

III. ICT TOOLS – USE IN EDUCATION

SOME TRENDS OF ICT TOOLS APPLICATION BY TEACHERS: A COMPARATIVE STUDY OF RUSSIAN AND SPANISH EXPERIENCE

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***Abstract:** The paper studies the specificity of the use of ICT tools by Spanish and Russian teachers. The research was carried out within the framework of the IRNet project with the participation of two universities - Herzen State Pedagogical University of Russia and University of Extremadura, Spain. The results of the survey described give a general idea of various ICT tools use intensity in two countries.*

Key words: ICT tools, competences, teaching activities, IRNet.

INTRODUCTION

From the pedagogical activity standpoint, the achievement of a new quality of the educational process and the orientation towards innovative results in the electronic environment, require setting new goals and using special tools of professional activity (Smyrnova-Trybulska, Noskova, Pavlova, Yakovleva, Morze, 2016). What new tools does a teacher need to master in order to make an entire use of the high potential of the electronic environment?

In Russian pedagogical studies, quite widespread is the approach, according to which five groups of pedagogical tools that are used in the creation of electronic educational resources are identified: interactive, multimedia, modelling, communication and productivity (Osin, 2007). Despite the name “tools”, in fact

this idea represents the quality of the electronic educational resources content, which determines new opportunities for the resource use in the educational process.

In European pedagogical studies, for Area, Gutiérrez and Vidal (2012), in the case of teaching materials based on technologies, the main characteristics of these digital materials are: Hypertextuality, Multimedia and Interactivity. At the same time, there are authors who classify the digital educational resources according to the following criteria (Grañas's proposal):

1. News: This category includes reference books and documents containing structured information, but not for an educational purpose a priori.

2. Instructional: Materials designed according to training needs.

3. Evaluative: They constitute a variation of instructional materials, and have a purely evaluative purpose.

4. Instrumental: Interactive services or applications that cover many aspects of learning support, including tools for the search, processing and visualization of information.

5. Experiences: Interactive training scenarios that are based on games or simulations.

6. Conversational: Conversational materials and services consist of synchronous or asynchronous communication dialogues in which there are (conversations) between participants in a training activity.

7. Collaboration: This type of material includes a wide range of work proposals for this purpose: databases, encyclopaedias, reports, articles, notes, manuals and guides, networked lectures, from activities fully open to highly formalized.

When choosing the most appropriate educational ICT tools for a particular educational situation, a number of factors may influence, but ideally, a reasonable variety of methods and resources should be used to enable students to participate, illustrate their ideas, investigate and find solutions to problems, in order to favour the acquisition of learning (Jiménez-Cortés, Vico-Bosch, Rebollo-Catalán, 2017).

Regarding the use of technological means in education, traditionally some mistakes have been made as “transferring” the didactic situation into cyberspace, and taking the teaching methods and learning strategies of in live classroom to the virtual formative environments. However, these strategies and methods were tailor-made and thought for face-to-face teaching. Therefore, its implementation without adaptation, it has not been a successful measure, since we have brought into virtual teaching the way of thinking in face-to-face teaching. The pursuit of the new teaching strategies has come to the fore, bringing, for example, the concepts of “flipped classroom” (Lucke, Dunn, Christie, 2017).

ICT tools “in hands” of a teacher have evolved from a merely learning tool into a multifunctional tool for creating various educational opportunities for learners’ self-guided work, and for designing and shaping an electronic educational environment (Gutiérrez-Esteban, Camacho, 2017). The main purpose of pedagogical ICT tools is to organize and support the activities of students in the electronic educational environment (both in the classroom and outside). Pedagogical ICT tools in the organization of out-of-class independent work play a special and a very important role (Noskova, Pavlova, Yakovleva, 2017).

We suggest the classification of “pedagogical” ICT tools, based on the focus of different types of students’ activities organized and facilitated in the electronic environment:

- ICT tools for presenting and organizing learning information acquisition in the electronic environment;
- ICT tools for organizing educational communication in the electronic environment;
- ICT tools for managing educational and cognitive activities in the electronic environment.

1. EXPERIMENTAL STUDY OF THE OF ICT TOOLS APPLICATION BY TEACHERS

1.1 Research Methods

An experimental study of the ICT tools use by teachers was carried out within the IRNet project (<http://www.irnet.us.edu.pl>). In this paper, we focus on the results obtained by Russian and Spanish research teams. For the purpose of study, a questionnaire was elaborated.

The main objective was identifying the specific application of the three main groups of ICT tools in the electronic educational environment by teachers:

- ICT tools for presenting and organizing learning information acquisition in the electronic environment (for example, the intensity of various electronic and interactive equipment application, a variety of electronic content, etc.),
- ICT tools for organizing educational communication in the electronic environment (for example, a variety of communication ICT tools and students’ involvement in networking and communication, etc.),
- ICT tools for managing educational and cognitive activities in the electronic environment (for example, the intensity of various ICT tools application).

In addition, within each group, two questions were proposed that allowed determining the correlation between actually used ICT tools by teachers and the opinion of teachers about the relevance of these types of ICT tools for students.

In each of the questions, respondents were asked to assess the degree of application or preference of ICT tools on a 5-point scale (1 point - never or almost never, 2 points - very rarely, 3 - rarely, 4 - quite often, 5 - very often or constantly). The questionnaire was designed for teachers and specialists in the field of education (school teachers, academic teachers, methodologists, etc.) who actively use ICT in their professional activities, understand the essence and specificity of e-learning, and have a sufficient experience in using distance education technologies to facilitate students' activities. All questions were presented in Russian and English with the aim of disseminating this experience, as well as attracting the necessary number of respondents from Spanish universities and schools. In addition, the questionnaire passed the initial validation: it was analysed, and each issue was evaluated and commented on by Russian and Spanish experts.

Finally, quantitative and qualitative analysis of the results was carried out using Google Form tools and Statistical software (statsoft.com). In general, the analysis was performed on 122 variables. The research sample included 65 respondents in total, 19 from Spain and 46 from Russia. Of all the results obtained, we selected only those that have statistically significant differences. The quantitative and qualitative analysis of the obtained results shows general trends in the use of ICT tools by Russian and Spanish teachers. In addition, the distinctive differences were determined in the preference of ICT tools. Moreover, we see the prevailing directions of ICT tools use.

1.2 General Overview of the Participants

General overview of the participants is presented in Table 1. The larger part of the respondents appeared to be academic teachers with a certain teaching experience, together with the sufficient practice in implementing ICT in their professional activities. Consequently, the respondents can be considered the representatives of the advanced part of the pedagogical community.

Table 1.

General overview of the participants

Teaching experience			ICT experience			Professional occupation	
<3 years	>5 years	3-5 years	<3 years	>5 years	3-5 years	School teacher	Academic teacher
5%	92%	3%	5%	89%	6%	11%	89%

Source: Own work

2. COMMON TRENDS IN THE APPLICATION OF ICT TOOLS BY RUSSIAN AND SPANISH TEACHERS

In order to see the general trend, it is enough to analyse the number of respondents who chose the lowest rank (1), as well as the highest rank (4 and 5). The results of the survey (see Table 2) show that both Russian and Spanish teachers are very active in using multimedia equipment in their professional activities. They also benefit from thematic websites. Mobile devices are less popular. Teachers almost never use virtual and augmented reality interfaces. Respondents note the importance of the e-content choice (variability and diversity) and they actively provide students with the opportunities for automated self-control. The use of e-mail is equally in demand by all teachers. Cloud documents are also quite in demand.

Table 2.
Common trends in presenting and organizing learning information acquisition in the electronic environment

1.		<i>What ICT tools do you use for presenting educational information (relate the degree of use on a 5-point scale):</i>									
		<i>Russia (%)</i>					<i>Spain (%)</i>				
<i>(1-5)</i>		<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>
computer + multimedia projector, document camera		2	2	4	15	77	0	0	0	20	80
websites		7	9	18	20	46	15	0	30	20	35
mobile devices		28	24	17	6	25	35	15	10	15	20
virtual and augmented reality interfaces		63	11	11	11	4	60	10	10	10	10
2.		<i>What opportunities do you provide students to learn the content (relate the degree of use on a 5-point scale):</i>									
		<i>Russia (%)</i>					<i>Spain (%)</i>				
<i>(1-5)</i>		<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>
selection of necessary content (content diversity, hypertext navigation)		9	17	13	35	26	0	10	20	10	60

selection of the preferred educational content formats (text, audio, video)	6	13	22	28	34	0	10	15	35	40
support of educational motivation (motivating resources, e.g. video, etc.)	6	20	20	26	28	5	10	30	20	35
automated self-control	15	15	20	22	28	10	20	30	10	30

Source: Own work

3. DIFFERENCES IN THE ICT TOOLS APPLICATION

For each variable, an average rate of the application intensity was calculated. In this paper, we present only statistically significant differences between the answers of Russian and Spanish teachers. The Figures 1-3 below present the most interesting results for each of the three groups of questions.

3.1 ICT Tools for Presenting and Organizing Learning Information Acquisition in the Electronic Environment

In relation to ICT tools employed for presenting and organizing learning information acquisition, it should be noted that LMS presents the highest rate, due to it is a widespread tool in the university educational level area. Similar punctuation it shows “own lecturers recordings” and “foreign language e-resources” for teachers from both countries. Undoubtedly, LMS is the most used tool due to its adaptability to the user demands (teachers), the reports offered to teachers regarding students’ learning progress, their improvements and involvements, and mainly their practices within this digital scenario. Due to the fact that Spanish teachers are more actively using LMS, it can be assumed that they also apply own lectures recordings on the basis of LMS. It is obvious that the realities of close interaction within the European Union also encourage Spanish teachers to use foreign language e-resources more actively.

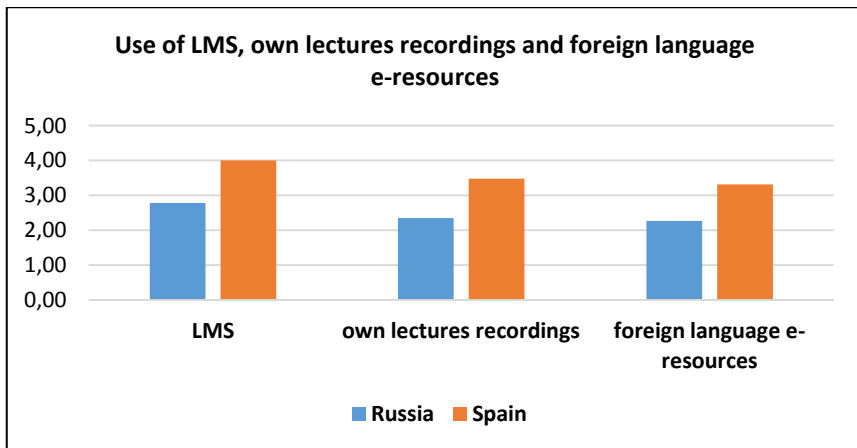


Figure 1. Use of LMS, own lectures recordings and foreign language e-resources (average rate)

Source: Own work

3.2 ICT Tools for Organizing Educational Communication in the Electronic Environment

We presume that the activity in the application of LMS is related to preferences in the ICT tools for organizing educational communication. LMS provide rich opportunities for facilitating communication and interactions. This tendency is again founded in relation to the organization of the educational communication in the electronic environment; teachers mainly make use of forums, especially Spanish teachers, followed by “rules, regulations, terms of network interactions” and finally, online lecturers. The proportion between both countries is similar.

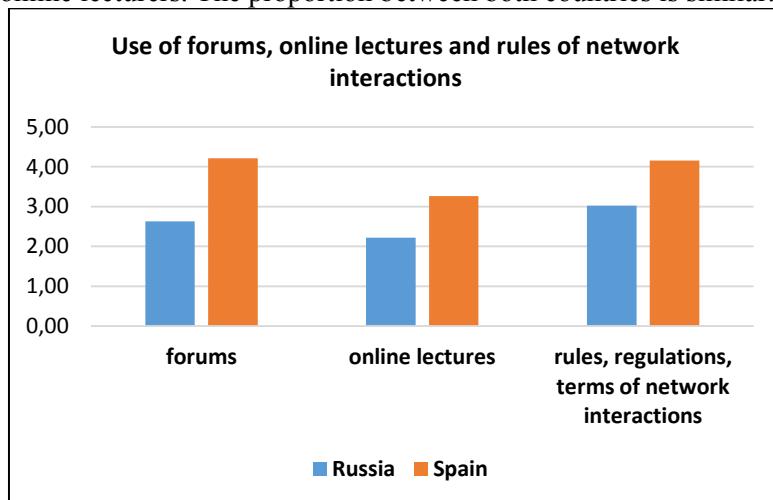


Figure 2. Use of forums, online lectures and rules of network interactions (average rate)

Source: Own work

3.3 ICT Tools for Managing Educational and Cognitive Activities in the Electronic Environment

In both countries, teachers trend to use ICT tools for organizing learning information acquisition in order to know students' academic achievements by using online polls. However, there are some differences when choose criterial rubrics and electronic organizers, with different frequency for both tools. In general terms, it seems to be that Spanish teachers repeatedly use this kind of tools versus their Russian counterparts.

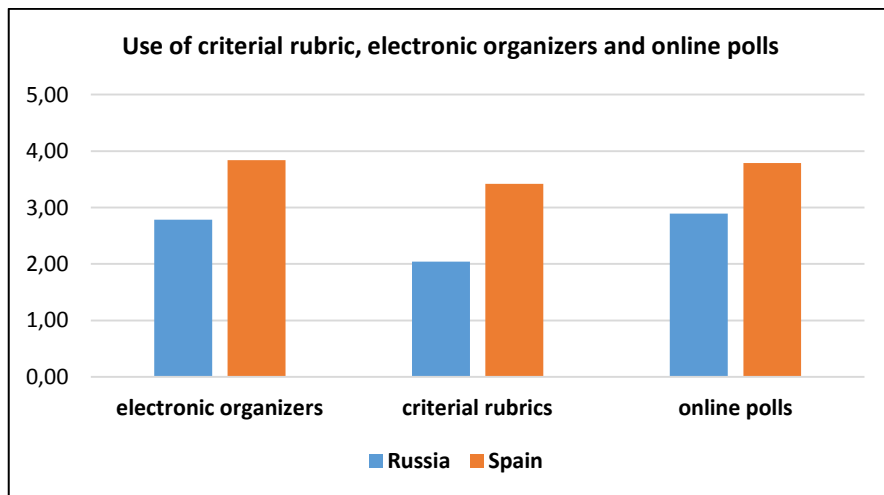


Figure 3. Use of criterial rubric, electronic organizers and online polls (average rate)

Source: Own work

CONCLUSIONS

The results show the current tendency in ICT tools use by teachers from Russia and Spain. Mostly they take advantage of the electronic content capabilities, for example, multimedia and interactivity for fostering motivation. In addition, the benefit from ICT tools efficiency and performance, for instance while actively implementing automated tests and learning analytics. Moreover, they use cloud technologies for supporting networking and collaboration. Teachers consider themselves to be aware of students' demands and aspirations of ICT tools offered.

Spanish teachers in general are more active users of ICT tools. We can note that the e-resources that teachers use largely cause their communication preferences and ways to manage teaching and learners' cognitive activities. As in the case of active use of LMS, the electronic system induces the application of available communication means (e.g. forums, online lectures, etc. together with the

appropriate management capabilities (e.g., electronic organizers, criterial rubrics, online polls, etc.).

Without a doubt, the main advantage of modern ICT tools is an opportunity for a teacher to go beyond in-class interactions, to provide learners with a certain freedom in educational and cognitive activities, taking into account the opportunities and specificity of information and communication behaviour of young people. ICT tools and new activities allow teachers to create electronic educational environments where learners not only master the necessary competencies, but also get the opportunity for self-realization, personal development, and professional development (Dabbagh, Kitsantas, Al-Freih, Fake, 2015).

The prospective of the study consists in scaling the survey, engaging respondents from other European and Russian universities. In addition, the data obtained can be applied while designing e-courses in universities. This is especially important, because the data on the most promising directions in the application of ICT tools by teachers have been obtained, and several directions have been identified that require special attention and development, taking into account the educational request, and information behaviour of the 21st century students (Gibert, Tozer, Westoby, 2017).

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