The use of e-learning resources in distance learning

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Abstract. The article presents the results of research on the implementation of electronic educational resources in distance learning in order to develop the ICT (information and communication technology) competence of teachers. The author of the article did a theoretical analysis on the concept of "professional competence of teachers", its structural content. Based on the current situation associated with the spread of coronavirus infection and the transition of all educational institutions to distance learning, the author suggested that not all school and university teachers were ready to teach using information and communication technologies. Having conducted a thorough analysis of studying problem and identified the level of developing the ICT competence of a modern teacher, the author selected and implemented Electronic Learning Resources (ELR) as a means of teaching, which, in his opinion, can improve or develop this competence. The basis of the research presented in the article is one of the secondary schools of the Ural region. The results of the implementation of the proposed ELR allowed the author to conclude that this ICT competence should be necessarily formed and improved by teachers themselves continuously and purposefully, since the system of advanced training courses does not keep pace with the rapid development of the information environment.

1. Introduction

Due to the drastic changes that have affected the education system, associated with the spread of coronavirus infection COVID-19, there is an urgent need to improve the skills of modern teachers. Moreover, it doesn't mean just obtaining a certificate confirming the teacher's professionalism, but it means forming or developing such professional competence as information and communication technology.

According to recent practice and analysis of A. L. Miller's research, which developed an approach to the formation of ICT competence of a teacher in the context of additional professional education, teachers do not distinguish between such concepts as "ELR tools" and "ELR as a means of learning"[1]. The transition of all Russian institutions to distance learning, associated with the adoption of quarantine measures, as well as the analysis of training programs for students of pedagogical universities, led to the conclusion that school and university teachers need to regularly improve the level of ICT competence, as knowledge in this area becomes outdated very quickly due to the intensive development of information technologies.

Thus, the aim of the presented research is to select and implement ways to develop teachers' ICT competence through ELR (electronic learning resources) based on the analysis of existing researches on this problem.
2. Methodology
The goal of modern education has always been to meet the actual needs of the individual, who is able to adapt to the constantly changing conditions of developing society. And such a person can be raised and trained by the same qualified, competitive, creative teacher, who himself quickly adapts to the conditions in a dynamically changing world. Scientist V. B. Baydenko believes that one of the main requirements for the competence for a modern teacher should be the destruction of professional isolation and forming those skills and abilities that meet these requirements at a specific stage of developing society [2].

Answering the question of what competencies, a modern teacher should have, it is necessary to explain the term "professional competence of a teacher". First of all, it is a set of professional and personal qualities of the teacher, which are necessary for the successful implementation of his pedagogical activity [2]. In other words, a professionally competent teacher is a teacher who achieves high results in teaching students, and is also capable of self-assessment and self-analysis based on the results of his or her activities [3].

Analyzing the structural content of professional competence of teachers, it should be noted that its composition is always updated depending on the social order of society and the country as a whole. Summarizing the main researches on the problem of studying the main components of professional competence of teachers, we can distinguish three main ones: psychological and pedagogical, methodological and activity-based. One of the main components is precisely psychological and pedagogical, as the teacher's professionalism is primarily assessed taking into account demonstrating skills to solve problem situations, to build adequate relationships with students from the point of pedagogical view, aimed at the personal development of the latter.

Despite the divergence of views of scientists on the characteristic of the psychological and pedagogical component of the teacher's professional competence, they agree on one thing: development of the component is possible only in the presence of personal qualities. It is impossible to increase the level of this component of competence without taking into account developing significant personal qualities of the teacher [4;5;6, etc.].

Within the methodological component of professional competence, there are a number of competencies: design, diagnostic, reflexive, research, etc. [7;8].

But as already noted above, in connection with the global changes in the information culture of society, forming another teacher's competence, which is called the culture of information and communication technology or ICT competence, is put on the forefront.

There is no single definition of the competence currently being studied. It is interpreted extensively and narrowly: in broad sense, ICT competence refers to the ability, narrowly it is defined as the quality of the teacher's personality [9]. In both cases, the purpose of this competence is to use IT-technologies to solve problems in teacher's professional activities.

Analyzing the content of the ICT competence, despite the different names of components identified by scientists, the essence of these components is unified. Thus, V. A. Adolf, I. Yu. Stepanova distinguish motivational-value, content-operational, research-reflexive components [10].

A. E. Maron, L. Yu. Monakhov are distinguished motivational-target, cognitive-content, and reflexive components [11].

A. L. Miller characterizes the motivational-value, professional-activity and reflexive-communicative components [1].

In relation to this study, the professional activity (cognitive-content/content-operational) component has a particular importance, as it includes the ability to comprehend information and use ELR in work to achieve goals, as well as for self-realization.

In addition, this component of the ICT competence refers to both basic and subject-oriented competence [9;12]. Thus, in forming and developing the ICT competence, the teacher does not just need certain knowledge, skills, abilities that he receives during advanced training courses, he must connect this knowledge, skills and abilities with other knowledge that he receives in the process of self-education.
3. Results

The transition of all educational institutions to distance learning, associated with the spread of COVID-19 coronavirus infection, has shown that there is a problem of developing the ICT competence among teachers and lecturers.

In identifying and selecting the ELR on the basis of ICT-competence, the following methods were used:

- incoming control, including a survey of research participants in order to identify the appropriate level of the ICT competence;
- selection of ELRs based on the possibility of their adaptation and the level of the ICT competence of this study participants;
- analysis of teachers’ working conditions (technical equipment and multimedia capabilities);
- predicting the research result by answering the following questions: "What can be achieved by using the selected ELR?", "Do I need to adapt the selected ELR or make new ones? »
- final survey, after the implementation of the selected methods of developing the teachers’ ICT competence by means of ELR.

Questionnaires before and after the implementation of the selected ELR include a three-level classification using the ELR: basic level (ready to use ELR in professional activity); educational level (ability to adapt an existing e-learning resources, depending on lesson objectives and confidence in its activities, a professional networking cooperation); the object-oriented level (the ability to make own e-learning resources and use them in educational process).

The survey conducted at the entrance control (included questions about the use of ELR in professional activities and the purpose of this survey was to identify the practical awareness of teachers about using ELR, how often they use them or make them in educational process) and on the basis of this survey, we identified the most frequently used ELR. All surveys were conducted among teachers of schools in the Ural region remotely using Google forms. The results of the first input survey are shown below:

| Question | Positive response (%) |
|----------|-----------------------|
| Working with a new generation of multimedia content management systems | 26 |
| I have no idea, I've Heard of it, but I've never used it | 30 |
| There was an attempt to use it, but the predicted result was not achieved. | 13 |
| I use fragments of some electronic teaching materials occasionally | 10 |
| I use it regularly | 14 |
| Almost all lessons are built using the data of electronic teaching materials | 7 |
| Other ELR (with the indication of sites) | |
| I have no idea heard it, but never used it | 3 |
| I use it occasionally (FIPL, I-class, ucheba.com=uroki.ru, window.edu.ru and others) | 46 |
| I use it systematically (school-collection.edu, en.edu etc.) | 37 |
| I always use ege.edu, "Infourok", "Multiurok", it- n.ru and others | 7 |
Based on the data obtained during the survey and study of teachers’ working conditions, the following reasons for the low pedagogical level of the ICT competence formation were identified:

- The dynamic development of information technologies outstrips improving the system of advanced training in the field of the ICT competence. In other words, the Internet can no longer be considered just a database, it is a certain tool and mechanism, in forming the content of which the teacher must take an active part.

- Teachers often do not have the motivation to actually master IT products. This reason, of course, is due to the huge workload of Russian teacher and the lack of time for self-education. It is no secret that the modern teacher is responsible not only for high-quality teaching of students, but also for performing a huge amount of reporting work. Therefore, if you need to take advanced training courses, a teacher only has enough strength for an attending it formally without learning practical skills.

- In the process of analyzing the documents that set out the main requirements for the key competencies for a teacher, it was revealed that there are no clear regulatory standards for the level of forming the ICT competence of a teacher. It is also one of the reasons for the low level of developing this competence.

- Analyzing the working conditions of teachers in terms of technical equipment of the workplace, it was also revealed that not all classrooms are equipped with all the necessary multimedia equipment. But this reason requires careful study, because before transition to distance learning, teaching of not all academic disciplines required technical equipment.

- On the basis of the analysis carried out in order to determine the level of the ICT competence of a teacher, as well as to identify the main reasons for the low pedagogical level of developing this competence, we selected, adapted and implemented e-learning resources according to the following algorithm:
  
  - Practical development of offline resources with their didactic capabilities. This step includes multimedia textbooks in any subject, educational portals, and online libraries. At this stage, it is not just introducing teachers to the resources presented, but rather the practical development of these resources with a view to further using them in their activities. Teachers registered on their chosen educational portals, hold classes using interactive maps, multimedia teaching materials, and gave students tasks that involved active use of online libraries.

  - Use of ELR tools in teacher activities. Teachers do not just take advanced training courses "for a check mark", but attend master classes organized by the authors of ELR, where the methodology of their use in pedagogical activities is detailed. After that, teachers used either ready-made e-learning resources on educational portals (if the level of the ICT competence is not high enough), or supplemented and implemented ELR tools in their classes.

  - Classes were organized using ELR tools supplemented or made by teachers themselves, with prediction of the result and possible difficulties. It should be noted here that making of new interactive resources included first of all interactive presentations in MS Power Point, as well as usage of own symbols and maps based on the basic charts, author's sets of illustrations in the "Library of electronic visual AIDS 1C»,

  - Reflexive positioning after the lesson with the use of e-learning resources. Teachers conducted their own analysis of the lesson (s) and answered the following questions in the form of feedback: "Was the lesson successfully implemented with new types of activities?", "Did I manage to involve students in new types of activities using ELR, as I originally planned?", "What difficulties did I face when implementing a lesson using ELR?", "What should I do to eliminate these difficulties the next time my usage of ELR tools?", etc.

  Getting into a reflexive position is a very important stage in introducing any new activity into teacher work [13]. In our study, reflection allows the teacher to adjust their steps or lesson plan for future use of ELR.
The presented ELR for the development of the ICT competence were implemented in one of Comprehensive schools of the Ural region. The results of integrating the selected e-learning resources into the distance education process were obtained on the basis of the final control, which included the method of questionnaires of participants. This survey consisted of answers to questions on the above-mentioned methods of using ELR in their activities and was a means of feedback for the organizers of this study. According to the data at the end of the study (based on the results of a survey), the following results were obtained:

- only 30 people out of 90 agreed to participate in the experiment;
- only 14 of the 30 participants implemented all 4 methods (according to feedback data);
- 7 teachers performed only the first two methods (mastered several offline resources and used ready-made ELR tools in their distance lessons);
- 9 teachers used only the first method (registered on one of the portals and got acquainted with the multimedia teaching materials). They explained their refusal to implement the selected ELR and portals by saying that these resources and educational platforms have a complicated registration and activation system;
- 14 teachers who tried to implement all the methods faced the following problems: not all students were able to participate in this type of work using ELR tools, which entailed a long explanation of the task individually and as a result, a large amount of time was spent, and teachers had to quickly replace ELR tools with traditional methods for some students.

After implementing the methods of using ELR for the purpose of developing the ICT competence, the participants’ levels of competence formation were revealed on the basis of questionnaires. The results are shown in the table 2:

| Level                  | Number of participants (%) |
|------------------------|----------------------------|
| Basic                  | 80                         |
| Pedagogical            | 18                         |
| Professionally oriented| 2                          |

As can be seen from the table that the basic skills of working with means of informatization have 80% of the teachers of different subjects, but further development of the ICT-competence 18% is slow and uneven (low level of pedagogical ICT competence), and only 2% the ICT competence can be attributed to the professionally-oriented level. But in this case it is necessary more detailed study, because the presented research adopted among a small number of participants and the level was estimated according to the best effectiveness of the presented methods, but even these 2% had difficulties and problems. It should be noted that all the teachers interviewed (even those who did not participate in the study) have a certificate of successful completion of the advanced training course in the field of using e-learning resources in their professional activities.

4. Conclusion
The obtained data on implementing ELR for developing the ICT competence of teachers allowed us to conclude that the formation of a motivational and value component of the ICT competence plays one of the main roles in the development of this competence by means of ELR. If a teacher has a motivation, he or she will constantly strive to introduce new activities in classes, and not give up when the first difficulties arise (as shown in this study). It leads to the following conclusions: in order to implement (especially new items) ELR the teacher needs constant support and be sure that he will be able to get advice at any time on the use of a particular ELR tool.

Also, the teacher in his professional activity should always strive for innovation. It is thanks to innovations a teacher can do self-realization in his professional activity, develop, improve his skills and, as a result, professional competence.
In the context of the modernization of the education system, the qualification requirements for teachers have been radically changed, and one of the main ones is the introduction of information and communication technologies into teaching activities. At the same time, a huge number of advanced training courses in this area are often formal. Although classrooms in schools are equipped with a computer and Internet, and there is a huge number and variety of ELR, their implementation in practice is very slow.

Therefore, as shown by the conducted experiment and analysis of existing research on the development of information culture of teachers, a modern teacher needs to constantly improve the level of the ICT competence through not formal training courses, but practical development and constant improving skills of networking.

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