EMPOWERING UNIVERSITY TEACHERS THROUGH DIGITAL COMPETENCE ASSESSMENT
Capacitar professores universitários por meio da avaliação de competências digitais

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ABSTRACT

This paper focuses attention on the need to account for the specific content of digital competences in the teaching profession. The study substantiates its original methodology, which relies on a quantitative procedure based on the Likert scale as an instrument of self-reflection in determining individuals' attitudes to particular issues. The empirical study examines the level of digital competence among university teachers in Kazan, Russia. Different areas of professional digital competence are compared considering the socio-demographic characteristics of gender, age, and work experience. The study demonstrates that teachers, regardless of their gender, age, and experience, successfully apply information and communication technologies (ICT) in their professional practice. However, women are more likely to have a more active digital position and young specialists tend to overestimate their digital competence. To improve the effectiveness of ICT implementation in education, programs for the development of digital skills should be developed with consideration of teachers' age and work experience. In addition, it is recommended to conduct further research on the problem using different statistical methods.
Keywords: Digital competences, Digital university, DigCompEdu for educators at all levels, Socio-demographic factors

CAPACITAR PROFESSORES UNIVERSITÁRIOS POR MEIO DA AVALIAÇÃO DE COMPETÊNCIAS DIGITAIS
Empowering university teachers through digital competence assessment

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RESUMO

Este artigo concentra-se na necessidade de considerar o conteúdo específico das competências digitais na profissão docente. O estudo fundamenta sua metodologia original, que se baseia em um procedimento quantitativo baseado na escala Likert como instrumento de autorreflexão para determinar as atitudes dos indivíduos em relação a questões específicas. O estudo empírico examina o nível de competência digital entre professores universitários em Kazan, Rússia. Diferentes áreas de competência digital profissional são comparadas considerando as características sociodemográficas de gênero, idade e experiência profissional. O estudo demonstra que os professores, independentemente de gênero, idade e experiência, aplicam com sucesso as tecnologias da informação e comunicação (TIC) em sua prática profissional. No entanto, as mulheres são mais propensas a ter uma posição digital mais ativa e os jovens especialistas tendem a superestimar sua competência digital. Para melhorar a eficácia da implementação das TIC na educação, programas para o desenvolvimento de habilidades digitais devem ser desenvolvidos levando em consideração a idade e a experiência profissional dos professores. Além disso, recomenda-se a realização de pesquisas adicionais sobre o problema utilizando diferentes métodos estatísticos.
Palavras-chave: Competências digitais, Universidade digital, DigCompEdu para educadores de todos os níveis, Fatores sociodemográficos

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INTRODUCTION

With today's ubiquity of information technology, digital competence has acquired the status of a critical factor in many types of work, including higher education, where it has become a key competence of university teachers (Akhmetshin et al., 2024; Gadzaova et al., 2024). Digital competence is now a crucial precondition for teachers' successful adaptation to the realities of the digital university 4.0 (Appakova-Shogina et al., 2024; Nikolaeva et al., 2023). The structure of digital teaching competences has a more complex content compared to many other employment areas, as teachers are challenged to integrate and utilize information technology in pedagogical practice (Tolmachev et al., 2022; Uteuliyev et al., 2023; Zotova et al., 2022). In our view, the teacher has been given the role not of a subject, but of an agent of digitalization in higher education, capable of playing a decisive role in the transformation of the existing educational system based on a reassessment of the technologies of education and its strategic goals (Burganova, Iureva, 2023).

There are many approaches to the essence of teachers' digital competence. One of the most popular perspectives used even beyond the EU is outlined in the European Framework for the Digital Competence of Educators at All Levels (DigCompEdu) (Redecker, 2017), which highlights six different areas of competences required of teachers to promote effective, inclusive, and innovative teaching strategies using digital tools. The US, many EU countries, and other regions have their own frameworks for improving the digital competence of teachers in information and communication technology (ICT). However, they are more focused on pre-university education and do not adequately reflect the requirements for the digital maturity of university teachers (Basilotta-Gómez-Pablos et al., 2022). Virtually all universities, including Russian, cite research and publication activity as one of the most important accreditation indicators to assess the professional competence of teachers. Requirements to meet certain criteria of digital literacy are almost non-existent. This largely explains why so far many universities, especially regional ones, are not particularly concerned about creating the material and technical base for implementing a digital educational environment. Teachers have great difficulties using free internal university digital services for educational and research purposes. However, teachers play a key role in integrating professional knowledge and information technology, which obliges them to improve their digital competence. The recent experience of universities operating online during the COVID-19 pandemic demonstrated the need to raise the digital competence of teachers, including the skills of using digital services and technologies to organize the educational process and support effective communication with students in the transition to distance learning (Dias-Trindade et al., 2019; Smagulov et al., 2023).

Numerous studies on the experience of university teachers in using digital communications in the pandemic and post-pandemic contexts have shown the challenges they faced and the evolution of their attitudes towards ICT (Analiticheskii doklad, 2020; Barannikov et al., 2020).

In this context, our *research goal* was to analyze the digital competence of university teachers working in Kazan using a reflective model and compare the levels of different competence areas depending on teachers' socio-demographic characteristics, i.e., gender, age, and work experience.

1 METHODS

Our *methodology* relied on a quantitative procedure based on summated rating with a Likert-type scale, considered one of the most effective instruments for measuring attitudes and opinions and usually used as a self-reflection tool to establish people's attitudes to a problem. The self-assessment tool used in our study was a questionnaire on the topic "Digital competences of educators" developed by us based on the set of digital competences provided by the DigCompEdu framework. Specifically, DigCompEdu lists six main areas of competences: 1) professional engagement; 2) digital resources; 3) teaching and learning; 4) assessment; 5) empowering learners; 6) facilitating learners' digital competence: (6.1) information and media literacy, (6.2) communication, (6.3) content creation, (6.4) responsible use, (6.5) problem solving (Burganova, Iureva, 2021; Portillo et al., 2020; Volkov, 2020). This methodology has already been implemented in several studies on the development of professional digital competences among school teachers (Sales et al., 2020).

The survey was conducted using the online questionnaire service on the Anketolog platform in September 2024 and was anonymous. The questionnaire contained 18 questions that collectively reflected six areas of

professional digital competences: 1. Using ICT to collaborate with colleagues (question 1); 2. Using digital channels to improve communication (question 2); 3. Developing digital competences (question 3); 4. Using websites and search strategies (question 4); 5. Using in-house educational resources (question 5); 6. Protecting confidential content (question 6); 7. Using ICT to interact with students (questions 7–9); 8. Digital grading and analysis of student data (questions 10–11): 9. ICT to ensure individualization and active engagement of students (questions 12–15): 10. Assessing information reliability and safe behavior on the Internet (questions 16–17); 11. Creative use of ICT (question 18). Each question had five answer options, "completely disagree", "partially disagree", "partially agree", "agree", "partially agree", and "completely agree", corresponding to a score from 0 to 4 points.

The sampling procedure was non-random (purposive) with elements of quota sampling to ensure more or less proportional representation of the general population by gender, age, status, and work experience in higher education. This study can be described as exploratory, because the final sample of respondents was rather small — 102 teachers of social sciences and humanities courses at the undergraduate and graduate levels. The sample included teachers from four universities in the Republic of Tatarstan, Russia: Kazan Federal University, Kazan National Research Technological University, Kazan Innovative University, and Kazan State Agricultural University.

Among the 102 surveyed teachers, 70 (68.5%) were women and 32 (31.5%) were men. The total number of respondents by age groups was: 20 to 25 years old — 7 (6.7%), 26 to 30 years old — 17 (16.7%), 31 to 35 years old — 20 (20.01%), 36 to 40 years old — 5 (5.0%), 41 to 45 years old — 10 (10.0%), 46 to 50 years old — 9 (8.30%), 51 to 55 years old — 14 (13.3%), 56 to 60 years old — 3 (3.0%), 61 to 65 years old — 7 (6.70%), 66 to 70 years old — 3 (3.0%), 71 years old and over — 7 (6.7%).

Data analysis was performed using the Python programming language in the Jupyter Notebook environment. The main tools for data analysis and visualization were two libraries: Pandas for tabular data and Matplotib for graphs, such as bar charts.

2 RESULTS

Differences in the six areas of teacher competences mentioned above were analyzed according to socio-demographic variables: gender, age, and work experience.

Mean scores by gender are displayed in Figure 1

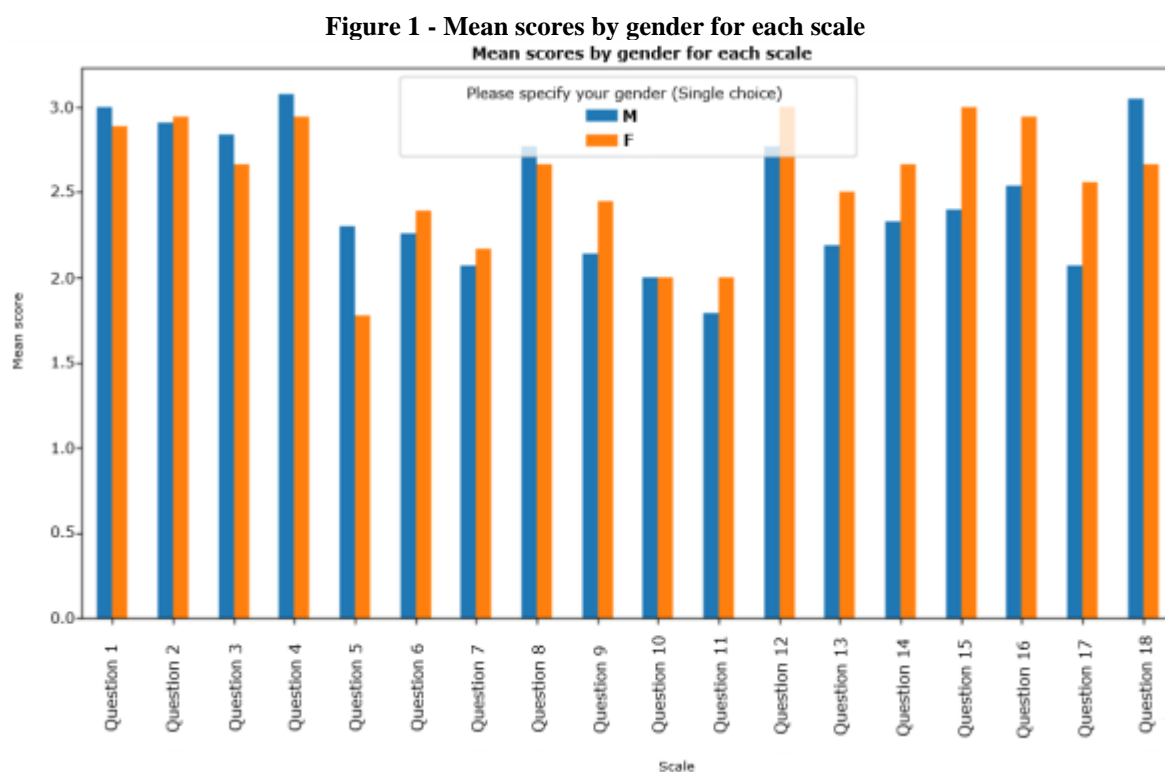**Figure 1 - Mean scores by gender for each scale**

Figure 1 shows that the general trends in most of the questions are the same for men and women. However, there are a few clear differences:

1. In questions 5 and 6, women rate themselves lower compared to their male colleagues, which might indicate gender differences in the perception of these aspects of using ICT.

2. An opposite trend is observed in question, with female teachers rating themselves much higher than men.

3. Scores on questions 1, 2, 3, and 4 are quite uniform, showing the similarity of both attitudes and experiences using digital technology among teachers of both genders.

4. In questions 7–11 and 12–17, some aspects have higher average scores, which might indicate that women use ICT more actively.

These are only general trends in the attitudes of male and female teachers to the use of ICT. For a more detailed analysis of the distribution of scores by gender, we need to focus on the key topics covered in the questionnaire.

On *question 1* addressing the problem of using ICT to communicate with colleagues, both women and men have rather high scores, which shows that digital interaction has become a universal practice for teachers regardless of gender. *Question 2,* which focuses on the use of channels to improve communication, also shows no gender differences, with men and women rating their activity in using digital tools to communicate with both colleagues and students equally highly. *Question 3* on attitudes to developing one's own digital competences shows a gap between men and women in favor of the former, which may suggest a stronger motivation to use ICT among the male teachers. In addition, responses to *question 4* devoted to websites and search strategies demonstrate that men are more focused on using digital resources to search for information. Even greater gender differences are observed in *question 5* on teachers' attitudes to utilizing their own educational resources: men are likely to be more involved in creating and modifying learning materials than their female counterparts. *Question 6* on attitudes to protecting confidential content demonstrates a greater understanding by female teachers of the importance and sensitivity of cybersecurity. Similarly moderate differences can be seen in questions 7–9 covering teachers' attitudes to using ICT to interact with students. Female educators more actively engage students in the use of ICT to plan and independently control their own learning process.
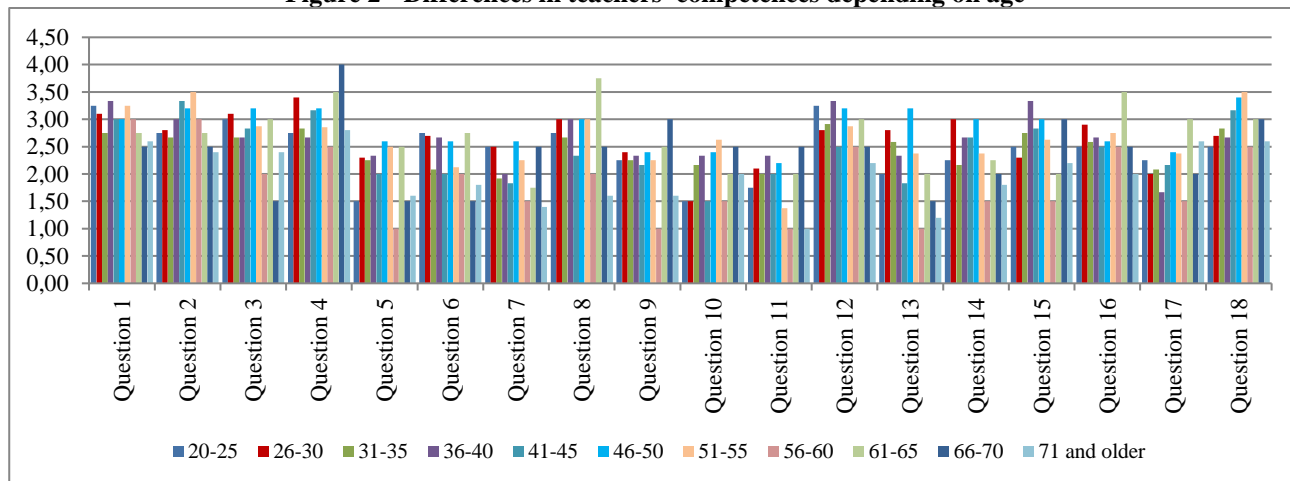
Answers to question 11, which identifies attitudes to digital grading and analysis of student data, also suggest a greater interest in using digital tools to monitor students' knowledge on the part of women. The same trend is observed in responses to subsequent survey questions. As demonstrated by *questions 12–15*, women are more likely to use ICT to engage students and create opportunities for individualized learning. In addition, women might be paying more attention to teaching students safe and responsible online behavior, as well as to assessing the reliability of information (questions 16–17). Responses to question 18 on teachers' attitudes towards encouraging students to use ICT creatively suggest that women are less actively involved in the creative elements of the learning process.

Thus, the comparative analysis of university teachers' digital competence based on the criterion of gender reveals that women have a more active attitude towards using digital instruments in various competence areas.

Next, we should analyze the influence of age as a factor in digital competence.

Differences in the six areas of competence between teachers in different age groups are shown in Figure 2.

Figure 2 - Differences in teachers' competences depending on age

The interviewed teachers of different age groups show significant differences in almost every area of competence, which is especially evident from questions 2–7, 10–15, and 17–18. Table 1 provides the mean values of these gaps in competence levels.

Table 1 - Average digital competence scores of teachers by age groups

Age	Question 1	Question 2	Question 3	Question 4	Question 5	Question 6	Question 7	Question 8	Question 9	Question 10	Question 11	Question 12	Question 13	Question 14	Question 15	Question 16	Question 17	Question 18
20–25	3.25	2.75	3.00	2.75	1.50	2.75	2.50	2.75	2.25	1.50	1.75	3.25	2.00	2.25	2.50	2.50	2.25	2.50
26–30	3.10	2.80	3.10	3.40	2.30	2.70	2.50	3.00	2.40	1.50	2.10	2.80	2.80	3.00	2.30	2.90	2.00	2.70
31–35	2.75	2.67	2.67	2.83	2.25	2.08	1.92	2.67	2.25	2.17	2.00	2.92	2.58	2.17	2.75	2.58	2.08	2.83
36–40	3.33	3.00	2.67	2.67	2.33	2.67	2.00	3.00	2.33	2.33	2.33	3.33	2.33	2.67	3.33	2.67	1.67	2.67
41–45	3.00	3.33	2.83	3.17	2.00	2.00	1.83	2.33	2.17	1.50	2.00	2.50	1.83	2.67	2.83	2.50	2.17	3.17
46–50	3.00	3.20	3.20	3.20	2.60	2.60	2.60	3.00	2.40	2.40	2.20	3.20	3.20	3.00	3.00	2.60	2.40	3.40
51–55	3.25	3.50	2.88	2.86	2.50	2.13	2.25	3.00	2.25	2.63	1.38	2.88	2.38	2.38	2.63	2.75	2.38	3.50
56–60	3.00	3.00	2.00	2.50	1.00	2.00	1.50	2.00	1.00	1.50	1.00	2.50	1.00	1.50	1.50	2.50	1.50	2.50
61–65	2.75	2.75	3.00	3.50	2.50	2.75	1.75	3.75	2.50	2.00	2.00	3.00	2.00	2.25	2.00	3.50	3.00	3.00
66–70	2.50	2.50	1.50	4.00	1.50	1.50	2.50	2.50	3.00	2.50	2.50	2.50	1.50	2.00	3.00	2.50	2.00	3.00
71 and above	2.60	2.40	2.40	2.80	1.60	1.80	1.40	1.60	1.60	2.00	1.00	2.20	1.20	1.80	2.20	2.00	2.60	2.60

Based on this data, we can draw the following conclusions about differences in the digital competences of teachers across age groups:

1. **20 to 25 years old**. Beginner teachers show low scores on questions 5, 10, and 11 (1.5, 1.5, and 1.75 points, respectively), which may indicate less use of their own educational resources in teaching and learning, as well as in digital grading and the analysis of student data (questions 10–11). On the other hand, this age group scored high on the use of ICT in communication with colleagues, active use of websites and search strategies, and creative use of ICT. Thus, we can conclude that these teachers have a high level of general digital competence, but their competences in digital teaching are insufficient.

2. **26 to 30 years old.** Young specialists demonstrate consistently high scores on almost all questions, except for question 10. This pattern is especially noticeable in questions 1, 3, 4, 8, 14, and 16 (3 points and above), which may suggest that young people actively use digital tools and resources both in communication with colleagues and in teaching students, widely utilizing ICT in professional practice. Overall, these teachers confidently navigate these aspects of their work.

3. **31 to 35 years old**. This age group, also belonging to the youth, demonstrates stable and uniform scores. Particularly high scores can be seen in questions 1, 4, 12, 15, and 18 (2.7, 2.8, 2.9, and 2.83 points, respectively), indicating that these teachers actively utilize ICT in collaborating with colleagues, use websites and search strategies, ensure individualized learning and student engagement by means of ICT, and apply this technology creatively.

4. **36 to 40 years old**. Compared to other groups, this age group scores higher on questions 1, 2, 8, 13, and 15 (3.3, 3.0, 3.0, 3.33, and 3.33 points, respectively). In turn, questions 7, 17, and 18 have particularly low scores (2, 1.67, and 1.67 points, respectively), which indicates potential problems in using ICT to interact with students, assessing the reliability of information, and applying ICT creatively.

5. **41 to 45 years old**. This group scored especially high on questions 1, 2, 4, and 18 (3.0, 3.33, 3.17, and 3.17 points, respectively), which shows that they actively use ICT to work with colleagues, rely on digital channels to improve communication, use websites and search strategies, and approach ICT creatively. However, the teachers in this group have little reliance on ICT in their interactions with students, in digital grading and analysis of student data, and in achieving individualization and student engagement.

6. **45 to 50 years old**. Employees of this age rate themselves highly on questions 1, 2, 3, 4, 8, 12, 13, 14, 15, and 18 (3.0, 3.2, 3.2, 3.2, 3.0, 3.2, 3.2, 3.0, 3.0, and 3.4 points, respectively), which indicates their high engagement in digital processes and evaluation strategies.

7. **51 to 55 years old**. Teachers in this age group give themselves particularly high scores on questions 1, 2, 8, and 18 (3.25, 3.50, 3.0, and 3.5 points, respectively) and other questions on average do not go below 2.5 points, which demonstrates quite a stable high level of engagement in digital processes and evaluation strategies, as well as high creativity in the use of ICT in the educational process.

8. **56 to 60 years old**. This age group had only two high scores, on questions 1 and 2 (3.0 and 3.0 points, respectively), which describe the use of ICT to work with colleagues and digital channels to improve communication. On the other hand, seven items received extremely low scores: questions 5, 7, 10, 11, 13, 14, 15, and 17 (1.00, 1.50, 1.50, 1.0, 1.0, 1.50, 1.50, and 15.0 points, respectively).

9. **61 to 65 years old**. This group of teachers is characterized by their focus on high achievement, especially in questions 3, 4, 8, 12, 16, 17, and 18 (3.0, 3.5, 3.75, 3, 0, 3.53, 3.0, and 2.88 points, respectively), which indicate their stability in planning and using digital resources in teaching students.

10. **66 to 70 years old**. Teachers in this group show mixed results, with high scores on questions 4, 9, 15, and 18 (4.0, 3.0, 3.0, and 3.0 points, respectively) and low scores on questions 3, 5, 6, and 15 (1.5 points each). This may suggest that, on the one hand, they make extensive use of websites and search strategies, rely on ICT in their interactions with students, and are oriented towards creative interaction with students. On the other hand, these teachers do not pay enough attention to developing their digital competences, using their own educational resources, and utilizing ICT for individualization and ensuring student engagement.

11. **71 years old and over.** The oldest age group of teachers is marked by the least involvement in the digitalization of the teaching process. The highest scores were given to questions 1, 4, 17, and 18 (2.60, 2.80, 2.6., and 2.0 points, respectively) and the lowest — to questions 5, 6, 7, 8, 9, 11, 13, and 14 (1.60, 1.8.0, 1.4.0, 1.6.0, 1.0, 1.20, and 1.80 points, respectively). The highly rated indicators include those referring to teachers' use of ICT for working with colleagues, active engagement with websites and search strategies, teaching students about safe behavior on the Internet, and creative use of ICT. Teachers in the oldest age group underutilize their own educational resources, pay little attention to protecting confidential content or using ICT to interact with students, hardly engage in digital grading and analysis of student data, and do not focus on using ICT to individualize learning and engage students.

Thus, we can conclude that there is no direct correlation between attitudes towards the active use of ICT in teaching and teachers' age. In any case, this proved true only for the 71+ age group, which had the lowest scores in digital competences in almost three of the six competence areas (areas 3, 4, and 5).

The highest and most stable results in almost all areas of digital competence were reported by teachers aged 46 to 50 (9 best scores for different competences) and 61 to 65 (8 best scores).

Next, let us compare teachers' digital competence depending on their work experience.

Figure 3 shows the shares of different work experience groups in the sample.

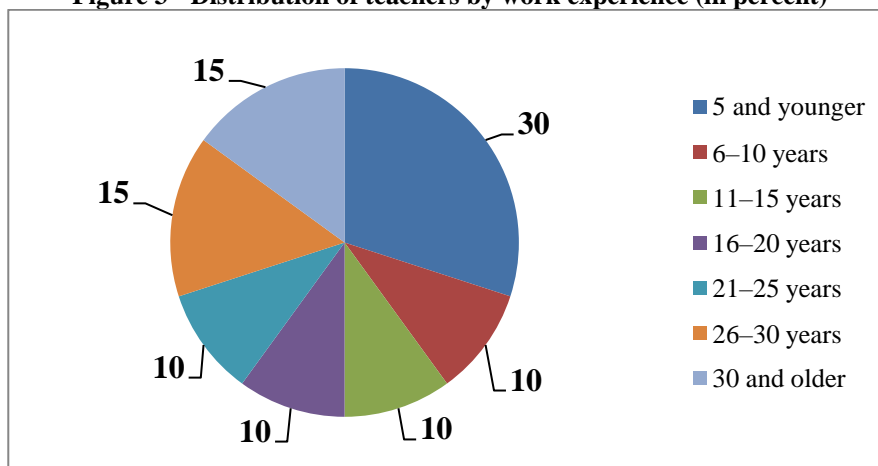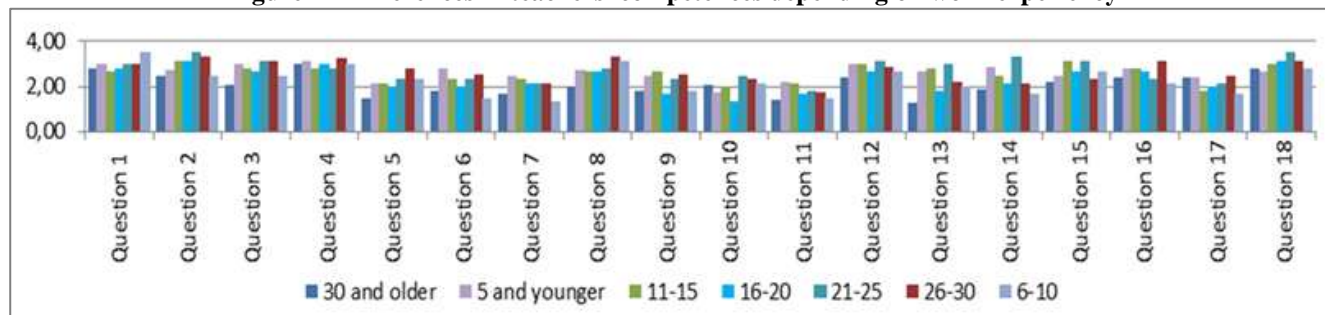**Figure 3 - Distribution of teachers by work experience (in percent)**

Figure 4 provides a bar chart of differences in the six areas of teachers' competences according to the criterion of work experience.

Figure 4 - Differences in teachers' competences depending on work experiency

Work experience is negatively correlated with teachers' digital literacy. This is especially evident in answers to questions 2, 3, 5, 6, 7, 8, 9, 11, 12, 13, 14, 15, and 18.

Table 2 presents the mean values of gaps in digital competences depending on work experience.

Table 2 - Gaps in the level of teachers' competences depending on work experience

Quest ion 1	Quest ion 2	Quest ion 3	Quest ion 4	Quest ion 5	Quest ion 6	Quest ion 7	Quest ion 8	Quest ion 9	Quest ion 10	Quest ion 11	Quest ion 12	Quest ion 13	Quest ion 14	Quest ion 15	Quest ion 16	Quest ion 17	Quest ion 18
3.00	2.72	3.00	3.11	2.11	2.78	2.44	2.72	2.44	1.78	2.22	3.00	2.67	2.89	2.44	2.78	2.39	2.67
3.50	2.50	2.50	3.00	2.33	1.50	1.33	3.17	1.83	2.17	1.50	2.67	2.00	1.67	2.67	2.17	1.67	2.83
2.67	3.17	2.83	2.83	2.17	2.33	2.33	2.67	2.67	2.00	2.17	3.00	2.83	2.50	3.17	2.83	1.83	3.00
2.83	3.17	2.67	3.00	2.00	2.00	2.17	2.67	1.67	1.33	1.67	2.67	1.83	2.17	2.67	2.67	2.00	3.17
3.00	3.50	3.17	2.83	2.33	2.33	2.17	2.83	2.33	2.50	1.83	3.17	3.00	3.33	3.17	2.33	2.17	3.50
3.00	3.33	3.11	3.25	2.78	2.56	2.11	3.33	2.56	2.33	1.78	2.89	2.22	2.11	2.33	3.11	2.44	3.11
2.80	2.50	2.10	3.00	1.50	1.80	1.70	2.00	1.80	2.10	1.40	2.40	1.30	1.90	2.20	2.40	2.40	2.80

Based on the obtained data, the following conclusions can be drawn regarding the level of digital engagement in different work experience groups:

1. **Under 5 years.** This is a group of novice teachers who scored high and stable in many areas of digital literacy, especially on questions 1, 3, 4, and 12 (3 points and above). These are areas 1, 2, and 5 of digital competence, which means that novices are actively using and implementing ICT with a strong focus on developing

their own competences, and much less on using digital resources, applying them in digital evaluation and in analyzing student data (questions 5, 10–11).

2. **6 to 10 years.** This group of young teachers with some work experience shows more modest results with high scores on questions 1, 4, and 8 (above 3 points) on the one hand and very low scores (below 2 points) on questions 6–11, 14, and 17. These results indicate that teachers actively apply ICT to work with colleagues but are much less engaged with digital technologies for creative interaction with students.

3. **11 to 15 years**. The group of more experienced teachers shows more stable and uniform results. Particularly high scores on questions 2, 12, 15, 18 (3.17, 3.00, 3.17, 3.00 points, respectively) suggest that they actively use ICT to interact with colleagues, utilize digital resources, improve their digital skills, evaluate the reliability of information, ensure individualization and active engagement of students. The only question with an average score below 2 points was question 17 related to developing a responsible model of behavior on the Internet among students.

4. **16 to 20 years**. This group of educators shows high scores on questions 2, 4, and 18 and a strong position on questions 1, 3, 8, 12, 15, and 16. This demonstrates their active use of digital channels to improve communication with colleagues, the use of websites and search strategies, highly creative application of ICT in the educational process, and the use of ICT to individualize learning and ensure student engagement. However, compared to other groups (except for the one with the longest work history), this group has many more scores below 2 points — on questions 9, 10, 11, and 13. This may indicate problems with using ICT to interact with students in digital grading and analyzing student data.

5. **21 to 25 years**. Faculty with more significant work experience rate themselves especially high on questions 1, 2, 3, 12, 13, 14, 15, and 18 (3.00, 3.50, 3.17, 3.17, 3.00, 3.33, 3.17), which show their high engagement with digital processes and evaluation strategies. Question 18 had the greatest average score (3.50 points), indicating high creativity in ICT use in the educational process.

6. **26 to 30 years**. This group of teachers also rated themselves highly, especially on questions 1, 2, 3, 4, 8, 16, 18 (3.00, 3.33, 3.11, 3.25, 3.33, 3.11, 3.11, points, respectively), indicating high level of digital competences in using digital resources in the educational process.

7. **Over 30 years.** Teachers with longer work experience gave themselves low scores in many areas of digital competence, particularly on questions 5 and 11 (1.5 and 1.4 points, respectively), which may indicate poor use of their own digital learning resources in teaching and ineffective use of ICT to protect confidential information and in developing student assessment strategies. Nevertheless, the most experienced teachers proved to be at the top of their game in other tasks: they use web resources confidently (question 4 — 3 points) and place great emphasis on assessing the reliability of information, teaching students how to navigate the Internet safely, and engaging students in creative activities (questions 16 and 17 — 2.40 points, question 18 — 2.8 points).

CONCLUSION

Our findings demonstrate general positive trends in the use of ICT by university teachers and indicate differences in the reported challenges in specific areas of ICT use depending on gender, age, and work experience. The study gives reason to conclude that teachers, irrespective of gender, age, and work experience, are successful in introducing ICT into their interaction with colleagues, actively use digital channels to improve their communications, and focus on developing their digital competences, making use of websites and search strategies, and engaging students in the creative use of ICT in the learning process.

The comparison of teachers' digital competences shows that female teachers have more active attitudes towards using ICT in their professional practice and suggests that age and work experience have a certain influence. It can be inferred that even minor work experience leads to better results in ICT use.

Therefore, specialized training programs for developing digital competences should be introduced for older teachers and the youngest generation. Although the survey participants with less than 5 years of work experience provided a higher self-assessment of their digital competence in almost all areas, this result should not be taken at face value, as it can be attributed to the higher self-esteem and lower self-criticism characteristic of youth.

Regardless of teachers' age, ICT application in education needs to focus on integrating digital and professional pedagogical competences. To better understand these differences, it would be worthwhile conducting research using statistical methods, including a t-test or regression analysis.

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