 10: Use of digital competencies for continuing training

Age	YES		NO		DOESN'T KNOW		Total	
	ƒ	%	ƒ	%	ƒ	%	ƒ	%
20–-30	20	76.92	5	19.23	1	3.85	26	100
30–40	33	51.56	25	39.06	6	9.37	64	100
40–50	28	54.90	20	39.21	3	5.88	51	100
50–60	33	51.56	25	39.06	6	9.37	50	100
over 60	2	44.44	6	33.33	1	22.22	9	100
Total	116	58.00	81	40.50	17	8.50	200	100

^{2} =15.507, df = 8 $C_к$ =0.23, C_{max} = 0.89

By calculating the Chi-squared test (^{2} = 15.507) and the significance level of 0.01 for the degree of freedom df = 12 (^{2} = 20.90), it was found that, in relation to the independent variable (age of the respondents), there was no statistically significant difference in relation to the age of the educator.

A considerable number of surveyed educators do not have a certain experience in attending online seminars (85% of them), regardless of age.

By calculating the Chi-square test (^{2} = 8.16) and the significance level of 0.01 for the degree of freedom df = 12 (^{2} = 20.90) it was found that, in relation to the independent variable (age of the respondent), there is no statistically significant in relation to the age of the educator when it comes to their experience in attending online seminars.

Results of the research in relation to the level of education of educators

The data on whether educators use the computer in their immediate educational work are shown in Table 11.

Table 11: Use of computers

Age	YES		NO		Unanswered		Total	
	ƒ	%	ƒ	%	ƒ	%	ƒ	%
2-Year Postsecondary Education	51	65.38	27	34.61	0	0.00	78	100%
College	100	92.59	4	3.70	4	3.70	108	100%
University	9	100	0	0.00	0	0.00	9	100%
M.A.	5	100	0	0.00	0	0.00	5	100%
Total	165	82.50	31	15.50	4	2.00	200	100%

^{2} =38.28 , df = 6, $C_к$ = 0.40, C_{max} = 0.86

The research findings presented in Table 11 show that 82.50% of teachers are self-trained to use computers in relation to the level of education. Educators with a university degree and a master's degree think they are fully trained in the use of computers, while there is an insignificantly smaller number of educators with a 2-Year Postsecondary Education and College degree.

The existence of statistically significant differences in the use of computers was determined on the basis of the Chi-square test (^{2} = 38.28) and the significance level of 0.01 for the degree of freedom df = 6 (^{2} = 16.82).

The readiness of educators to acquire knowledge in the field of digital technologies is shown in Table 12.

Table 12: Readiness of educators to acquire knowledge in the field of digital technologies

Level of education	YES		NO		Unanswered		Total	
	ƒ	%	ƒ	%	ƒ	%	ƒ	%
2-Year Postsecondary Education	54	69.23	21	26.93	3	3.84	78	100%
College	100	92.59	4	3.70	4	3.70	108	100%
University	8	88.88	0	0.00	1	11.11	9	100%
M.A.	5	100	0	0.00	0	0.00	5	100%
Total	167	83.5	25	12,5	8	4.00	200	100%

^{2} = 25.94 , df = 6 $C_к$ = 0.31, C_{max} = 0.86

When it comes to the readiness of educators to acquire knowledge in the field of digital technologies, 83.50% think that that they are ready, 12.50% of teachers are not, and 4% did not answer. A more prominent attitudes about their readiness to acquire knowledge in the field of digital technologies was noticed among educators with M.A. degree (100%) and educators with College degrees (92.59%), while a lower degree of consent was given by a group of teachers with 2-Year Postsecondary Education (69.23%) and University degree (88.88%).

The existence of statistically significant differences on the readiness of educators to acquire knowledge in the field of digital technologies was determined on the basis of the Chi-square test (^{2} = 25.94) and the significance level 0.01 for the degree of freedom df = 6 (^{2} = 16.82). Therefore, it has been established that, in relation to the independent variable (the level of education) there is a statistically significant difference in the readiness of educators to acquire certain knowledge in the field of digital technologies.

Table 13 shows the assessment of teachers at a five-level Likert scale on their skills in working with MS Word, MS Excel, MS Power Point, Internet and E-twinning, EPALE.

The analysis of the results presented in Table 13 show the assessment of the teachers' own competencies for the use of computer programs in relation to the level of education. By calculating the Chi-square test, it has been established that there is a statistically significant difference in the assessment of teachers on a scale from 1 to 5 in relation to the independent variable (educational level of educators). Statistically significant differences are present in all the above program packages based on the calculated value of the ^{2} test (see the Table), and the significance level of 0.01; it can be noticed that there are differences in the assessment of the educator in relation to the level of education.

Table 13: Mastery of educators in certain programs

MS Word														
Level of education	1		2		3		4		5		Unanswered		Total	
	ƒ	**%**	**ƒ**	**%**	**ƒ**	**%**	**ƒ**	**%**	**ƒ**	**%**	**ƒ**	**%**	**ƒ**	**%**
2-Year Postsecondary Education	5	6.40	3	3.85	10	12.82	13	16.67	6	7.69	41	52.56	78	100
College	3	2.70	8	7.40	19	17.59	27	25.00	37	34.26	16	14.82	108	100
University	0	0.00	0	0.00	0	0.00	4	44.44	5	55.55	0	0.00	9	100
M.A.	0	0.00	0	0.00	0	0.00	2	40.00	3	60.00	0	0.00	5	100
Total	8	4.00	11	5.50	29	14.50	44	22.00	51	25.5	57	28.50	200	100

^{2} =56.14 , df = 15 $C_к$ =0.46, C_{max} = 0.86

MS Excel														
Level of education	1		2		3		4		5		Unanswered		Total	
	ƒ	**%**	**ƒ**	**%**	**ƒ**	**%**	**ƒ**	**%**	**ƒ**	**%**	**ƒ**	**%**	**ƒ**	**%**
2-Year Postsecondary Education	9	11.54	5	6.40	12	15.38	4	5.13	3	3.84	41	52.56	78	100
College	12	11.11	10	9.26	29	26.85	23	21.30	9	8.33	25	23.14	108	100
University	0	0.00	1	11.11	3	33.33	5	55.55	0	0.00	0	0.00	9	100
M.A.	1	20.00	1	20.00	0	0.00	2	40.00	1	20.00	0	0.00	5	100
Total	22	11.00	17	8.50	44	22.00	34	17.00	13	6.50	70	35.00	200	100

^{2} =48.20 , df = 15 $C_к$ =0.44, C_{max} = 0.86

MS Power Point														
Level of education	1		2		3		4		5		Unanswered		Total	
	ƒ	**%**	**ƒ**	**%**	**ƒ**	**%**	**ƒ**	**%**	**ƒ**	**%**	**ƒ**	**%**	**ƒ**	**%**
2-Year Post-secondary Education	10	12.82	5	6.40	4	5.12	10	12.82	5	6.40	44	56.51	78	100
College	7	6.48	6	5.55	27	25.00	25	23.15	21	19.44	22	20.37	108	100
University	1	11.11	0	0.00	2	22.22	2	22.22	4	44.44	0	0.00	9	100
M.A.	0	0.00	0	0.00	0	0.00	2	40.00	3	60.00	0	0.00	5	100
Total	18	9.00	11	5.55	33	16.5	39	195	33	16.5	66	0.33	200	100

^{2} =57.055, df = 15 $C_к$ =0.47, C_{max} = 0.86

Internet														
Level of education	1		2		3		4		5		Unanswered		Total	
	ƒ	**%**	**ƒ**	**%**	**ƒ**	**%**	**ƒ**	**%**	**ƒ**	**%**	**ƒ**	**%**	**ƒ**	**%**
2-Year Post-secondary Education	4	5.12	3	3.85	7	8.97	22	28.20	24	30,77	18	23,07	78	100
College	2	1.85	2	1.85	9	8.33	30	27.78	57	5.28	8	7.40	108	100
University	0	0.00	0	0.00	0	0.00	3	33.33	6	66.66	0	0.00	9	100
M.A.	0	0.00	0	0.00	1	20.00	1	20.00	3	60.00	0	0.00	5	100
Total	6	3.00	5	2.50	8	4.00	56	28.00	90	45.00	26	13.00	200	100

^{2} =33.49 , df = 15 $C_к$ =0.38, C_{max} = 0.86

E-twinning, EPALE														
	1		2		3		4		5		Unanswered		Total	
	ƒ	**%**	**ƒ**	**%**	**ƒ**	**%**	**ƒ**	**%**	**ƒ**	**%**	**ƒ**	**%**	**ƒ**	**%**
2-Year Postsecondary Education	12	15.38	2	2.56	3	3.85	0	0,00	0	0,00	61	78,21	78	100
College	27	25.00	9	8.33	10	9.25	2	18.52	0	0.00	60	55.55	108	100
University	2	22.22	0	0.00	0	0.00	1	11.11	0	0.00	6	66.66	9	100
M.A.	4	80.00	1	20.00	0	0.00	0	0.00	0	0.00	0	0.00	5	100
Total	45	22.50	12	6.00	13	6.50	3	1.50	0	0.00	127	63.50	200	100
^{2} =30.91 , df = 15 $C_к$ =0.36, C_{max} = 0.86														

Table 13 shows that we can find that higher grades (4 and 5) were provided by teachers with university and master degrees, i.e. 80.00% of them think that they have mastered the Internet, 75.00% have mastered by PowerPoint, 55.55% Excel and 90.00% Word, compared to teachers with 2-Year Postsecondary Education and College degrees. Based on the data presented, it can be concluded that regardless of the level of education, most educators did not master the use of E-twinning, EPALE. It can also be noted that educators with university and master degrees show better preparation for the use of modern software tools in work than educators with 2-Year Postsecondary Education and College degrees.

Table 14 shows the results of educators who have created their own mail address.

Table 14: Having a personal e-mail address

Level of education	YES		NO		Unanswered		Total	
	ƒ	**%**	**ƒ**	**%**	**ƒ**	**%**	**ƒ**	**%**
2-Year Postsecondary Education	50	64.10	23	29.49	5	6.41	78	100%
College	98	90.74	10	9.26	0	0.00	108	100%
University	8	88.88	1	11.11	0	0.00	9	100%
M.A.	5	100	0	0.00	0	0.00	5	100%
Total	161	80.50	34	17.00	5	2.50	200	100%

^{2} =24.14 , df = 6, $C_к$ = 0.32, C_{max} = 0.86

80.50% of educators declared that they have a personal e-mail address, while 17.00% of them do not possess one. By calculating the Chi-square test, it was found that there is a statistically significant difference in the possession of

a personal e-mail address of educators compared to the independent variable (educational level of the educator). Statistically significant differences are present in all answers of educators, based on the calculated value of ^{2} test (^{2} = 24.14), and the significance level of 0.01, it can be seen that there are differences in responses of educators if they have an e-mail address. Table 14 gives a conclusion that 100,00% of teachers with a master degree have their own e-mail address, followed by teachers with university degree (90.74%) and educators with college degree (88.88%). A significantly smaller number of teachers with 2-year postsecondary education, i.e. 64.10% of them have an e-mail address.

The results of the research on the domain of work of educators related to the use of digital technologies in the exchange of information with family, colleagues and associates are presented in Table 15.

Table 15: Use of digital technologies in information exchange

FAMILY								
Level of education	YES		NO		Unanswered		Total	
	ƒ	**%**	**ƒ**	**%**	**ƒ**	**%**	**ƒ**	**%**
2-Year Postsecondary Education	58	74.33	12	15.38	8	10.26	78	100%
College	90	83.33	11	10.18	7	6.48	108	100%
University	6	66.66	2	22.22	1	11.11	9	100%
M.A.	4	80.00	1	20.00	0	0.00	5	100%
Total	158	79.00	26	13.00	16	8.00	200	100%

^{2} =3.73 , df = 6, $C_к$ =0.23, C_{max} = 0.89

COLLEAGUES								
Level of education	YES		NO		Unanswered		Total	
	ƒ	**%**	**ƒ**	**%**	**ƒ**	**%**	**ƒ**	**%**
2-Year Postsecondary Education	53	67.95	13	16.67	12	15.38	78	100%
College	94	87.04	3	2.78	11	10.18	108	100%
University	8	88.88	1	11.11	0	0.00	9	100%
M.A.	5	100.00	0	0.00	0	0.00	5	100%
Total	127	63.50	22	11.00	51	25.50	200	100%

^{2} =15.99 , df = 6 $C_к$ =0.23, C_{max} = 0.89

ASSOCIATES								
Level of education	YES		NO		Unanswered		Total	
	ƒ	**%**	**ƒ**	**%**	**ƒ**	**%**	**ƒ**	**%**
2-Year Postsecondary Education	53	67.95	13	16.67	12	15,38	78	100%
College	94	87.04	3	2.78	11	10.18	108	100%
University	8	88.88	1	11.11	0	0.00	9	100%
M.A.	5	100	0	0.00	0	0.00	5	100%
Total	127	63,50	22	11.00	51	25.50	200	100%

^{2} =20.11, df = 6, $C_к$=0.23, C_{max} = 0.89

The existence of statistically significant differences in the field of work of educators related to the use of digital technologies in the exchange of information with family, colleagues and associates, in relation to the level of education, based on the Chi-square test (^{2} = 3.73 – family, ^{2} = 15.99 – colleagues, ^{2} = 20.11 – associates) and the significance level of 0.01, the table value of the ^{2} test (^{2} = 16.812) shows that there are statistically significant differences in the exchange of information between teachers and associates in relation to the education level of educators. On the other hand, since the calculated value of the ^{2} test is lower than the table values when it comes to sharing information with family and colleagues, it is concluded that there are no statistically significant differences in educators' answers in relation to their level of education.

Namely, on average 65.00% of educators, regardless of the level of education, use digital technologies on a daily basis to exchange information with family, colleagues and associates. A stronger attitude towards information exchange with family is observed among educators with college degrees (83.33%), M.A. degrees (80.00%) and 2-year postsecondary degrees (74.33%), than among educators with university degrees (66.66%). The same percentage of educators with university (100%) and master's degrees (88.88%) have a highly expressed attitude regarding information exchange with colleagues and associates, while the least impressive attitude towards the information exchange is expressed by educators with 2-year postsecondary degrees (colleagues – 67.95%, associates – 47.33%).

The opinion of educators on the contribution of digital literacy to their comprehensive educational work is given in Table 16.

Table 16: Contribution of digital literacy to educators' work

Level of education	YES		NO		Indecisive		No answer		Total	
	ƒ	%	ƒ	%	ƒ	%	ƒ	%	ƒ	%
2-year postsecondary education	53	89.82	11	14.10	8	10.26	6	7.70	78	100%
College	97	89.82	2	1.85	5	4.63	4	3.70	108	100%
University	9	100	0	0.00	0	0.00	0	0.00	9	100%
M.A.	5	100	0	0.00	0	0.00	0	0.00	5	100%
Total:	164	82.00	13	6.50	13	6.50	10	5.00	200	100%

^{2} =36.93, df =9 $C_к$ =0.39, C_{max} = 0.86

A large number of educators, regardless of their level of education, believed that the use of new technologies in educational work contributes to their digital literacy, or more precisely, 82.00% of them. Based on the results shown, it can be concluded that educators with 2-year postsecondary and college degrees (89.82%), with university degree and master degrees (100%), in a high percentage believe that the use of new technologies in educational work contributes to their digital literacy.

Based on the calculated Chi-squared test (^{2} = 20.05) and the significance level of 0.01, the table value of the ^{2} test with the degree of freedom df = 9 is 21.66%, we can conclude that there are no statistically significant differences in the attitudes of educators when it comes to contribution of digital technology to their digital literacy.

The results of the research on the domains of computer use in different activities, in relation to the educational level of educators, are shown in Table 17.

Table 17: Use of computers in different domainsof activities

Level of education	Preparation of Activity		Conducting of Activity		Keeping records on educational work		Monitoring of child development and progress		Unanswered		Total	
	ƒ	%	ƒ	%	ƒ	%	ƒ	%	ƒ	%	ƒ	%
2-year post-secondary education	31	24.41	31	24.41	23	18.11	13	10,24	29	22,83	127	100%
College	70	31.53	59	26.58	50	22.52	30	13.51	13	5.85	222	100%
University	8	36.36	5	22.72	7	31.82	2	9.09	0	0.00	22	100%
M.A.	4	28.57	4	28.57	3	21.43	3	21.43	0	0.00	14	100%
Total	113	29.95	99	25.71	83	21.56	48	12.47	42	10.91	385	100%

^{2} =31.412 , df = 12, $C_к$ = 0.36, C_{max} = 0.86

Regarding the use of computers in various domains of activities, we have obtained data from the research that 29.95% of teachers use computer for preparatory activity, 25.71% for conducting activities, 21.56% for keeping records on educational work, and 12.47% for monitoring child development and progress. We can conclude that approximately the same attitude is observed among educators regardless of the level of education of the same.

By calculating the Chi-squared test (^{2} = 31.412) and the significance level 0.01 for the degree of freedom df = 12 (^{2} = 20.90), it was found that in relation to the independent variable (educational level of educators), there is a statistically significant difference in relation to education of educators. Therefore, it is concluded that educators with university and master degrees are more trained to use computers in the given domains of activity, in relation to educators who have 2-year postsecondary and college degrees.

The results obtained by the survey in relation to the need for additional professional development of educators in the use of digital competences are presented in Table 18.

Table 18: Use of digital competencies for professional development

Level of education	YES		NO		Indecive		Total	
	ƒ	%	ƒ	%	ƒ	%	ƒ	%
2-year postsecondary	23	29.49	40	51.28	15	19.23	78	100
College	64	59.26	34	31.48	10	9.26	108	100
University	3	33.33	5	55.55	1	11.11	9	100
M.A.	4	80.00	1	20.00	0	0.00	5	100
Total	94	47.00	80	40.00	26	13.00	200	100

^{2} =19.71, df = 6 $C_к$ =0.29, C_{max} = 0.86

When it comes to the use of digital competencies for the professional development of educators, the research showed that 47.00% of teachers have a believe that the use of digital competencies is necessary for professional development, while 40,00% of them think it is not necessary. Based on the data presented in Table 18, it can be concluded that educators with master degrees possess a clearly developed awareness on the importance of education in the use of digital competencies for additional professional development, followed by educators with college degrees (59.26%). In a significantly lower percentage (average 30%), educators with a level of education of 2-year postsecondary and college level recognize the importance of applying modern technologies, as well as the need for greater attention to IT education for educators.

By calculating the Chi-squared test (^{2} = 19.71) and the significance level of 0.01 for the degree of freedom df = 6 (^{2} = 16.812), it was found that, in relation to the independent variable (education level of educators), there is a statistically significant difference in relation to their education.

Table 19 represents the results related to the experience of educators in attending online seminars in relation to their level of education.

Table 19: Experience of educators in attending online seminars

Level of education	YES		NO		Unanswered		Total	
	ƒ	**%**	**ƒ**	**%**	**ƒ**	**%**	**ƒ**	**%**
2-year postsecondary education	7	8.04	65	74.71	5	6.41	78	100
College	6	5.56	97	97.00	5	4.63	108	100
University	0	0.00	9	100	0	0.00	9	100
M.A.	1	20.00	3	80.00	1	20.00	5	100
Total	14	7.00	174	87.00	12	6.00	200	100

^{2} =6.28, df = 6 $C_к$ =0.17, C_{max} = 0.86

A large number of surveyed educators do not possess certain experience in attending online seminars (more precisely, 87%), regardless of their age, while only 7,05 % have declared that they have possess experience in attending online seminars.

By calculating the Hi-square test (^{2} = 6.28) and the significance level of 0.01 for the degree of freedom df = 6 (^{2} = 16.812), it was found that, in relation to the independent variable (the working environment of educators), there is no statistically significant difference in relation to the level of education, when it comes to their experience in attending online seminars.

Final considerations

In order for educators to be successful in their work, they should follow modern trends and apply modern technology in their immediate educational work. For many years now, information and communication technologies have been the present and not the future . Certainly, in order for the implementation of digital technologies in preschool institutions to be successful, it is important that there is a positive attitude and willingness of teachers to develop their professional competencies during their education and further training throughout their lives, regardless of age, among which, digital competencies in terms of mastering modern information and communication technologies are very important.

Analysis of the results of the survey shows that the level of competencies of the teachers of the Morava District regarding the use of modern digital technologies is at an enviable level, i.e. most educators are qualified to use new technologies in the immediate educational work. Also, the research produced a conclusion that the level of competencies for the use of modern digital technologies is statistically significantly determined by the age of educators, and the level of education of the educators. The research data indicate that educators younger than 50 years of age, and with a higher level of education use computers more in their work than their older colleagues, and colleagues with lower levels of education. While most educators use computers in their work, the results of the self-assessment of educators have shown that younger educators, and those with university and master degrees, gave higher scores forworking with Ms Word, Ms Excel, PowerPoint and the Internet.

The research also showed that the attitude of educators towards acquiring knowledge in the field of digital technologies, and the contribution of digital literacy to their comprehensive educational work is correlated with the level of education of educators and their age. The results of the research have shown that younger educators, and those with university and master degrees, are more motivated to acquire knowledge in the field of digital technologies, and they also have a well-developed attitude that the use of new technologies in educational work contributes to their digital literacy. Younger educators with higher levels of education also have a more positive attitude towards additional training in the use of modern technologies, and believe that the computer as one of the means of new technology is the most commonly used for preparating and conducting of activities in relation to records keeping and monitoring of child development and progress.

Based on everything aforementioned, we can conclude that being competent in the use of new technologies means acting professionally, ethically, and creatively, while following modern trends in the use of digital technologies in educational practice. Therefore, it is necessary to use the existing confidence of educators, to introduce new methods of work and to improve existing ones, which are supported by new technologies, in all preschool institutions of the Morava District. This can be achieved through organized training of educators in all preschools in acquiring knowledge and skills necessary for the use of new technologies, as well as by improving the equipment of preschool institutions with new technologies and the quality of content presented with the help of information and communication technologies.

References

Anđelković, S. & Stanisavljević Petrović, Z. (2012). Changes in University teaching – the road from knowledge to competencies. *Pedadagogika*, 84(8), 1248–1259.

Janjić, I., Petković, V. & Grujić, T. (2015). Key aspects of the use of information and communication technologies for students – future preschool teachers. *Rethinking education by leveraging the eLearning pillar of the Digital Agenda for Europe*, 1, 173–179. Doi: 10.12753/2066-026X-15-116.

Rulebook on standards of competence for the profession of educators and their professional development, *Official Gazette RS*, No. 88/17 and 27/18.

Stanisavljevic Petrovic, Z., Pavlovic, D. & Soler-Adillon, J. (2016). ICT in early education: reasons for insufficient application. *eLearning vision 2020*, 2, 227–233. Doi: 10.12753/2066-026X-16-119.

Stošić, L. (2011). Pripremljenost vaspitača u oblasti tehničkog i informatičkog obrazovanja. U Dragan Golubović (Ur.), *TIO Tehnologija, informatika, obrazovanje za društvo učenja i znanja* (pp. 903–910). Čačak: Tehnički fakultet.