

Acquisition of Methodological and Digital Competences within Lifelong Learning Programmes

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Abstract – This paper examines the acquisition of methodological and digital competencies among participants of the lifelong learning program at the Faculty of Humanities and Social Sciences in Osijek, specifically the Pedagogical-Psychological-Didactic-Methodological (PPDM) training program. The program is intended for people who have completed higher education studies other than teaching and aspire to work in education. The aim of the research is to assess the perceived usefulness of methodological topics and to determine the level of methodological knowledge, methodological competences and digital competences acquired through the program. Data were collected via an online questionnaire. Descriptive and inferential statistical analyses were conducted. The results indicate a high level of satisfaction with the usefulness of methodological topics, as well as a high level of self-assessment of methodological knowledge, methodological competences and digital competences in all examined dimensions.

Statistically significant differences were identified with regard to gender, level of education, teaching experience and age in certain variables. Overall, the findings confirm the effectiveness of the PPDM program in supporting the development of key professional competences.

Keywords – Digital competences, lifelong learning, methodological competences, training.

1. Introduction

Lifelong learning is a key challenge for the future of society and represents more than education and/or training; it is a way of thinking and a habit that people need to develop. Learning throughout one's entire life creates a challenge for understanding, researching, and supporting new essential dimensions such as self-directed learning, on-demand learning, collaborative learning, and organizational learning.

These approaches often require new media and innovative, adequately supportive technologies. Lifelong learning implies continuity, within which conceptual knowledge and its practical application should form an integral part [8]. It is a continuous and supportive process that encourages and empowers individuals to acquire knowledge, skills, and values, and to apply them with confidence, creativity, and enjoyment in appropriate circumstances and environments [8]. Lifelong learning also includes programmes for acquiring teaching competencies, through which (future) teachers are trained for teaching work in their professional field. These competencies include knowledge, skills, attitudes, metacognition, and strategic thinking, as well as behaviours that represent the ability to deal with complex situations and make decisions. Such training implies the development and mastery of cognitive structures that contain theoretical and practical knowledge, which constitute teachers' professional performance [9].

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This performance includes: Establishing a positive classroom climate, a supportive relationship with students, a participatory learning environment, the implementation of active teaching, the use of educational tools and technology, and the creation of instruction based on the subject curriculum, i.e., learning outcomes and students' learning experiences. In this sense, the teacher reflects on a methodological repertoire that encompasses a whole spectrum of productive methodological possibilities leading to authentic learning activities that help students acquire knowledge and skills and participate, share, and construct appropriate solutions that lead to the achievement of learning outcomes [6].

The described professional attributes of a teacher constitute their methodological competence, which occupies a special place among teaching competencies and represents the skill of conscious and creative action within the instructional context of teaching and learning. In the process of training future teachers, methodological topics occupy an important place. They should encompass crucial methodological content, from planning to assessment, in order to provide participants with insight into the comprehensiveness of methodological knowledge and thinking in lesson planning. Among these topics, the following are particularly prominent: the teacher's methodological preparation for a lesson, learning outcomes, methods oriented toward creativity and critical thinking as well as student assessment. Teachers are expected to act as leaders and facilitators, which means guiding students, directing discussions, providing examples, and modelling behaviours that demonstrate key concepts, principles, and skills, thus helping students navigate activities and tasks and shaping learning experiences [6]. In order to fulfil this role, teachers need methodological knowledge, which includes knowledge about learning and knowledge about teaching. This constitutes its specificity and simultaneously represents the two streams of the educational process: learning and teaching [3]. Thus, teachers are expected not only to possess excellent subject-matter expertise, meaning knowledge of their primary discipline, but also knowledge that belongs to teaching competencies, which includes methodological knowledge. The central part of methodological topics is certainly the teacher's methodological preparation for the lesson, because a teacher who plans in advance suggests his dedication to teaching and can expect a positive reaction from students [19]. Lesson planning is considered a vital component of teacher training [14], therefore, this topic is not only indispensable in initial teacher education, but also in additional teacher competency acquisition programs [1].

According to [3] "a particular feature of methodological knowledge lies in the fact that it is not only cognitive knowledge, but also knowledge of specific teaching skills and the ability to create new methodological forms (approaches, methods, procedures, etc.), in which the affective and value potential of the teacher, that is, the methodologist, plays an important role". According to [5], some authors distinguish theoretical and practical-methodological knowledge, psychological categories of knowledge, abilities and skills, methodological skills (competencies), and knowledge with respect to vocation (specialization). On the one hand, theoretical- methodological knowledge includes knowledge of the core sciences of methodology. On the other hand, practical-methodological knowledge belongs to basic teaching skills and includes: Lesson planning and preparation, lesson delivery, lesson management and flow, classroom climate [10], knowledge of communication with students, use of teaching aids and materials, and the creation of methodological artefacts [3]. Methodological competence denotes the skill of teaching a school subject and includes the act of lesson delivery, which requires an entire repertoire of methodological knowledge, models, strategies, and routines. This includes procedures for announcing the topic and learning outcomes, guiding students in carrying out activities and tasks, and checking their knowledge and understanding through assessment procedures [17]. Accordingly, training participants in the PPDM programme to teach a school subject, i.e., the process of acquiring methodological competence, includes mastering methodological knowledge, as well as sophisticated and focused observation of teaching in the context of school practice, followed by reflection, evaluation, and decision-making among a range of available alternatives, which represents preparation for independent teaching. The acquisition of methodological competence also includes understanding the dynamics and relationships within the classroom, as well as the rules and behaviours specific to certain tasks and activities. Teaching participants how to deliver student-centred instruction and shaping their teaching abilities while respecting students' needs and capabilities is a demanding methodological path. It is important to train participants to develop their own teaching style that enables students to achieve their full potential as learners [17]. On the one hand, this means that the methodology teacher themselves must undergo a conceptual shift in their teaching, from teacher-centred to learner-centred, enabling participants to actively engage in the process of acquiring methodological knowledge and competence.

On the other hand, it means that methodology instruction should include all methodological topics that lead to participants' readiness to implement contemporary teaching. This implies that PPDM programmes should be taught by methodologically competent experts who have excellent command of methodological knowledge and possess a high level of methodological competence, as well as organisational and communication skills necessary to motivate participants to actively participate in classes, provide high-quality and stimulating feedback on their progress, explain tasks skillfully, clearly articulate expectations, and promote communication, interaction, and self-development. Thus, teachers who teach methodological subjects should be enthusiastic and inspiring through all aspects of their teaching [20].

The digital transformation of society is having a strong impact on education systems, redefining the ways of learning, teaching and professional development. In this context, digital competences are becoming a key prerequisite for the effective participation of an individual in education, work and social life, as well as the foundation of lifelong learning. Despite the growing interest of the scientific community, the concept of digital competence remains conceptually heterogeneous. In the literature, different, partially overlapping terms such as computer, information, media and digital literacy are encountered, which indicates the complexity and multidimensionality of the concept itself. Contemporary theoretical frameworks increasingly define digital competence as a holistic ability that encompasses technical, cognitive, ethical and socio-emotional dimensions, with an emphasis on critical thinking, responsible use of technology and collaboration in the digital environment [7]. This understanding of digital competences is associated with professional effectiveness and employability [18].

Lifelong learning is highlighted as a key mechanism for developing and maintaining digital competences. Research consistently confirms that teachers who develop lifelong learning habits achieve a higher level of digital literacy and are ready to integrate digital technologies into the teaching process. Digital literacy is shown to be crucial for teaching effectiveness, innovation and adaptation to changes in curricula and educational policies.

However, [15] warn that the availability of digital technologies alone is not sufficient to reduce educational inequalities. The digital divide, low levels of digital literacy and socio-economic disparities continue to pose serious obstacles, especially for marginalized groups, further highlighting the need for inclusive and context-sensitive lifelong learning policies.

Empirical research on teachers' digital competences has shown a significant increase since 2020. Differences in levels of digital competence have been identified across geographical contexts, subjects and levels of education, with teachers in rural areas and outside STEM fields often at a disadvantage [11].

At the same time, the lack of standardized theoretical frameworks and reliable measurement instruments is highlighted, as most research relies on self-assessment, which does not always reflect the actual level of competence. Particular attention in the literature is paid to initial teacher education, where a gap is observed between the perceived importance of digital competences and the actual level of competence of future teachers. Personalized and long-term approaches to the development of digital competences, based on self-assessment and reflection, are highlighted as a potentially effective solution [2].

Despite the growing body of research, the existing body of research still shows methodological limitations. Quantitative and survey research predominates, while longitudinal and mixed approaches are rare. There is also a need for interdisciplinary research that views digital competences not only as a technical skill, but as a complex capability linked to pedagogy, professional identity, well-being and quality of life [12]. A synthesis of the analyzed literature confirms that digital competences are a key component of lifelong learning and the digital transformation of education [4]. They go beyond technical skills and include cognitive, ethical and socio-emotional dimensions, strongly linked to professional development, social inclusion and quality of life. The effective development of digital competences requires systematic institutional support, inclusive policies, quality infrastructure and the integration of digital competences into all levels of education. Special emphasis is placed on long-term, personalized and ethically based approaches that direct the digital transformation of education towards social justice. Digital competence is one of the eight key competences for lifelong learning:

- (1) Communication in the mother tongue,
- (2) Communication in foreign languages,
- (3) Mathematical literacy and basic competences in science and technology,
- (4) Digital competence,
- (5) Learning to learn,
- (6) Interpersonal and civic competence,
- (7) Entrepreneurship and
- (8) Cultural expression.

The National Framework Curriculum for Preschool Education and General Compulsory and Upper Secondary Education of the Republic of Croatia [13] defines digital competence as follows: "Digital competence refers to the ability to use information and communication technology safely and critically for work, in personal and social life, and in communication. Its key elements are basic information and communication skills and abilities: The use of computers to locate, evaluate, store, create, present, and exchange information, as well as the development of collaborative networks via the Internet."

Five areas of digital competence according to the European Framework for the Digital Competence of Educators (DigCompEdu) [16] are:

(1) *The information processing area* - refers to searching for, organising, and critically evaluating digital data, information, and content;

(2) *The communication and collaboration area* - relates to opportunities for interaction, communication, and collaboration through the use of digital technologies and tools;

(3) *The digital content creation area* - includes creating and editing existing content, as well as improving and integrating information and content into existing knowledge bases, with particular emphasis on understanding the use of copyright and licences;

(4) *The safety area* - addresses ways of protecting devices, content, personal data, physical and psychological well-being, and privacy in the digital environment, as well as raising awareness of the impact of digital technologies on social inclusion and;

(5) *The problem-solving area* - refers to developing the ability to identify needs and problems, resolve them in the digital environment, and use digital tools in creative and innovative ways.

The research questions posed in this study were as follows:

RQ1: *How do the participants in a lifelong learning programme at the Faculty of Humanities and Social Sciences in Osijek – the Pedagogical-Psychological-Didactic-Methodological Training Programme consider usefulness of methodological topics?*

RQ2: *Did the participants in a lifelong learning programme at the Faculty of Humanities and Social Sciences in Osijek – the Pedagogical-Psychological-Didactic-Methodological Training Programme acquire methodological knowledge at a satisfactory level?*

RQ3: *Did the participants in a lifelong learning programme at the Faculty of Humanities and Social Sciences in Osijek – the Pedagogical-Psychological-Didactic-Methodological Training Programme acquire methodological competence at a satisfactory level?*

RQ4: *Did the participants in a lifelong learning programme at the Faculty of Humanities and Social Sciences in Osijek – the Pedagogical-Psychological-Didactic-Methodological Training Programme acquire digital competence at a satisfactory level?*

2. Methodology

The topic of this paper is the methodological and digital competence of participants in a lifelong learning programme at the Faculty of Humanities and Social Sciences in Osijek, the Pedagogical-Psychological-Didactic-Methodological Training Programme, attended by those who have completed a non-teaching degree and wish to work in education, teaching the subject of their profession.

The aim of the paper is to determine the usefulness of methodological topics and the level of methodological knowledge and methodological and digital competence of the participants in the Pedagogical-Psychological-Didactic-Methodological Training Programme.

The instrument for data collection from the participants in a lifelong learning programme at the Faculty of Humanities and Social Sciences in Osijek was an online questionnaire, which was sent by e-mail to a suitable sample of participants in a lifelong learning programme at the Faculty of Humanities and Social Sciences in Osijek in January 2025.

3. Results and Discussion

Using an online questionnaire sent by e-mail in January 2025, to a suitable sample of participants in a lifelong learning programme at the Faculty of Humanities and Social Sciences in Osijek from the internal database of the Faculty of Humanities and Social Sciences in Osijek in two iterations, a total of 180 completed questionnaires were collected.

The demographic data of the participants were as follows: By gender, 44 (24.44%) were male participants in a lifelong learning programme and 136 (75.56%) were female participants in a lifelong learning programme; by age, participants in a lifelong learning programme were younger than 30 years old 69 (38.33%); between 31 and 40, 61 (33.89%) and over 40, 50 (27.78%).

According to level of education participants in a lifelong learning programme were as follows: Finished undergraduate study 29 (16.11%); finished graduate study 139 (77.22%); other 12 (6.67%).

According to previous working experience as teachers, participants in a lifelong learning programme were as follows: With previous working experience as teachers 90 (50.00%) and with previous working experience as teachers 90 (50.00%). Namely, half of the participants had previous working experience as teachers and another half of the participants did not have previous working experience as teachers at all.

Research questions RQ1-3 were confirmed. The theoretical range of responses spans from 1 to 5, whereas the conducted research yielded a narrower range of responses, with the minimum value being 2.00, indicating higher evaluation values. All arithmetic means exceed the value of 4, which points to a high assessment of the usefulness of methodological topics, a high level of knowledge, and a high level of methodological competence (Table 1).

Table 1. Descriptive statistics for level of methodological competences, level of methodological knowledge and usefulness of methodological topics

	Min	Max	M	SD	Crombach α	Asymmetry	
						Skewness	Kurtosis
Level of methodological competences	2.00	5.00	4.375	0.649	0.680	-0.810	0.302
Level of methodological knowledge	2.91	5.00	4.375	0.516	0.926	-0.559	-0.272
Usefulness of methodological topics	2.22	5.00	4.474	0.534	0.926	-1.001	1.057

Additional differences for all three variables were tested in relation to socio-demographic characteristics. Gender differences for level of methodological competences, level of methodological knowledge and usefulness of methodological topics were examined using an independent samples t-test.

Only one statistically significant gender difference was found, for the variable usefulness of methodological topics, indicating that women rated their usefulness higher (Table 2).

Table 2. Gender differences for level of methodological competences, level of methodological knowledge and usefulness of methodological topics

	Gender	N	M	SD	t	p
Usefulness of methodological topics	male	44	4.311	0.552	-2.36	0.026
	female	136	4.526	0.519		
Level of methodological knowledge	male	44	4.241	0.563	-1.86	0.067
	female	136	4.418	0.495		
Level of methodological competences	male	44	4.500	0.581	1.58	0.117
	female	136	4.335	0.667		

Statistically significant differences were found in relation to the level of education for two variables: The usefulness of methodological topics and the level of methodological knowledge.

In both cases, individuals with a completed undergraduate degree (lower level of education) rated the usefulness and their level of methodological knowledge higher compared to those with a completed graduate degree (Table 3).

Table 3. Level of education in correlation with level of methodological competences, level of methodological knowledge and usefulness of methodological topics

	Level of education	N	M	SD	t	p
Usefulness of methodological topics	Undergraduate	29	4.663	0.454	2.33	0.025
	Graduate	139	4.440	0.534		
Level of methodological knowledge	Undergraduate	29	4.589	0.507	2.48	0.019
	Graduate	139	4.336	0.507		
Level of methodological competences	Undergraduate	29	4.535	0.549	1.74	0.088
	Graduate	139	4.331	0.666		

In relation to working experience, a statistically significant difference was found for one variable: The level of methodological competence.

Individuals with teaching experience rated their level of methodological competence higher compared to those without teaching experience (Table 4).

Table 4. Working experience as a teacher in correlation with level of methodological competences, level of methodological knowledge and usefulness of methodological topics

	Working experience	N	M	SD	t	p
Usefulness of methodological topics	no	90	4.486	0.573	0.33	0.746
	yes	90	4.461	0.494		
Level of methodological knowledge	no	90	4.381	0.540	0.16	0.874
	yes	90	4.369	0.494		
Level of methodological competences	no	90	4.228	0.731	-3.12	0.002
	yes	90	4.522	0.519		

The age differences were tested using a one-way ANOVA.

No statistically significant age-related differences were found (Table 5).

Table 5. The age-related differences in correlation with level of methodological competences, level of methodological knowledge and usefulness of methodological topics

	Age	N	M	SD	F _(2,177)	p
Usefulness of methodological topics	< 30	69	4.406	0.593	0.90	0.408
	31-40	61	4.519	0.518		
	> 40	50	4.511	0.463		
Level of methodological knowledge	< 30	69	4.444	0.538	1.01	0.367
	31-40	61	4.326	0.473		
	> 40	50	4.339	0.536		
Level of methodological competences	< 30	69	4.391	0.647	0.10	0.904
	31-40	61	4.385	0.608		
	> 40	50	4.340	0.710		

Research question RQ4 was also confirmed. All arithmetic means exceed the value of 4, indicating a high evaluation of all dimensions of digital competence (Table 6).

Table 6. Descriptive statistics for level of digital competences

	Min	Max	M	SD	Crombach α	Asymmetry Skewness	Kurtosis
Information and data literacy	2.33	5.00	4.559	0.568	0.911	-1.187	0.954
Communication and collaboration	2.50	5.00	4.549	0.586	0.946	-1.146	0.527
Content creation	1.00	5.00	4.055	0.789	0.786	-0.749	0.572
Security	1.50	5.00	4.251	0.769	0.854	-0.986	0.672
Problems solving	1.00	5.00	4.063	0.851	0.927	-0.736	0.150

Additionally, differences across all five dimensions of digital competence were tested in relation to socio-demographic characteristics. Gender differences, differences by level of education and working experience, were examined using an independent samples *t*-test.

No statistically significant gender differences were found for any of the five dimensions (Table 7).

Table 7. Gender differences in correlation with level of digital competences

	Gender	N	M	SD	t	p
Information and data literacy	male	44	4.515	0.665	-0.53	0.592
	female	136	4.574	0.535		
Communication and collaboration	male	44	4.451	0.688	-1.15	0.255
	female	136	4.582	0.548		
Content creation	male	44	3.989	0.847	-0.61	0.543
	female	136	4.077	0.771		
Security	male	44	4.284	0.746	0.33	0.742
	female	136	4.241	0.778		
Problems solving	male	44	4.136	0.887	0.64	0.525
	female	136	4.039	0.841		

In relation to the level of education, statistically significant differences were found across all five dimensions of digital competence, all in the same direction.

Individuals with a completed undergraduate degree (lower level of education) rated all five digital competences higher compared to those with a completed graduate degree (Table 8).

Table 8. Level of education in correlation with level of digital competences

	Level of education	N	M	SD	t	p
Information and data literacy	Undergraduate	29	4.816	0.384	3.69	0.000
	Graduate	139	4.494	0.596		
Communication and collaboration	Undergraduate	29	4.799	0.379	3.58	0.001
	Graduate	139	4.485	0.614		
Content creation	Undergraduate	29	4.483	0.567	4.13	0.000
	Graduate	139	3.962	0.819		
Security	Undergraduate	29	4.629	0.674	3.15	0.003
	Graduate	139	4.185	0.768		
Problems solving	Undergraduate	29	4.466	0.697	3.19	0.003
	Graduate	139	3.993	0.846		

No statistically significant differences were found in relation to working experience as a teacher for any of the dimensions (Table 9).

Table 9. Working experience as a teacher in correlation with level of digital competences

	Working experience	N	M	SD	t	p
Information and data literacy	no	90	4.570	0.592	0.26	0.794
	yes	90	4.548	0.546		
Communication and collaboration	no	90	4.579	0.569	0.67	0.504
	yes	90	4.520	0.604		
Content creation	no	90	4.083	0.714	0.48	0.633
	yes	90	4.027	0.861		
Security	no	90	4.306	0.702	0.95	0.346
	yes	90	4.197	0.831		
Problems solving	no	90	4.170	0.786	1.70	0.091
	yes	90	3.956	0.903		

ANOVA revealed statistically significant age-related differences in three dimensions of digital competence: *Communication and collaboration*, *Content creation*, and *Problems solving*.

Post hoc analysis with Bonferroni correction showed that, for all three dimensions, the statistically significant differences were found only between the youngest group of participants (under 30) and the oldest group (over 40).

In all cases, younger participants rated these three digital competences significantly higher than the oldest group (Table 10).

Table 10. The age-related differences in correlation with level of digital competences

	Age	N	M	SD	F _(2,177)	p
Information and data literacy	< 30	69	4.647	0.559	2.08	0.127
	31-40	61	4.563	0.585		
	> 40	50	4.433	0.544		
Communication and collaboration	< 30	69	4.663	0.544	3.47	0.033
	31-40	61	4.560	0.572		
	> 40	50	4.381	0.629		
Content creation	< 30	69	4.257	0.712	4.65	0.011
	31-40	61	4.015	0.715		
	> 40	50	3.825	0.912		
Security	< 30	69	4.333	0.723	0.73	0.483
	31-40	61	4.229	0.826		
	> 40	50	4.165	0.762		
Problems solving	< 30	69	4.228	0.846	4.07	0.019
	31-40	61	4.099	0.769		
	> 40	50	3.790	0.901		

4. Conclusion

The lifelong learning program in which teaching competencies are acquired includes not only the acquisition of knowledge and skills, but also their application in the teaching environment. It also includes the process of building and strengthening the personality of future teachers, making them rational, capable, sensitive, intelligent and capable of dealing with teaching situations and examples. In this context, an important part of the training of candidates for a teaching job, i.e., the acquisition of teaching competencies, is methodological and digital competence. Training a methodologically competent teacher means mastering a methodological repertoire from which they will be able to choose and apply appropriate methodological models that lead to the achievement of planned learning outcomes. A conscientious and integrated approach in the lifelong learning program requires the selection, organization, assessment and management of tools and technology during education in order to ensure their efficiency and productivity, as well as success in mastering digital competence. Thorough and specific lesson planning enables the value and productivity of teaching and learning. Considering that in modern teaching the emphasis is on the student and his activities, it is a matter of curricular planning in which the starting point is learning outcomes - statements that emphasize what knowledge and skills students will master after the learning process. With regard to social forms of work, it is important to include all teaching forms, but group work and pair work should be analyzed in focus as forms of work that intensively promote students and their activity and that represent learning that can take place even without teaching. Methodological systems, methods and methodological procedures are particularly important and useful topics whose creative potential complements the methodological context of modern teaching.

Within this topic, written preparation for the lesson is particularly taken into account, which ensures the peak and effectiveness of teaching. Teaching aids, tools and sources also contribute to its quality and comprehensiveness, and among them, a special place is occupied by the textbook of the subject whose design includes various multimodal resources (language, image, font, appearance, color, spatiality) accompanied by videos, digital texts and other audible and/or audible-visual materials. In modern teaching, special attention is paid to the issue of learning and teaching as an activity, therefore this topic also belongs to the complex of methodological topics for the education of future teachers. The topic of student evaluation in teaching completes the cycle of methodological topics in the acquisition of methodological competencies as part of teaching competencies. High scores on methodological competence and knowledge indicate that the program successfully integrates theoretical and practical aspects of methodology, enabling participants to develop skills necessary for lesson planning, implementation, classroom management, assessment, and reflective teaching practice. In addition, consistently high scores in all five dimensions of digital competence suggest that the program effectively supports the development of digital skills essential for teaching and learning in digital media. In conclusion, the PPDM program represents a valuable model of lifelong learning that contributes to the professional development of future teachers by fostering methodological and digital competences aligned with contemporary educational standards. The findings highlight the importance of continuous improvement of such programs, with particular attention to differentiated support based on participants' prior experience and individual needs.

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