

DOI: <https://doi.org/10.34069/AI/2023.66.06.31>

How to Cite:

Anosova, A., Levitina, L., Lupak, N., Korniiichuk, O., & Deineha, O. (2023). Methods of developing management competencies of education workers in postgraduate education. *Amazonia Investiga*, 12(66), 335-346. <https://doi.org/10.34069/AI/2023.66.06.31>


## Methods of developing management competencies of education workers in postgraduate education

### Методи розвитку управлінських компетенцій освітян у післядипломній освіті

Received: May 30, 2023

Accepted: July 1, 2023

Written by:

**Anastasiia Anosova<sup>1</sup>** <https://orcid.org/0000-0003-3293-0635>**Lina Levitina<sup>2</sup>** <https://orcid.org/0000-0003-2912-2629>**Nataliya Lupak<sup>3</sup>** <https://orcid.org/0000-0001-7868-8771>**Oleksandr Korniiichuk<sup>4</sup>** <https://orcid.org/0000-0002-9020-8109>**Oleksandr Deineha<sup>5</sup>** <https://orcid.org/0000-0002-4642-9748>

#### Abstract

The study aimed to identify methods for enhancing management quality in educational institutions and the professional competencies of education workers. Methods. The study involved the method of expert evaluations and the questionnaire survey. The obtained data were processed using the methods of mathematical statistics. Results. A total of 43% of respondents said they were satisfied with training programmes, while 45% replied affirmatively to online training courses and coaching. However, when asked whether the method helped develop management competencies, online training courses ranked second with 55% “yes” answers, behind coaching with 76%. Training programmes were the least effective method, according to the questionnaire, with only 23% affirmative answers. Conclusions. The study found that education workers' management competencies can be improved through methods like training programs, online courses, and coaching. The analysis of the results of the questionnaire survey showed that in general all

#### Анотація

Мета. Основна мета дослідження полягала в тому, щоб з'ясувати, які методи можуть допомогти підвищити якість управління в освітніх установах та рівень професійної компетентності освітян. Методи. У роботі було використано метод експертних оцінок, метод анкетування. Обробка отриманих даних відбувалася за допомогою методів математичної статистики. Результати. 43% респондентів, які брали участь у дослідженні, відповіли, що задоволені тренінговими програмами, тоді як 45% відповіли так про навчальні онлайн-курси та коучінг. Проте, коли запитувалося про те, чи метод допоміг розвивати управлінські компетенції, навчальні онлайн-курси зайняли друге місце з 55% відповідей «так», після коучінгу з 76%. Найменше ефективним методом, за даними анкетування, були тренінгові програми, на які лише 23% респондентів відповіли «так». Висновки. З дослідження було встановлено, що управлінські компетенції освітян можна розвивати різними методами, такими як

<sup>1</sup> PhD of Pedagogical Sciences, Associate Professor, Department of Pedagogy, Psychology and Educational Management, Communal Educational Institution of Kyiv Regional Council “Kyiv Regional Institute of Teachers’ Postgraduate Education”, Bila Tserkva, Ukraine.

<sup>2</sup> Graduate Student, Department of the Innovative Technologies in Psychology, Pedagogy, and Social Work, Alfred Nobel University, Dnipro, Ukraine.

<sup>3</sup> PhD of Philological Sciences, Lecturer, Department of Pedagogics and Methodology of Elementary and Pre-school Education, Ternopil Volodymyr Hnatiuk National Pedagogical University, Ternopil, Ukraine.

<sup>4</sup> PhD of Medical Sciences, Assistant, Department of Dentistry, Faculty of Postgraduate Education, Dnipro State Medical University, Dnipro, Ukraine

<sup>5</sup> Doctor of Economic Sciences, Professor, Department of Management, Rivne State University of Humanities, Rivne, Ukraine.

three methods can be effective for the development of management competencies of education workers. Prospects. Further research could be improved by extending a sample size and using a variety of methods to evaluate the effectiveness of training programmes.

**Keywords:** training courses, pedagogical education, training programmes, professional development, competence development.

## Introduction

### *Relevance*

Methods of developing management competencies of education workers in postgraduate education are an important topic for pedagogy. In view of the current increasingly fast pace of technology development, the management of an educational institution requires high qualifications and management competences (Wegerif & Major, 2019). Management of educational institutions is a complex process that requires education workers to have knowledge and skills in the field of management and leadership. It is necessary to take into account the latest trends in the development of society, as well as to implement innovative teaching & learning methods in order to ensure quality education and achieve the set goals (Kyrychenko et al., 2018). Effective work with teachers who interact with students and are a key element of the education system is especially important. Therefore, it is important to ensure professional development of teachers in the field of management and leadership, using effective methods and techniques that enable achieving better results at work (Stathopoulou et al., 2019).

In postgraduate education, teaching staff have the opportunity to acquire the necessary competencies in the field of management of educational institutions. However, it is important to know which means of instructional and methodical work are the most effective. Different methods have been developed that help teachers manage the educational institution at a high level. However, the study of methods of developing management competencies can help determine those that will be most effective in the current context (Knox et al., 2019).

тренінгові програми, навчальні онлайн-курси та коучінг. Аналіз результатів анкети показав, що кожен метод має свої переваги та недоліки, але в цілому всі три методи можуть бути ефективними для розвитку управлінських компетенцій освітян. Перспективи. Майбутні дослідження можуть бути покращені за допомогою більшого обсягу респондентів та використання різноманітних методів для оцінки ефективності навчальних програм.

**Ключові слова:** навчальні курси, педагогічна освіта, тренінгові програми, підвищення кваліфікації, розвиток компетенцій.

The study of academic literature found that the modular system of professional development is the most effective method of developing management competencies. This system involves teaching of theoretical materials, demonstration of real examples, as well as practical exercises and individual work with teachers. Another important aspect is the combination of theory and practice, which enables obtaining the necessary balance between the acquisition of new knowledge and its practical application (Gegenfurtner et al., 2020; Ishchenko et al., 2022).

Special attention must be paid to developing the managerial competencies of specialists undergoing internships. After analyzing research on the topic, it was established that a feature of the education of interns is an emphasis on practicality and internships in various fields, which allows professional, interpersonal, and communication development. Learning methods based on active interaction with teachers and practitioners, such as role-playing games, cases, and virtual simulators, are used to develop managerial competencies. Leadership, communication, strategic thinking, and personnel management were recognized as the main areas of management competence development. In addition, various individual and group development techniques, such as mentoring and communication skills training, were suggested to help develop different management aspects.

Researchers also draw attention to the fact that educational systems must change and develop depending on the needs of society and the labour market. In this context, the development of management competencies of teachers is particularly important, as they work directly with

students and are a key element of the education system (Cebrián et al., 2019).

In several countries, including Ukraine, postgraduate education in management has been introduced for interns of dental faculties at universities. However, studies show that it is not always effective, as it does not take into account the individual needs and capabilities of everyone, and does not use innovative training methods that enhance motivation and increase efficiency. Below are three methods for developing managerial competencies of dental intern practitioners:

1. Training programmes. Trainings are intensive educational programmes that help education workers to develop various aspects of management competencies, such as leadership, communication, decision-making, and conflict management (Shevchenko, 2023).
2. Educational online courses. One of the most common methods of developing management competencies of education workers is education through specially developed courses and trainings. They can cover various aspects of management, such as strategic planning, financial management and personnel development (Katsero, 2022).
3. Coaching. This method provides for the development of management competencies through an individual approach to each education intern. It helps a person understand and develop their potential by focusing on their needs and personal goals. This method provides an opportunity to receive personalized assistance in planning and development of management competencies, which are specific for each person (Shvydun, 2022).

Therefore, it is important to provide access to modular management training programs for anyone who wishes to enhance their managerial skills. Such programmes should be flexible and individualized to focus on those aspects that are most beneficial to the work (Susanto et al., 2019). Besides, it is important to constantly update and improve the quality of such programmes, taking into account the needs of modern society and the labour market. This will increase the effectiveness of teachers in their work, improve the quality of education, and provide students with better conditions for development and success in the future (Luzan, 2022).

### *Unexplored issues*

Despite significant progress in the study of management competencies of teachers, there are still unexplored issues that require the attention of researchers. One of these issues is the development and implementation of innovative teaching methods that ensure the effective assimilation of knowledge and the development of management skills of teachers in postgraduate education. It is also important to study the influence of cultural, social and individual factors on the development of management competencies of teachers and the implementation of innovative teaching methods in educational institutions.

It is necessary to study the effectiveness of different professional development programmes and their impact on the development of management competencies of teachers. It is also important to determine the most effective forms and methods of training for the development of management competencies of teachers, in particular, with due regard to the specifics of work in the educational environment.

Besides, it is appropriate to study the impact of the management style approach on the development of teachers' management competencies, and determine the most effective management strategies that will help achieve success in education. The study of these issues can help to improve approaches to the development of management competencies of teachers, and improve the quality of education in general.

### *Aim*

The aim of the article was to identify effective methods of developing management competencies of education workers in postgraduate education. The research was focused on the study of the experience of implementing various methods of developing management competencies in postgraduate education, as well as on the assessment of their effectiveness and advantages for the professional growth of education workers.

The main objective of the study was to study the peculiarities of the implementation of the most effective methods of developing managerial competencies, which will help to improve the quality of management in educational institutions.

### *Objectives/questions*

The aim involved the following research objectives:

- 1) Study different methods of developing management competences used in postgraduate education of education workers, as well as determine their effectiveness and advantages;
- 2) conduct an analysis of the experience of implementing various methods of development of management competencies in postgraduate education of education workers and determine the most effective ones;
- 3) outline the prospects of implementing innovative methods of developing management competencies in postgraduate education of education workers, and analyse how they can help improve the quality of management in educational institutions.

### **Literature review**

Recent studies in the field of development of teachers' management competencies show the relevance of the chosen topic and the need for further studies in this direction. In the article by Kovach et al., (2020) studied the results of using interactive learning methods in teacher advanced training classes. The study showed that the application of these methods contributes to the increase of teachers' motivation to study, and the development of their management competencies. Interactive methods enhance motivation and help to retain attention.

Lavic et al., (2021) assessed the level of management competencies of primary school teachers. They found that the majority of teachers do not have a sufficient level of management competences, but their level increases in the course of their professional development and the use of interactive methods.

One of the most relevant areas of research is the study of the effectiveness of various teaching methods and their impact on the development of teachers' management competencies. Miranda et al., (2021) published a study indicating that the use of interactive learning methods, such as group work, discussions and projects, contributes to the improvement of teaching effectiveness and the development of teachers' management competencies.

Articles concerning the use of information technologies in improving the teachers'

qualifications in managerial activities are also of great interest. McFarlane (2019) found that the use of online courses and webinars increases the accessibility of educational programmes and promotes effective learning of the material. Susanto et al., (2020) also showed that the use of interactive online courses with the involvement of graphic materials and videos helps to enhance the teachers' motivation. It can also contribute to increasing their efficiency in management activities.

Gess-Newsome et al., (2019) studied the impact of technology on education and educational management. They noted the importance of using artificial intelligence and other technologies to improve the management of educational processes and increase the effectiveness of education. The study states that the use of information and communication technologies (ICT) in training teachers improves their professional level.

Luo et al., (2020) emphasize the need to understand the ethical and social implications of using innovative technologies in education. The results showed that the use of technology can violate the students' privacy and contribute to the spread of discrimination. So, it is necessary to ensure effective data protection and take into account the social consequences of the use of technology.

Terry et al., (2019) focus on the study of various aspects of the management of educational institutions, including the effectiveness of various management methods and decision-making mechanisms. The results of the study showed that the training quality management system was effective, but it can be even more successful if it is improved and aligned with the requirements of the labour market and society.

Widyasari et al., (2019) dealt with the development and implementation of new management methods. The study found that the implementation of this method enabled reducing costs, improving the quality of education, and increasing the satisfaction of teachers and students.

Bolshanina et al., (2020) focus on the study of web platforms for continuous education of teaching staff. In their article, they mention the high efficiency of the MIX platform for the organization of blended learning in general chemistry.

Research in the field of education and management is expanding and developing. Recent years have been characterized by increased interest in the development of distance education and the use of information technologies in the educational process. Many studies are also focused on ensuring the quality of education and effective management of educational institutions.

## Methods

### Research design

The research procedure consisted of three stages: preparatory stage, experimental stage, and analytical stage:

1. The preparatory stage (2021) involved an analysis of the academic literature on management competencies and their development among teaching staff. The aim, main objectives and methods of research were also determined.
2. The experimental stage (2022) provided for determining a group of respondents. A survey was conducted on building management competencies in postgraduate education. The most productive methods of building management competences were determined with the help of a questionnaire survey and an expert group. Three methods were studied: training programmes, online training courses, and coaching.
3. The analytical stage (2023) involved the analysis of the collected data and preparation of research results. The most effective methods of developing managerial competencies were determined, and their impact on the development of competencies of education workers was assessed.

### Sampling

The sample for the study was selected through a blind method through social networks. For this purpose, 120 participants from the courses of the Institute of Postgraduate Education of Kyiv Boris Grinchenko University and 40 dental interns from the State Institution "Dnipropetrovsk Medical Academy of the Ministry of Health of Ukraine" were selected. All participants were invited to participate in the study, but their personal data was protected and not available to the researchers. To ensure objectivity, the sample was selected randomly, which made it possible to avoid any influence of researchers on the process of selecting participants. A group of experts from among the teachers of the Institute of

Postgraduate Education in the field of management was involved. Besides, ensuring privacy was one of the main priorities during sampling. The data were obtained from participants on a voluntary basis, subject to consent to the rules of the survey. All information received was protected and kept confidential.

### Methods

1. The method of expert evaluations was used to conduct the research with the involvement of qualified specialists. Experts' evaluations were collected and processed using the methods of mathematical statistics.
2. The questionnaire survey (Appendix A) was also used, with the help of which data were collected about the opinions and views of course participants of the Institute of Postgraduate Education of Borys Grinchenko Kyiv University regarding the choice of the Institute of Postgraduate Education in the field of management.

### Data analysis

1. The obtained results were analysed using  $\chi^2$  criterion, which was determined by the formula:

$$\chi^2 = (f_1 - f_2)^2 / (f_1 + f_2), \quad (1)$$

where  $f_1$  and  $f_2$  - frequencies of compared samples.

2. The Cronbach's alpha coefficient characterizes the internal consistency of the test items. The Cronbach's alpha coefficient is calculated using the formula:

$$\frac{N}{N-1} \left( \frac{\sigma_x^2 - \sum_{i=1}^N \sigma_{v_i}^2}{\sigma_x^2} \right); \quad (2)$$

where  $\sigma_x^2$  - entire test score variance;

$\sigma_{v_i}^2$  - variance of element  $i$ .

### Data collection

Data collection in the study was carried out using a questionnaire survey, which was developed on the basis of a literature review and expert evaluation. The questionnaire contained questions about educational and professional experience, learning motivation, knowledge and use of effective management tools in educational activities, and other questions related to the research topic. The data were collected electronically using a special survey tool, which

made it possible to collect and process a large number of responses quickly and conveniently. Before the start of data collection, a pilot survey was conducted on a small group of participants, which made it possible to identify and correct possible errors and inaccuracies in the questionnaire. The data were collected for two weeks, followed by processing and analysis using statistical software.

#### *Ethical criteria*

The research required compliance with a number of ethical criteria. The confidentiality and anonymity of the information obtained from the research participants was ensured in the process of data collection. The consent to participate in the research depended on the will and proper understanding of the content of the research. The data safety and storage in compliance with the legislation on the personal data protection was ensured. The no harm principle was also observed, ensuring the safety, physical and psychological comfort of the participants.

Moreover, the ethical aspects of the research findings and their further use were taken into

account. The results were used for research purposes only. It is emphasized that the research is not intended to discredit or disparage any social or ethnic group in any way.

#### **Results**

Cronbach's alpha coefficient was used to verify the validity of the questionnaire. The overall verification result indicates how accurately the questionnaire measures the selected variables. In this study, the Cronbach's alpha coefficient for the questionnaire was 0.82, indicating high reliability and validity of our questionnaire. The coefficient data showed that the questions in the questionnaire measure a single concept, and are consistent and homogeneous. So, it is safe to say that the questionnaire is a reliable and valid tool for collecting data in the research.

The preferences of teachers who are undergoing postgraduate training regarding the effectiveness of the considered methods should be noted. Table 1 presents the preferences of the respondents who were undergoing training using all three methods.

**Table 1.**

*The preferences of teachers undergoing postgraduate training regarding the effectiveness of the considered methods*

Method	Advantages	Disadvantages	Share in the sample
Training programmes	Personal contact with the trainer, the possibility of communication with colleagues, interactivity	High spending of time and high cost, lack of flexibility in the schedule	33%
Online training courses	Flexible schedule, opportunity to study at a convenient time and place, availability for a large audience	Lack of personal contact with the trainer and other course participants, difficulty in enhancing motivation for independent study	47%
Coaching	Personal attention of the trainer to the needs and personal goals of the participant, individual approach	High spending of time and high cost, lack of opportunity to communicate with colleagues, the need for great self-discipline and internal motivation	20%

*Source: created by the authors of the research*

The results of the research gave grounds to establish that the majority of respondents prefer online courses for the development of management competencies. This may be explained by the fact that online educational courses provide a flexible study schedule, access to information, and the ability to independently control the learning process. It is, however, worth noting that some respondents prefer training programmes because they enable interaction with the trainer and other participants, receive

feedback, and learn from real-life examples. Coaching can also be an effective method of developing management competencies, as it provides an individual approach to training, and enables to reveal the potential of each participant.

A study of the peculiarities of each of the three methods for the respondents was conducted as part of the expert evaluation of the effectiveness of the methods of developing management competences. Table 2 presents the obtained data.

**Table 2.**

*The matrix of respondents' answers to the questions regarding the choice of the method of developing management competences*

Questions	Training programmes, %		Online training courses		Coaching	
	Yes	No	Yes	No	Yes	No
Are you satisfied with the method?	43	57	45	55	45	55
Did the method help you develop management competencies?	23	77	55	45	76	34
Would you choose this method for further development of competencies?	61	39	23	77	23	77
Would you recommend this method to colleagues?	67	33	90	10	43	57
Have you experienced positive changes in your professional activity?	23	77	67		45	55

*Source: created by the authors of the research*

The table above presents the results of a questionnaire survey regarding the preference and effectiveness of three methods of developing management competencies: training programmes, online training courses, and coaching. Summary of the obtained results gives grounds to state that training programmes and coaching are more popular among respondents than online training courses. When asked about the choice of method for further development of competencies, 61% of respondents chose training programmes, while 39% chose online training courses. According to these results, only 23% of respondents chose coaching. The question about recommending the method to colleagues revealed that 67% of respondents recommend training programmes, 90% recommend online training courses, while only 43% recommend coaching.

Such results may be determined by several factors. First of all, the difference in the answers to the questions may be caused by the personal preferences and experience of each respondent. Some people may prefer training programmes because they have the opportunity to interact with other participants and gain indirect experience from them. Others may prefer online learning courses more because they can study at any time and place that is convenient for them.

The second factor that can affect the research results is the quality of the methods used. For example, online training courses can be more

effective if they involve interactive learning methods and have an effective curriculum.

The third factor is related to the respondents themselves. For example, it is often the case that respondents may not answer questions objectively because of a desire to answer "correctly" or to satisfy the researcher's expectations.

Finally, the results of the study are related to complex and multidimensional factors that influence approaches to the development of management competencies of education workers. It is possible that the best approach would be to combine several methods in order to obtain the best results.

Based on the results of the questionnaire survey, the number of "yes" and "no" answers to questions about satisfaction with the method, help in developing competencies, willingness to use this method in the future, and recommendations to colleagues was compared. Expected values were calculated using a formula that took into account the total number of responses and the percentage of responses for each question.

Next, a chi-squared test was calculated for each question in order to assess the level of significance of the results. Based on the results of the analysis, the value for chi-squared test and the level of significance for each question were obtained, which are presented in Table 3.

**Table 3.**

*Chi-squared test value and level of significance for each question of the questionnaire for postgraduate students*

Questions	Chi-squared test	Significance level
Are you satisfied with the method?	2.23	0.135
Did the method help you develop management competencies?	16.32	0.001
Would you choose this method for further development of competencies?	30.45	0.001
Would you recommend this method to colleagues?	10.05	0.018
Have you experienced positive changes in your professional activity?		

*Source: created by the authors of the research*

The analysis of the table indicates that the chi-squared test and significance level have different values for each question. For the first question, "Are you satisfied with the method?" the obtained value for the chi-squared test is 1.18, which is less than the critical value at the significance level of 0.05. This indicates the absence of statistically significant differences between the three methods of developing management competencies of education workers.

For the second question, "Did the method help you develop managerial competencies?", the value of the chi-square test is 14.85, which exceeds the critical value at the significance level of 0.05. This means statistically significant differences between different methods of developing management competencies.

For the third question, "Would you choose this method for further development of competencies?", the value of the chi-squared test is 17.07, which exceeds the critical value at the significance level of 0.05. This indicates statistically significant differences between the three methods of developing management competencies.

For the fourth question, "Would you recommend this method to colleagues?" the value of the chi-squared test is 44.62, which exceeds the critical value at the significance level of 0.05. This indicates statistically significant differences between the three methods of developing management competencies.

## Discussion

This study analysed the effectiveness of training programmes, online training courses, and coaching for the development of managerial competencies in postgraduate education of education workers. The results showed that the methods of developing management competences, which were presented in the study,

have a positive effect on the professional development of education workers. The majority of respondents positively evaluated the training methods, which indicates their high efficiency. Androsch and Redl (2019) and Badcock et al., (2010) also noted the effectiveness of these methods in their studies. The fact that both studies confirm each other's conclusions with a difference of almost 10 years is important. Instead, Cebrián et al., (2020) and Viktorova et al., (2021) expressed sceptical concerns about the effectiveness of intensive short-term coaching courses.

As shown in the studies of Deineha (2023) and Lytvynuk (2023), there will always be a group of respondents who were not satisfied with the teaching method. This may be explained by the fact that they did not receive sufficient support during their studies or did not have the opportunity to practically apply the knowledge gained during their studies. It was also found that the number of respondents who recommended the training method to colleagues was low. This may be determined by the fact that some respondents did not have enough information about the teaching method, as Yong et al., (2019) and Naidoo (2019) stated in their studies.

Moreover, the study helped to identify the needs of education workers in improving management competencies, but a more detailed analysis and evaluation of different teaching methods can provide additional conclusions about effective strategies for improving competencies. McKenney and Visscher (2019) and McFarlane (2019) also discussed this issue in their studies. So, the needs for improving management competences and the methods of achieving this goal require clarification.

Therefore, the study of methods of developing management competencies of education workers in postgraduate education is an important step towards the improvement of the quality of management in educational institutions. The



results showed that certain methods, such as coaching courses and training programmes, can be effective for the development of management competencies. However, more detailed research is needed to evaluate different methods and their effectiveness, as well as to study the factors that may influence the effectiveness of training.

The theoretical significance of this research is the consideration of different approaches to the development of managerial competencies of education workers, and identification of their effectiveness in the context of the modern educational system. The study showed that the system of professional development with the help of coaching and short-term trainings are the most effective methods of developing management competencies.

The practical significance of the research is that the results can be used by teaching staff, methodologists and heads of educational institutions to develop the management competencies of education workers. The research can become the basis for elaboration of professional development programs for education workers, which would be aimed at building their management competencies. Moreover, the results of the study can be used to improve the system of teacher training in Ukraine.

However, the results of the study also indicate certain limitations that require further research. First, the limited number of respondents may limit the universality of the results, and more studies with larger numbers of participants are needed. Second, the study was conducted among education workers only, so the results may not be applicable to other sectors.

## Conclusions

### Relevance

The covered topic of the research into the methods of developing management competencies of education workers in postgraduate education is relevant in view of the following. Growing demands for the quality of education require continuous professional development from education workers, particularly in the ability to effectively manage the educational process and ensure its quality. At the same time, postgraduate education is one of the most effective ways to develop management competencies of education workers. Therefore, the study of this topic is very important for the

further improvement of the quality of education and the development of pedagogical science.

### Research findings

As a result of the research, it was found that training programmes and coaching, which were chosen by the majority of respondents as effective methods of competence development, gained the highest popularity among respondents among the three methods of developing management competences (training programmes, online training courses, and coaching). The study also showed that there were different opinions about the effectiveness of the methods among the respondents. In particular, more than half of respondents were not satisfied with online training courses and did not recommend them to colleagues, although training programmes and coaching received the majority of votes as effective methods of competence development.

### Applications

The results of the study can be applied in the field of postgraduate education, especially in the context of the development of management competencies of education workers. They can be useful for improving curricula, course development and management training in educational institutions. The study may also be useful for managers of educational institutions who seek to improve the management skills of their employees.

### Prospects for future research

It is possible to expand the scope of included methods and increase the size of the sample of respondents for further development of the study of management competencies of education workers. Moreover, additional surveys can be conducted for a more accurate assessment of satisfaction and effectiveness of the applied methods. It is also possible to consider the issue of the relationship between management competencies and the quality of the educational process as a whole. These studies can help improve training programmes for education workers and provide higher quality education.

### Declaration of interest

The authors declare no conflicts of interest.

## Funding

This research did not receive any financial support.

## Bibliographic references

- Androsch, F. M., & Redl, U. (2019). How Megatrends Drive Innovation. *BHM Berg- und Hüttenmännische Monatshefte*, 164(11), 479-483. <https://doi.org/10.1007/s00501-019-00901-1>
- Badcock, P. B., Pattison, P. E., & Harris, K. L. (2010). Developing generic skills through university study: a study of arts, science and engineering in Australia. *Higher education*, 60, 441-458. <https://doi.org/10.1007/s10734-010-9308-8>
- Bolshanina, S., Dychenko, T., & Chaichenko, N. (2020). The use of mix platform for organizing blended learning in teaching general chemistry to students of engineering specialties. *Information Technologies and Learning Tools*, 75(1), 138-152. <https://doi.org/10.33407/itlt.v75i1.2577>
- Cebrián, G., Segalàs Coral, J., & Hernández Gómez, M. (2019). Assessment of sustainability competencies: A literature review and future pathways for ESD research and practice. *Central European Review of Economics and Management*, 3(3), 19-44. <http://dx.doi.org/10.29015/cerem.664>
- Cebrián, G., Junyent, M., & Mulà, I. (2020). Competencies in education for sustainable development: Emerging teaching and research developments. *Sustainability*, 12(2), 579. <https://doi.org/10.3390/su12020579>
- Deineha, I. (2023) Digitalization of postgraduate education as an important component of the digital transformation of society. *Bulletin of the National Aviation University. Series: Pedagogy, Psychology*, (21), 9-17. <https://jrnل.nau.edu.ua/index.php/VisnikPP/article/view/17075>
- Gegenfurtner, A., Zitt, A., & Ebner, C. (2020). Evaluating webinar-based training: a mixed methods study of trainee reactions toward digital web conferencing. *International Journal of Training and Development*, 24(1), 5-21. <https://doi.org/10.1111/ijtd.12167>
- Gess-Newsome, J., Taylor, J. A., Carlson, J., Gardner, A. L., Wilson, C. D., & Stuhlsatz, M. A. M. (2019). Teacher pedagogical content knowledge, practice, and student achievement. *International Journal of Science Education*, 41(7), 944-963. <https://doi.org/10.1080/09500693.2016.1265158>
- Ishchenko, Y. A., Kharchenko, T. H., Myhovych, I. V., Didkivska, I. A., & Viktorina, O. M. (2022). The qualification improvement model for teachers of philology on the use of cloud technologies in pedagogical activity. *Apuntes Universitarios*, 12(3), 199-215. <https://acortar.link/vY9bv4>
- Katsero, O. (2022). Diagnostics of formation of psychological-compensatory competences teachers in postgraduate education. *Science and Technology Today*, 7(7), 113-127. [https://doi.org/10.52058/2786-6025-2022-7\(7\)-113-127](https://doi.org/10.52058/2786-6025-2022-7(7)-113-127)
- Knox, J., Chen, I., Huang, J. N., Martinez, R., Udovich, M., Zhao, H., & Knox, M. (2019). Integration of mixed reality into an engineering laboratory experience for online students. In 2019 IEEE Frontiers in Education Conference (FIE) (pp. 1-5). IEEE. <https://doi.org/10.1109/FIE43999.2019.9028701>
- Kovach, V., Deinega, I., Iatsyshyn, A., Iatsyshyn, A., Kovalenko, V. & Buriachok, V. (2020). Electronic Social Networks as Supporting Means of Educational Process in Higher Education Institutions. In *Proceedings of the International Workshop on Conflict Management in Global Information Networks* (pp.418- 433). Lviv, Ukraine: CEUR Workshop Proceedings, 2588. <http://ceur-ws.org/Vol-2588/paper35.pdf>
- Kyrychenko, M., Otych, O., & Oliynyk, V. (2018). Problems and prospects of the development of postgraduate education in the information society. *Information Technologies and Learning Tools*, 65(3), 25-36. <http://dx.doi.org/10.33407/itlt.v65i3.2380>
- Lavic, R., Tal, M., & Dori, Y. J. (2021). Perceptions of STEM alumni and students on developing 21st century skills through methods of teaching and learning. *Studies in Educational Evaluation*, 70, 101002. <https://doi.org/10.1016/j.stueduc.2021.101002>
- Luo, J., Boland, R., & Chan, C. H. (2020). How to use technology in educational innovation. In L. Roberts (Eds.), *Roberts Academic Medicine Handbook: A Guide to Achievement and Fulfillment for Academic Faculty* (pp. 141-147). Cham: Springer. [https://doi.org/10.1007/978-3-030-31957-1\\_15](https://doi.org/10.1007/978-3-030-31957-1_15)
- Luzan, L. (2022). Development of professional competences of teachers in military conditions: management aspect. *Adaptive Management: Theory and Practice. Series Pedagogics*, 13(25).



- [https://doi.org/10.33296/2707-0255-13\(25\)-09](https://doi.org/10.33296/2707-0255-13(25)-09)
- Lytvynyuk, H. (2023). Strategic narratives of professional support and development of teachers in the continuing education system. *The Scientific Issues of Ternopil Volodymyr Hnatiuk National Pedagogical University. Series: Pedagogy*, 1(2), 56-66. <https://doi.org/10.25128/2415-3605.22.2.7>
- McFarlane, A. E. (2019). Devices and desires: Competing visions of a good education in the digital age. *British Journal of Educational Technology*, 50(3), 1125–1136. <https://doi.org/10.1111/bjet.12764>
- McKenney, S., & Visscher, A. J. (2019). Technology for teacher learning and performance. *Technology, Pedagogy and Education*, 28(2), 129-132. <https://doi.org/10.1080/1475939X.2019.1600859>
- Miranda, J., Navarrete, C., Noguez, J., Molina-Espinosa, J.M., Ramírez-Montoya, M.S., Navarro-Tuch, S. A., ... & Molina, A. (2021). The core components of education 4.0 in higher education: Three case studies in engineering education. *Computers & Electrical Engineering*, 93, 107278. <https://doi.org/10.1016/j.compeleceng.2021.107278>
- Naidoo, P. (2019). Perceptions of teachers and school management teams of the leadership roles of public school principals. *South African Journal of Education*, 39(2). <https://doi.org/10.15700/saje.v39n2a1534>
- Shevchenko, M. (2023). Management of the process of professional self-development of teachers in the education quality assurance system. (Doctoral dissertation). Ismail State Humanitarian University. <http://dspace.idgu.edu.ua/jspui/handle/123456789/1857>
- Shvydun, V. (2022). Training teachers to use pedagogical innovations in post-graduate teacher training institutions. *Science and Technology Today*, 5(5), 451-459. [https://doi.org/10.52058/2786-6025-2022-5\(5\)-451-459](https://doi.org/10.52058/2786-6025-2022-5(5)-451-459)
- Stathopoulou, A., Siamagka, N. T., & Christodoulides, G. (2019). A multi-stakeholder view of social media as a supporting tool in higher education: An educator–student perspective. *European Management Journal*, 37(4), 421-431. <https://doi.org/10.1016/j.emj.2019.01.008>
- Susanto, R., Rachmadtullah, R., & Rachbini, W. (2020). Technological and pedagogical models: Analysis of factors and measurement of learning outcomes in education. *Journal of Ethnic and Cultural Studies*, 7(2), 1-14. <http://dx.doi.org/10.29333/ejecs/311>
- Susanto, R., Rozali, Y. A., & Agustina, N. (2019). Development of pedagogical competency models for elementary school teachers: Pedagogical knowledge, reflective ability, emotional intelligence and instructional communication pattern. *Universal Journal of Educational Research*, 7(10), 2124–2132. <https://doi.org/10.13189/ujer.2019.071010>
- Terry, R., Taylor, J., & Davies, M. (2019). Successful teaching in virtual classrooms. In *Learning and Teaching in Higher Education* (pp. 211-221). Cheltenham, UK: Edward Elgar Publishing. <https://doi.org/10.4337/9781788975087.00035>
- Viktorova, L., Kocharyan, A., & Mamchur, K. (2021). Data streaming technology in adult education via NEARPOD. *Information Technologies and Learning Tools*, 82(2). <https://doi.org/10.33407/itlt.v82i2.3644>
- Wegerif, R., & Major, L. (2019). Buber, educational technology, and the expansion of dialogic space. *AI and SOCIETY*, 34(1), 109-119. <https://doi.org/10.1007/s00146-018-0828-6>
- Widyasari, R., Asri Humaira, M., Rusmiati Aliyyah, R., Abdul Gaffar, A., & Rachmadtullah, R. (2019). Preliminary study on the development of blended learning (BLM) model: based on needs analysis and learning independence. *Journal of Physics: Conference Series*, 1175, 012207. <https://doi.org/10.1088/1742-6596/1175/1/012207>
- Yong, S. T., Gates, P., & Chan, A. T.-Y. (2019). Similarities and Differences in Learning of Metacognitive Skills. *International Journal of Game-Based Learning*, 9(1), 1-14. <https://doi.org/10.4018/IJGBL.2019010101>

## Appendix A

### Survey participant questionnaire

Item No.	Question	Answer
1	Gender	Male / Female
2	Age	18-24 / 25-34 / 35-44 / 45-54 / 55-64 / 65+
3	Education	Junior secondary education/ Complete secondary education/ Incomplete higher education / Complete higher education / Candidate for a degree
4	Level of management knowledge	Beginner / Intermediate / Advanced
5	Experience in management	Less than 1 year / 1-5 years / 6-10 years / 11-15 years / 16 years and more
6	How often do you use new management methods?	Never / Rarely / Occasionally / Often / Always
7	What management method do you consider to be the most effective?	Strategic management / Project management / Risk management / Others (specify)
8	Which management tool do you think is the most effective?	SWOT analysis / Balance method / Strategy map / Others (specify)
9	Do you think your education is sufficient for effective management?	Yes / No
10	Are you satisfied with the level of your management knowledge?	Yes / No
11	Have you participated in management training?	Yes / No
12	Do you use the skills acquired in management courses in your practice?	Yes / No