

Research article

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Study of Cognitive Component of Media Competence of Future Teachers: Theoretical and Practical Aspects

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Abstract

Introduction. Study of the problem of developing media competence of future teachers is relevant. Application of modern media within the educational process enables the preparation of teachers who are capable to use media resources effectively and to educate media-literate generation of students who are prepared for life within the constant information flow. Cognitive component of media competence is important particularly; it includes knowledge and understanding of the functions and capabilities of educational media resources. Novelty of this study lies in its identification of cognitive component of media competence of future teachers, which is revealed in knowledge and understanding of use of educational media in teaching. **Methods.** This study involved 107 students aged 17–19. Test for identifying the level of the information component of media competence (A. V. Fedorov, modified by S. S. Gamisoniya and O. V. Galustyan) and test of assessing teachers' media literacy (I. V. Zhilavskaya) were used. **Results.** Level of cognitive component of media competence of student of the experimental group increased during the formative phase of the experiment and became high predominantly. It is submitted that the majority of the experimental group students obtained knowledge

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and understanding of basic and specific functions and capabilities of educational media resources; they acquired structured and systematic understanding of the potential use of educational media information and products in teaching; they acquired ability and skill to analyze and to evaluate feasibility of using basic and specific media resources during the lessons. The majority of the control group students retained middle level and low level of cognitive component of media competence. **Discussion.** Study of cognitive component of media competence includes theoretical foundations and practical approaches of developing teachers' knowledge and skills for effective use of media resources. Its development within blended learning environment fosters the students' critical thinking and ability to use media content for educational purposes. The study concludes that it is necessary to integrate media education into curricula and to use interactive teaching methods.

Keywords

information and communication technologies, media competence, cognitive component, future teachers

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Introduction

Current stage of higher education development is characterized by a competence-based orientation (Galustyan et al., 2019). Currently, trend towards digitalization is observed in all spheres of life of modern society (Garanina et al., 2021; Hsiao, 2021; Azarko, Ermakov, Pronenko, 2024). This trend has not bypassed the educational process within higher education. Rapid development of information and communication technologies, expansion of wide public access to the content of various types (professional, educational, entertaining, etc.) leads to the attraction of many young people to social networks and online media resources (Macedo-Rouet et al., 2009; Spracklen, 2015). Modernization of Russian education highlights digitalization of education as one of its priorities, the main goal of which is to form a holistic information and educational environment (Ermakov et al., 2022; Orlov, Orlova, 2018). Application of the potential of modern media within the educational process enables the preparation of highly qualified teachers who are capable to deal with professional challenges effectively (Galustyan et al., 2018; Hawi &

Samaha, 2019). Therefore, developing the media competence of future teachers within the information society is becoming important increasingly.

Furthermore, studying of future teachers' media competence development within the context of its cognitive component is of a particular interest. It relates to that modern digital era has changed communication methods fundamentally (Martsinkovskaya, 2019; Rodríguez et al., 2018). Language of social media and instant messaging has become a new medium for self-expression of younger generation, when traditional norms of written language interact with innovative forms of communication (Matviyevskaya et al., 2019; Garg et al., 2022). Therefore, future teachers should acquire understanding of functions and capabilities of educational and digital technologies, as well as possess understanding of the characteristics of mass media discourse and digital trends.

Today, due to the constant advancement of technology, social communication between people has undergone significant changes. Internet has played a significant role in this, becoming an integral part of not only modern leisure time but also of educational process at universities during recent years. The authors (Galustyan et al., 2020; Lazem, 2019) note the importance of widespread use of digital educational resources within blended learning environment. The demand for application of blended learning in educational practice became evident during the COVID-19 pandemic (2020–2021) especially, when educational institutions were forced to transition to this format, relying primarily on educational resources and online media technologies (Choudrie et al., 2021; Hollweck & Doucet, 2020; Trombly, 2020; Kosyanenko, Topchiy, Volkova, 2025).

Application of a range of electronic media resources and blended learning tools by teachers are aimed at developing and improving competencies which are essential for professional teaching within the realities of modern era. Today, success of a modern teacher's professional activity depends on their mastery of new information technologies and methods, and their ability to use them in their professional work primarily (Molodozhnikova et al., 2020; Said, Kurniawan & Anton, 2018). Blended learning has enabled a reorientation to new educational conditions as one of the promising teaching tools (Appiah-Kubi & Annan, 2020). The use of media resources by teachers is a prerequisite for achieving high educational results currently, because media and Internet space are becoming platforms for professional communication, which include social networks, websites, chats, forums, and blogs, that make communication easier and more accessible (Johnson et al., 2021; Korhonen, Ruhalahti & Veermans, 2019; Smirnova, 2023). It highlights the demand for developing cognitive component of media competence of future teachers. Cognitive component of media competence is considered as knowledge and understanding of functions and capabilities of educational media resources; it includes understanding of the possibilities of using educational media information and media products in teaching activities; it includes ability and skill to analyze and to evaluate the feasibility of using basic and specific media resources during the lesson.

Methods

The aim of our experimental work was to develop cognitive component of media competence of future teachers. Southern Federal University (Rostov-on-Don, Russia) served as the basis for the empirical study.

Organization and participants of the empirical study

The object of the empirical study was the process of developing media competence of first-year students and second-year students. 107 students of Institute of Philology, Journalism and Intercultural Communication of Southern Federal University, who were trained at the Program 44.03.05 – "Pedagogical Education (with two profiles): Russian language and Foreign Language (English)" were involved in the study. Students were from 17 to 19 years of age. The empirical study was carried out within the framework of teaching disciplines "Introduction to Project-Based Activities" and "Project". Control group and experimental group were formed in order to identify statistical differences within the indicators of the studying phenomenon at the beginning of the ascertaining stage of the experiment. The control group included 53 first-year students, and the experimental group included 54 first-year students. The study was followed by six experts who were faculty members of Southern Federal University. They held PhD in Pedagogy and possessed a high level of media competence.

Instruments

Expert assessment and survey method were used as research instruments. Survey method was presented by the following techniques:

- Test for identifying the level of the information component of media competence (author is A. V. Fedorov, test was modified by S. S. Gamisoniya, O. V. Galustyan),
- Method "Assessment of Teachers' Media Literacy" (I.V. Zhilavskaya).

We used test for identifying the level of the information component of media competence in order to assess knowledge and understanding of functions and capabilities of educational media resources (A. V. Fedorov, modified by S. S. Gamisoniya, O. V. Galustyan). Test consisted of closed test tasks which were aimed at identifying knowledge and ideas of what media competence of a teacher included, what the advantages of a multimedia lesson were, what concepts "media text", "media editing", "media categories", "media library", "teacher's media culture", "media perception", "media language" included. (Fedorov, 2014).

Test "Assessment of Teachers' Media Literacy" by I.V. Zhilavskaya was also used in order to assess the cognitive component of future teachers' media competence comprehensively. This test contained questions and tasks that provided a comprehensive analysis of the respondent's media literacy (Zhilavskaya, 2013). The indicators and levels of cognitive component media competence of future teachers are presented in Appendix.

Experimental work

We implemented our technology for developing media competence of future teachers within blended learning during the pilot project. This technology was implemented within the framework of the disciplines "Introduction to Project-Based Activities" and "Project" for the first-year and second-year students who were trained at the Program 44.03.05 – "Pedagogical Education (with two profiles): Russian language and Foreign Language (English)." Technology's implementation involved several stages.

The first stage

The first stage involved lectures and practical classes which covered theoretical foundations, basic concepts, principles of media pedagogy, media literacy, and media competence. Classes were held face-to-face and online within flipped classroom blended learning model during this stage. It involved independent viewing of instructors' video lectures and study of online information and media resources. Students recorded their classmates' responses on their mobile phones during practical classes. Then students analyzed the responses of their groupmates in order to eliminate deficiencies in their learning. Students completed test for identifying the level of the information component of media competence (A. V. Fedorov, modified by S. S. Gamisoniya, O. V. Galustyan) at the end of this stage.

The second stage

The second stage involved students' completing cases and analyzing them in the group. Blended learning was also implemented during the case studies. Station Rotation Model and Self-Blend Model were used during the second stage. Students were divided into subgroups, then they were rotated. Students moved to another group and completed a new assignment when they completed their case based on the instructor's assignment. Students completed the assignments online under instructor supervision using Miro collaboration platform.

The second stage also included online classes which were conducted using Microsoft Teams Platform. Students developed WebQuests on the topic "Creating School of Future" independently during the second stage.

During this stage students were also given tasks that involved studying media texts from the Internet and analyzing them.

Here are some tasks and recommendations for working with media texts from Internet:

4. The goal is to gain experience in analytical activities within scientific and educational sphere.
5. Tasks:

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- Studying the conceptual apparatus of media pedagogy, media literacy, and media competence.
 - Studying the experience of successful activities in the field of education.
6. Credit assignments:
- Preparation of a summary/glossary for the course (at least 25 lexical units). Using such options as Agile/Scrum/Kanban/.
 - Comprehensive examination and comparative assessment of several media texts and presenting educational projects based on the following criteria:
 - relevance (for education system, for educational sciences, personal assessment),
 - goal setting (definiteness, significance and achievability of the goal),
 - content (presence of system of tasks, appropriate methods and resources, logicity and structure of activities),
 - partnership (presence of partners, participants, implementation of their expectations and needs),
 - general assessment of the project (possibility of sharing experience, choosing a preferred project, etc.);
 - comprehensive assessment of the individual teacher's project. <https://teacherofrussia.ru/>:
 - main stages of biography (career development after participation in the competition),
 - features of methodological system (teaching the subject),
 - features of social and educational system (interaction with children, parents, colleagues),
 - scientific and public activities (blogs, websites, publications),
 - general professional and personal assessment.
7. Advanced training and professional socialization (joining professional focused groups, blogging, participating in conferences and seminars).
8. Design of lesson activity project using media resources.
9. Project design in social and educational sphere using media resources.

Students used electronic information resources of Internet as well as materials posted in open access scientific social networks (*Academia*, *Mediagram.ru*, *ResearchGate*, *Science ID*, *SciPeople*, *Scientific Social Community*, *Social Science Research Network*, etc.).

During this stage students also analyzed research articles by famous educators and psychologists who had influenced the educational process. Students prepared multimedia presentations with audio and video effects, using software (iMovie and DaVinci Resolve) and data visualization tools (Storytelling Tools, Data Illustrator, data-illustrator.com, Visual.ly, Canva, Infogram, and others) after analyzing the research papers. The presentations were presented in a virtual classroom using Zoom and Microsoft Teams (Gamisonia & Galustyan, 2024).

Data Analysis

We used methods of descriptive statistics as well as mathematical statistical analysis using the Fisher angular transformation criterion (φ^*) to process the research results.

Results

Most of the future teachers of the experimental group demonstrated high level of media knowledge (75.9% of respondents, compared to 9.3% at the ascertaining stage) during the formative stage of the experiment. Middle level of knowledge and understanding of the potential of media resources within the educational activities was demonstrated by 20.4% of students of the experimental group. It is reported that there was a decrease from 38.9% at the initial stage of the experiment. Low level of media knowledge was demonstrated by 3.7% of respondents of the experimental group which is lower significantly than at the initial level (51.8%).

Respondents of the control group demonstrated middle level of knowledge in the media sphere in education which became predominant. It amounted to 47.2% of respondents, there was a slight increase in awareness of the media sphere (the number of respondents with unformed ideas decreased from 51.0% to 41.5%, and the number of respondents with extensive and structured ideas concerning the media sphere in education increased from 5.6% to 11.3% (Table 1, Figure 1).

Table 1

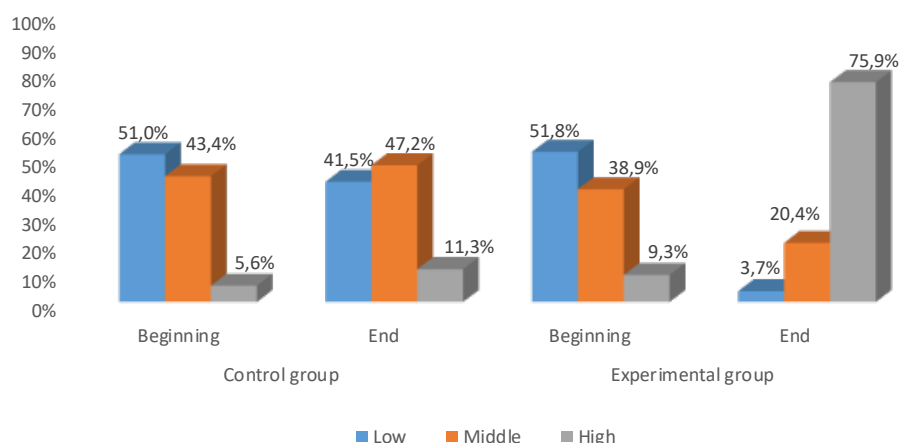
Level of knowledge in educational media sphere at various stages of the experiment

| Level | Control group | | Experimental group | |
|--------|---------------|-------|--------------------|-------|
| | Beginning | End | Beginning | End |
| Low | 51,0% | 41,5% | 51,8% | 3,7% |
| Middle | 43,4% | 47,2% | 38,9% | 20,4% |
| High | 5,6% | 11,3% | 9,3% | 75,9% |

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Figure 1

Level of knowledge in educational media sphere at various stages of the experiment



We used a statistical comparison of the results between the experimental group and control group at various stages of the experiment in order to confirm the growth of knowledge and understanding of the media sphere in education at the experimental group. We made conclusions which were based on the results of mathematical data analysis by using Fisher angular transformation criterion (φ^*). It was investigated that the experimental group had an increased proportion of respondents with comprehensive and structured system of understanding of the media sphere, while the number of respondents with undeveloped or partially developed knowledge base had been decreased compared to the control group. There were not identified any statistically significant changes in the system of understanding of media sphere at the control group (Table 2).

Table 2

Comparative analysis of level of knowledge in the media sphere at control group and experimental group at different stages of the experiment (Fisher angular transformation criterion (φ^))*

| Level | Control group and experimental group at the ascertaining stage | Control group at various stages of the experiment | Experimental group at various stages of the experiment | Control group and experimental group at the formative stage |
|--------|--|---|--|---|
| Low | 0,08; $p > 0,05$ | 0,99; $p > 0,05$ | 6,34; $p \leq 0,01$ | 5,26; $p \leq 0,01$ |
| Middle | 0,47; $p > 0,05$ | 0,40; $p > 0,05$ | 2,13; $p \leq 0,05$ | 3,00; $p \leq 0,01$ |

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| Level | Control group and experimental group at the ascertaining stage | Control group at various stages of the experiment | Experimental group at various stages of the experiment | Control group and experimental group at the formative stage |
|-------|--|---|--|---|
| High | 0,73; $p > 0,05$ | 1,08; $p > 0,05$ | 7,71; $p \leq 0,01$ | 7,43; $p \leq 0,01$ |

Level of media literacy of the students of the experimental group has also changed. Students of the experimental group demonstrated low level of media literacy at the ascertaining stage of the experiment. No one of the respondents of the experimental group exhibited low levels (0.0% of respondents) during the formative stage of the experiment. The proportion of future teachers with middle level of media literacy also decreased (from 42.6% of respondents to 26.0%). The overwhelming majority of students of the experimental group demonstrated high level of media literacy (74.0% of respondents during the formative stage of the experiment).

Low level and middle level of media literacy remained predominant (51.0% and 49.0% of respondents respectively) in the control group. None of the respondents of the control group demonstrated high level of media literacy (Table 3, Figure 2).

Table 3

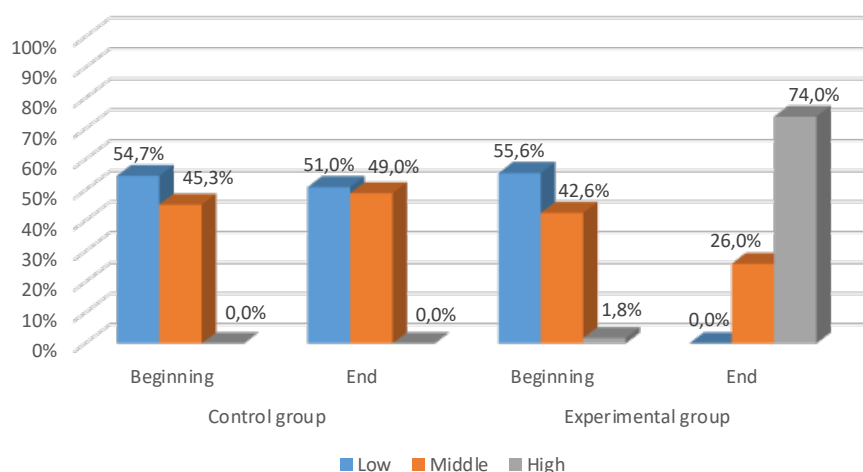
Level of media literacy at control and experimental groups at different stages of the experiment

| Level | Control group | | Experimental group | |
|--------|---------------|-------|--------------------|-------|
| | Beginning | End | Beginning | End |
| Low | 54,7% | 51,0% | 55,6% | 0,0% |
| Middle | 45,3% | 49,0% | 42,6% | 26,0% |
| High | 0,0% | 0,0% | 1,8% | 74,0% |

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Figure 2

Level of media literacy at control and experimental groups at different stages of the experiment



We compared the results between experimental group and control group at various stages of the experiment in order to confirm the increase of media literacy in the experimental group. So, we can conclude that media literacy improved in the experimental group compared to the control group based on the mathematical analysis of the data. Statistically significant changes in media literacy weren't found in the control group (Table 4).

Table 4

Comparative analysis of levels of media literacy at control group and experimental group at different stages of the experiment (Fisher angular transformation criterion (φ^))*

| Level | Control group 1 and Experimental group 1 | Control group 1 and Control group 2 | Experimental group 1 and Experimental group 2 | Control group 2 and Experimental group 2 |
|--------|--|-------------------------------------|---|--|
| Low | 0,14; $p > 0,05$ | 0,38; $p > 0,05$ | 8,75; $p \leq 0,01$ | 8,27; $p \leq 0,01$ |
| Middle | 0,28; $p > 0,05$ | 0,38; $p > 0,05$ | 1,83; $p \leq 0,05$ | 2,50; $p \leq 0,01$ |
| High | 1,39; $p > 0,05$ | 0,0; $p > 0,05$ | 9,37; $p \leq 0,01$ | 10,7; $p \leq 0,01$ |

1.8% of students of the experimental group and 45.3% of the control group delivered low level of cognitive component of media competence (Table 5, Figure 3).

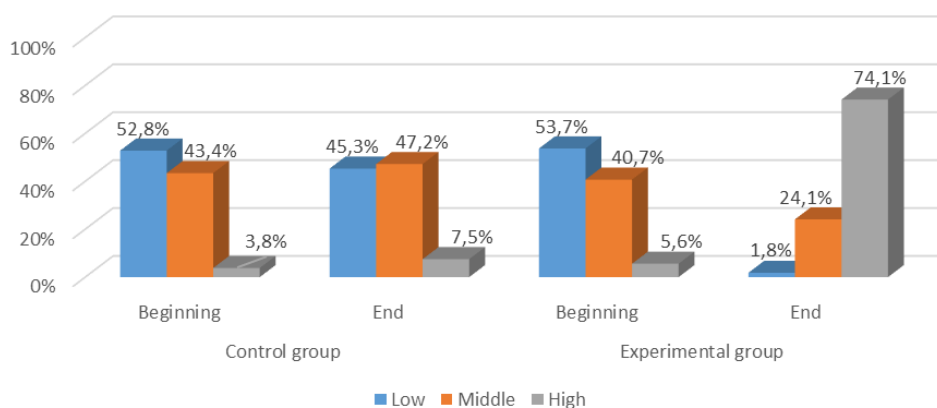
Table 5

Level of cognitive component of media competence of future teachers at different stages of the experiment

| Level | Control group | | Experimental group | |
|--------|---------------|-------|--------------------|-------|
| | Beginning | End | Beginning | End |
| Low | 52,8% | 45,3% | 53,7% | 1,8% |
| Middle | 43,4% | 47,2% | 40,7% | 24,1% |
| High | 3,8% | 7,5% | 5,6% | 74,1% |

Figure 3

Level of cognitive component of media competence of future teachers at different stages of the experiment



Data analysis confirmed a significant increase in the proportion of future teachers with high level of cognitive component of media competence in the experimental group, while the proportion of future teachers with middle level and low level had been decreased. Control group and experimental group differed in the development of cognitive component of media competence significantly during the formative stage

of the experiment. It can be concluded that the level of development of the cognitive component of media competence in the experimental group increased comparing to the ascertaining stage and comparing to the control group.

Discussion

Study in the field of media education focuses on developing future teachers' skills in working with various media, developing critical thinking, and creating educational media content, i.e., on the formation of cognitive component of media competence. Researchers (Rensaa, 2014; Said, Kurniawan & Anton, 2018) consider media competence and application of media in education to be one of the most important components of communicative and social development of future specialists. A number of researchers (Liao & Wu, 2020; Rodríguez et al., 2018) believe that media competence is component of teacher's professional competence. It should be noted that researchers (Lund & Engeness, 2020; Shaigerova et al., 2022) addressed the problem of media competence in general, however, scientific understanding of the problem of studying cognitive component of media competence of future teachers had been represented by a very limited number of theoretical and empirical material in modern pedagogy. Researchers (Podolskij, 2020; Rodríguez et al., 2018) focus primarily on the development of media competence in the context of developing teachers' knowledge, skills, and attitudes which are necessary for effective work with media resources and imparting media literacy to students. Key aspects of studies, which are devoted to media competence (Galustyan et al., 2019; Macedo-Rouet et al., 2009), include analysis of media messages, assessing their credibility, understanding the mechanisms of media influence, and developing critical thinking, which contributes to both the professional development of teachers and the enhancement of students' media literacy.

Our study substantiated and tested application of blended learning in developing cognitive component of media competence of future teachers experimentally. We used the two methods used in order to make analysis of levels of component of media competence of future teachers. So, important conclusions have been drawn. Control group and experimental group demonstrated low level of cognitive component of media competence of future teachers at the ascertaining stage of the experiment. Changes occurred during the formative stage of the experiment. Predominant level of cognitive component of media competence of future teachers in the experimental group became high. The proportion of respondents with high level reached 74.1% comparing to 5.6% of respondents at the ascertaining stage of the experiment. This proportion remained unchanged in the control group, which amounted to 7.5% of respondents.

It can be concluded that the majority of respondents of the experimental group obtained extensive structured knowledge and full understanding of functions and capabilities of educational media resources. They also obtained systemic understanding

of the possibilities of educational media information and media products application within the pedagogical activities.

Proportion of respondents of the experimental group with middle level of cognitive component of media competence decreased from 40.7% to 24.1%. The predominant level of cognitive component of media competence of future teachers was middle in the control group. Middle level persisted throughout all stages of the experimental study. These respondents demonstrated general knowledge and understanding of basic functions and capabilities of educational media resources, as well as general understanding of the potential use of educational media information and products in teaching. In summary, the experimental group demonstrated increase in cognitive component of media competence.

The obtained data are consistent with the opinion of researchers (Garanina et al., 2021; Hawi & Samaha, 2019) who consider that development of media competence of future teachers in the context of the information society presupposes the development of their ability of critical evaluation, creation and application of media content for educational purposes. Our findings are consistent with the findings of studies (Gamisonia & Galustyan, 2024; Zhao & Shi, 2022) indicating that the impact of media on students helps future teachers to understand the mechanisms of information influence and to develop an adequate teaching strategy. We also found that the use of blended learning contributes to the development of cognitive component of media competence. This demonstrates the need to emphasize the use of blended learning within the professional training of future teachers.

Conclusion

Cognitive component of media competence of future teachers was assessed using test for identifying the level of the information component of media competence (A. V. Fedorov, modified by S. S. Gamisoniya, O. V. Galustyan) and method "Assessment of Teachers' Media Literacy" (I.V. Zhilavskaya). The formative experiment resulted in changes. Predominant level of cognitive component of media competence of the experimental group became high, while this proportion remained unchanged in the control group. It can be stated that the majority of students of the experimental group acquired knowledge and understanding of basic and specific functions and capabilities of educational media resources, as well as structured and systematic understanding of the possibilities of using educational media information and media products within pedagogical activities.

Thus, the conducted study confirmed the need to develop media competence of future teachers in the context of blended learning, which is associated with the need for professionals with a high level of knowledge of media technologies, who are capable of carrying out professional pedagogical activities within the information society.

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Appendix

Indicators and levels of the cognitive component of media competence of future teachers

| Indicator | Level | | |
|---|---|---|---|
| | Low | Middle | High |
| Knowledge and understanding of functions and capabilities of educational media resources; understanding of possibilities of application of educational media information and media products within pedagogical activities | Lack of knowledge and insufficient understanding of functions and capabilities of educational media resources; insufficient understanding of possibilities of application of educational media information and media products within pedagogical activities | General knowledge and understanding of basic functions and capabilities of educational media resources; general understanding of possibilities of application of educational media information and media products within pedagogical activities | Knowledge and understanding of basic and specific functions and capabilities of educational media resources; readiness, structured and systematic understanding of possibilities of application of educational media information and media products within pedagogical activities |

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Saida S. Gamisoniya — organization and implementation of the empirical procedure, selection of respondents, statistical processing of data, interpretation of results, preparation and editing of the article text.

Irina V. Vlasyuk — preparation of materials for theoretical review, analysis of the results.

Galina P. Zhirkova — analysis of material for literature review, technical design of the article text.

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Conflict of Interest Information

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