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Contemporary Teacher Competencies Development: A Study of ICT Tools for Professional Activities in Russia and Spain

Abstract

The paper examines the relations between teacher competencies and the specificity of the use of ICT tools in professional activities. The research was carried out within the frame of the IRNet project with the participation of two universities – the Herzen State Pedagogical University of Russia and the University of Extremadura, Spain. The results of the survey described give a general idea of various ICT tools use intensity in both countries. Overall, teachers take advantage of the electronic content capabilities for fostering students' motivation. Teachers benefit from ICT tools' efficiency and performance, and they use cloud technologies for supporting networking and collaboration. Spanish teachers appear to be more active users of ICT tools. They apply LMS more intensively, together with own lectures recordings and foreign language e-resources. For facilitating students' communication, they apply discussion forums and online lectures intensively. For management, the most popular tools are electronic organisers, criterial rubrics, and online polls. The choice of e-resources that teachers use is largely based on their communication preferences and ways to manage teaching; these e-resources aim at facilitating learners' cognitive activities. As in the case of the 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 organisers, criterial rubrics, online polls, etc.). The results of the survey can help identify problem areas in teachers' ICT competencies.

K e y w o r d s: ICT tools, teacher competencies, teaching activities, IRNet

Introduction: An Overview of the Approaches to Teacher Competencies Development

The digital environment expands human activities and enriches learning objectives with a spectrum of new knowledge and competencies. Today, a wide computer mediation of professional activities is obvious. This requires the development of ICT competencies. This idea has been emphasised throughout the last decades all over the world and is reflected in key documents. For example, in Europe, "the 2020 digital agenda underlines the wealth of opportunity opened up by the digital age for creating new educational scenarios and strategies" (Jiménez-Cortés, Vico-Bosch, & Rebollo-Catalán, 2017). In 2015 the Horizon Report emphasised the necessity of adapting educational scenarios to digital technologies (Johnson, Adams Becker, Estrada, & Freeman, 2015).

In general, ICT competencies are considered to be a complex of abilities to use ICT tools and applications in particular domains (Ilomäki & Kankaanranta, 2009). Together with ICT competencies goes a wide range of concepts – new literacies – which are the ways of learning that encompass the use of technology (Lim, Hung, & Cheah, 2009): media literacy, digital literacy, etc. One of the main goals of education is the development of learning skills (Dabbagh, Kitsantas, Al-Freih, & Fake, 2015), and social skills or soft skills (Gibert, Tozer, & Westoby, 2017). In Russia, this trend is also visible. At school, the main goal is the development of so-called universal learning activities, that is, a set of skills that form a person's ability to self-improve through the assimilation of a new social experience. These activities include four groups – personal, cognitive, communicative, and regulatory ones. Learning activities create the prerequisites for mastering the strategy of lifelong learning.

Today we are talking about e-pedagogy, the pedagogy of knowledge society (Smyrnova-Trybulska, Noskova, Pavlova, Yakovleva, & Morze, 2016). In Russia, new approaches to developing competencies of future teachers are reflected by modern educational standards that are being gradually developed and improved. Moreover, the requirements for the professional activity of a teacher are manifested in the professional standard of a teacher, which was approved and started to be

applied in 2017. Professional ICT competence is understood as a qualified use of ICT tools common in this professional field when solving professional problems. Professional pedagogical ICT competence includes general ICT competence, general pedagogical ICT competence, and subject-oriented pedagogical ICT competence (reflecting the professional ICT competence of the relevant field of human activity). It is necessary to formulate detailed qualification requirements (a system of indicators), which will describe ICT competence of teachers in accordance with the level of their qualifications (Avdeeva & Uvarov, 2016). The work in this direction is going on and is being actively discussed by researchers and teachers.

In Spain, the educational system also fosters to achieve basic skills at the end of the compulsory education. One of them is digital competence as it is included in the national education law, LOMCE (2013). This competence implies having the skills to search, obtain, process, and communicate information, and to transform it into knowledge. It incorporates different skills, ranging from access to information, to its transmission in different media once treated, including the use of information and communication technologies as an essential element to inform, learn, and communicate (ITE, 2008).

Therefore, the education system must be prepared to cope with these advances, teacher training being the key element to facilitate the curricular implementation of ICT. This should be geared towards innovating, experimenting with ICT tools and reflecting on their use, and turning them into one more resource within the classroom.

At the same time, the European Commission at the beginning of the 21st century (2003, p. 18) clearly indicated that there was a deficit in ICT training for teachers in two areas: (1) linking ICT to pedagogical practices, and (2) linking ICT in relation to disciplines and the promotion of interdisciplinarity. However, in recent decades, this problem has not been completely solved. In fact, some political actions from governments show their concern about the Digital Teacher Training Competence. For instance, according to the definition offered by the Digital Teacher Competence Portfolio of Extremadura (2015), the digital competence is understood as "[…] insurance and critical technologies of the information society for work, leisure and communication use and combination of knowledge, skills, values and attitudes that achieve certain goals effectively in contexts and with digital tools."

This distress makes it necessary to train teachers due to the functions that ICT tools play and their impact on critical variables within the teaching and learning process, together with the different roles that a teacher plays in them. A reflection of such general social concern has been the special interest that has aroused the need to know and promote the levels of teachers' digital competence at all levels of education (Aguiar & Llorente, 2008; Cabero, Llorente, Leal, & Lucero, 2009). For these reasons, the training of teachers is a priority, since the school cannot leave aside the society demands. ICT require that teachers play new roles, and entail innovative pedagogies and new educational approaches in teacher training (Makrakis, 2005).

In accordance with Valverde (2015) and Kharbach (2012), those competencies must be identified in pre-service teachers' training (Gutiérrez Esteban & Luengo González, 2008) and linked to the shared experiences of "collaborative learning, which allow self-regulation of individual learning and the construction of these networks that shape and give meaning to the community of mobile learning. Another of the advances m-learning gives to teachers is the possibility of easy use, communication facilities and faster diffusion. It allows quick interchange and discussion among our Mobile Personal Learning Networks (MPLN)" (Gutiérrez & Camacho, 2017, p. 365).

Here we should note the differences in the aims of school and university education. Of course, for the university the main goal is professional development, as well as self-development. In the context of university education, we can talk about the wider use of ICT not just for supporting the educational process, but for implementing blended learning and creating an electronic educational environment.

Today, professional competencies of a teacher can hardly be separated from ICT competencies. The competent use of ICT tools is the indispensable condition for a successful professional activity. Therefore, in the context of our research, we consider these two phenomena – teacher competencies and ICT tools for professional activities – in a logical unity.

Pedagogical ICT Tools

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. It is obvious that a teacher needs to master new tools in order to make an entire use of the high potential of the electronic environment.

In Russian pedagogical studies, what is 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," this idea in fact represents the quality of the electronic educational resources content, which determines new opportunities for the resource use in the educational process.

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, Graña classifies digital educational resources according to the following criteria (2011):

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

sultation is open in the sense that they have a pre-established itinerary (podcasting).

2. Instructional: these materials are designed according to training needs. Navigation through the content menu is preset as well as learning sequences. One can define several instruction sequences in the same content of the previous knowledge base or the learning rate. Within this category there are: exercise activities, interactive tutorials, e-learning courses.
3. Evaluative: they constitute a variation of instructional materials and have a purely evaluative purpose. Self-assessment questionnaires, training tests, summative assessment, and opinion surveys are distinguished.
4. Instrumental: these are interactive services or applications that cover many aspects of learning support, including tools for the search, processing, and visualisation of information. These applications are free navigation. The examples are: search engines virtual atlas, calculators, translators, etc.
5. Experiences: these are interactive training scenarios that are based on games or simulations. They promote learning based on problem-building and strategic decision-making skills. There is a wide range of simulations and games that respond to these characteristics. We find levels of experiences with low content of interactivity (some WebQuest modalities) or highly interactive (scientific simulations and virtual worlds).
6. Conversational: conversational materials and services consist of synchronous or asynchronous communication dialogues in which there are conversations between participants in a training activity. Conversations can be open (group) or closed (see teacher). The examples are: mailing lists, forums, chat, instant messages, comments, blogs, audio and videoconferences, etc.
7. Collaboration: this type of material includes a wide range of work proposals for this purpose: databases, encyclopedias, reports, articles, notes, manuals and guides, networked lectures, from activities fully open to highly formalised. One can also activate from a few users to very large communities. This network shows how to make interaction between people and the management of shared knowledge. Representative examples of this category are many of the telematics projects, Wiki environments and management within a network oriented to the applications of knowledge.

When choosing the most appropriate educational ICT tools for a particular educational situation, a number of factors may be influential, but – ideally – a reasonable variety of methods and resources should be used to make it possible for students to participate, illustrate their ideas, investigate, and find solutions to problems in order to favour the acquisition of learning.

Regarding the use of technological means in education, traditionally some mistakes have been made while “transferring” the didactic situation into the cyberspace, and taking the teaching methods and learning strategies of a live classroom to the virtual formative environments. Namely, these strategies and methods

were tailor-made and thought for face-to-face teaching. This kind of implementation without adaptation has not been a successful measure, since we have brought into virtual teaching the way of thinking present in face-to-face teaching.

In the international pedagogical practice, ICT tools are characterised through the prism of solving specific educational problems. In particular, the annual rating of the most popular ICT tools has gained popularity (http://c4lpt.co.uk/top100 tools/). Open voting through filling out online questionnaires forms it. Here, the tools are sorted by several categories: tools for providing new knowledge (instructional tools), tools for developing content, social tools, and tools for personal and professional purposes. However, the rating does not provide a clear definition of what ICT tools mean in the educational context.

There are also approaches which characterise ICT tools from the standpoint of implementing specific pedagogical methods: for gamification (de Marcos, Garcia Lopez, & Garcia Cabot, 2016), for increasing the effectiveness of MOOCs (Yamada, 2016), or for supporting the development of universal learning activities (Zhuravlev, 2015). A number of publications show that the term "ICT tools" refers to information and communication technologies used for educational purposes (Lucke, Dunn, & Christie, 2017). Authors describe the usefulness, appropriateness, and efficacy of specific ICTs. In addition, they recommend certain ICT tools for specific pedagogical objectives.

At the same time, the cited publications do not analyse significant changes in the activity of a teacher when using these ICT tools. There are no grounds for their division into groups, since a certain ICT tool can be applied in different ways in different educational situations. Therefore, it is necessary to determine the theoretical grounds for using the concept of "pedagogical" ICT tools.

ICT tools in the hands of a teacher have evolved from merely a 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. The main purpose of pedagogical ICT tools is to organise and support the activities of students in the electronic educational environment (both in the classroom and outside). Pedagogical ICT tools play a special role in the organisation of out-of-class independent work.

In this paper, we suggest the classification of pedagogical ICT tools based on the focus of different types of students' activities organised and facilitated in the electronic environment:

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

ICT Tools Application by Russian and Spanish Teachers

Research Methods

An experimental study of the use of ICT tools 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. The research included several stages.

Firstly, a questionnaire was elaborated. The main objective was to identify the specific application of the three main groups of ICT tools in the electronic educational environment by teachers: ICT tools for presenting and organising learning information acquisition in the electronic environment, ICT tools for organising educational communication in the electronic environment, and ICT tools for managing educational and cognitive activities in the electronic environment. 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.

Secondly, 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. The questionnaire passed the initial validation: it was analysed, and each issue was evaluated and commented on by Russian and Spanish experts. Some of the issues were modified (content or style) as recommended by the scientific community.

As we have already noted, the questionnaire comprised three groups of questions. The first group (ICT tools for presenting and organising learning information acquisition in the electronic environment) included questions that allowed obtaining data on several areas:

- an extent to which various ICT tools and electronic equipment are used for presenting educational information (for example, computers, multimedia projectors, document cameras, LMS, sites, mobile devices, virtual and augmented reality interfaces, etc.);
- a variety of electronic content used (linear texts in electronic form, hypertext, computer presentations, video, audio, interactive digital models, virtual and augmented reality); and
- a variety of opportunities for learning the content (selecting the necessary content, choosing the preferred formats of educational content, contextual

help, automated self-control, the ability to interactively manipulate learning objects, etc.).

In addition, two questions were proposed that allowed determining the correlation between the e-resources actually used by teachers and the opinion of teachers about the relevance of these types of e-resources for students. In particular, the questions named such e-resources as electronic textbooks, text and hypertext resources of own development, records of own lectures, digital educational objects, tests, e-resources in foreign-language, open online courses, etc.

The second group of questions (ICT tools for organising educational communication in the electronic environment) covered several aspects:

- a variety of communication ICT tools use in teaching activities (e-mail, forums, blogs, social networks, multi-user documents, multi-user virtual environments, video conferencing facilities, etc.);
- opportunities provided to students for networking and communication (individual support, application of knowledge and skills in practice, support of educational motivation, formation of professional and social competencies, support of educational self-fulfilment and satisfaction of individual communication request, etc.); and
- a variety of resources helping organise educational communication on the web (rules, regulations, conditions of network interaction, problematic issues, situations, topical issues of discussion, archives of discussions, links to external resources, etc.).

In addition – as in the first group – two questions were proposed to identify the correlation between the means of interaction actively used by teachers and students' demand for these tools (counseling, pair and small group work, discussions, network conferences, online lectures and seminars, etc.).

The third group of questions (ICT tools for managing educational and cognitive activities in the electronic environment) primarily aimed at identifying an extent to which various ICT tools are used to manage educational and cognitive activities in the electronic environment (electronic calendars and organisers, network questionnaires, criterial rubrics editors, testing programmes, mobile on-line polls, learning analytics, etc.). Two questions were proposed to identify the correlation between ICT tools used for managing educational and cognitive activities and the relevance of these tools for students (plans, graphs, online questionnaires, tests, online voting, evaluation criteria, ratings, electronic journals of progress and achievement, electronic portfolio).

Finally, a quantitative and qualitative analysis of the results was carried out using Google Form tools and Statistical software (statsoft.com). For each variable, the following parameters were calculated: mean, or average – M, standard error – SE, standard deviation – SD, and standard error of the mean – SE(M). 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. Consequently, we see the prevailing directions of ICT tools use.

Research Results

The research sample

The research sample included 65 respondents in total, 19 from Spain and 46 from Russia (Figure 1). The larger part of the respondents were academic teachers (89%) with a certain teaching experience (92% of the respondents – more than 5 years), together with the sufficient practice in implementing ICT in their professional activities (89% – more than 5 years). Consequently, the respondents can be considered the representatives of the advanced part of the pedagogical community.

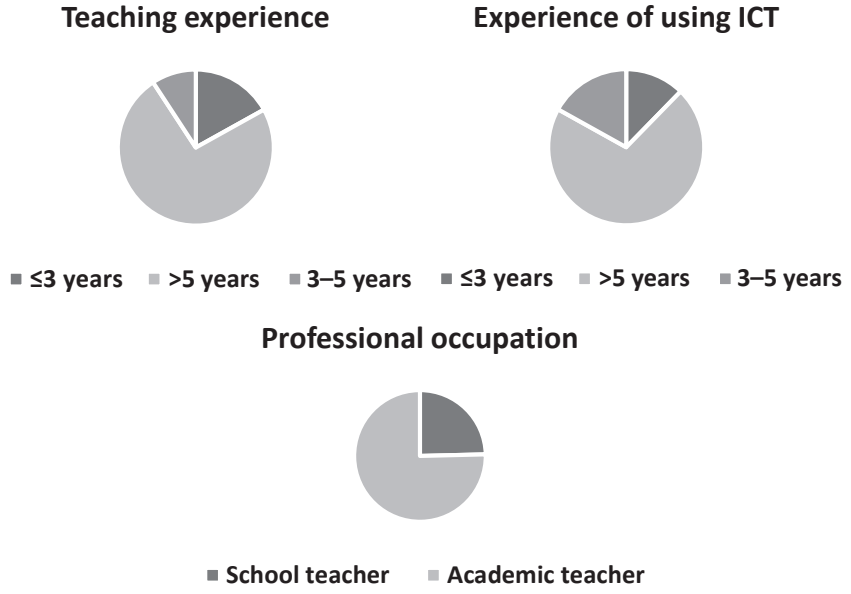

Figure 1. The research sample.

Source: Own work.

Some trends in the use of ICT tools by teachers

Russian and Spanish teachers are very active in using multimedia equipment in their professional activities (92% of Russian and 100% of Spanish colleagues chose the options "quite often" and "constantly"). Computer presentations are in the first place in popularity of all electronic content. Thematic sites are also popular (they are constantly used by 66% of Russian and 55% of Spanish teachers). Mobile devices are less popular – 52% of Russian and 50% of Spanish respondents indicated that they are used very rarely. A similar situation is revealed in the field of

application of virtual and augmented reality interfaces – 74% of teachers in Russia and 70% of teachers in Spain almost never use them.

Teachers note the importance of the choice of e-content (variability and diversity). These opportunities are actively implemented by 61% of Russian and 70% of Spanish teachers. In addition, the variety of choices of educational content formats has a value (62% and 75% of Russian and Spanish teachers, respectively, actively use these opportunities). Motivating resources are used quite actively (54% and 55%). About a half of teachers actively provide students with the opportunities for automated self-control (50% and 40% note that they offer these opportunities very often).

The use of e-mail is equally in demand by all teachers. Cloud documents are quite in demand (48% and 60%). All interviewed teachers noted that they actively seek to provide students with a range of opportunities that network communication has. These are individual communication support, application of knowledge and skills in practice, joint activities, support of educational motivation, reflexive position, formation of professional and social competencies, and support of educational self-realisation and satisfaction of individual communication request. In this aspect, there are no significant differences between countries; the number of active teachers in each case exceeds 50–60%.

Also, what is revealed is the direct correlation between the applicability of ICT tools by teachers in both countries and their assessment of the relevance of these tools to students (the Pearson correlation coefficient varies within 0.7–0.8). This result can be explained from two points of view. On the one hand, it may prove that teachers are well aware of learners' needs and aspirations. On the other hand, this may partially indicate the leading, somewhat authoritarian position of teachers who believe that students need exactly those forms and methods of teaching that they offer. In any case, this question requires an additional study of students' preferences. This may be the next step in the continuation of the study.

Differences in the application of ICT tools by Russian and Spanish teachers

ICT tools for presenting and organising learning information acquisition in the electronic environment

The differences between the two countries are presented in Table 1 and Figure 2. In relation to ICT tools employed for presenting and organising learning information acquisition, the most significant differences were revealed in terms of LMS application, together with "own lectures recordings" and "foreign language e-resources." It should be noted that LMS presents the highest rate, due to which it is a widespread tool in the university educational level area. Spanish teachers use these tools more intensively because they have more extensive experience in the implementation of e-learning. Undoubtedly, LMS provides high adaptability to the user's demands (teachers), the reports offered to teachers regarding students' learning progress, their improvements and involvements, and mainly their practices within this digital scenario. Also, what is remarkable is the possibility to implement

external resources within the LMS, such as social networks, RSS, video channels, and other tools that enrich students' educational experiences and foster learning but also skills acquisition thanks to multifarious teaching materials and diverse educational tools, on the basis of the transmedia narrative and the multiliteracies theories.

Spanish teachers are more actively using LMS, so it can be assumed that they also apply own lectures recordings based on 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.

Table 1.
Differences in the use of ICT tools for presenting and organising learning information acquisition in the electronic environment

	LMS				Own lectures recordings				Foreign language e-resources			
	M	N	M±SE	M±SD	M	N	M±SE	M±SD	M	N	M±SE	M±SD
Russia	2.78	46	1.65	0.24	2.35	46	1.58	0.23	2.26	46	1.47	0.22
Spain	4.00	19	1.20	0.28	3.47	19	1.39	0.32	3.32	19	1.67	0.38
Total	3.14	65	1.62	0.20	2.68	65	1.60	0.20	2.57	65	1.59	0.20

S o u r c e: Own work.

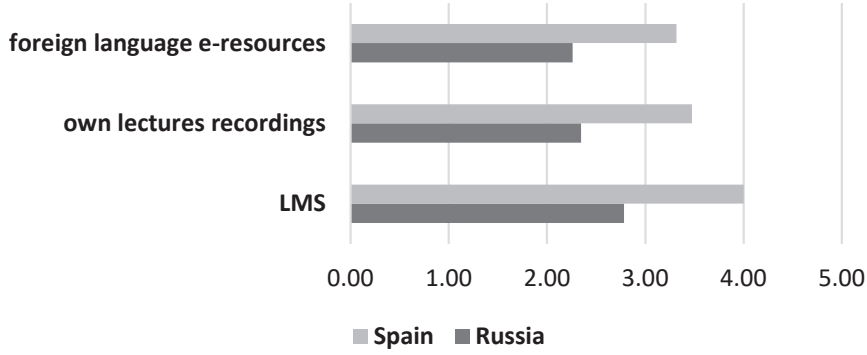

Figure 2. The use of ICT tools for presenting and organising learning information acquisition.

S o u r c e: Own work.

ICT tools for organising educational communication in the electronic environment

The differences between the two countries are presented in Table 2 and Figure 3. We presume that the activity of Spanish teachers in the application of LMS is related to their preferences in the ICT tools for organising educational communication. ICT tools that they apply are available in LMS, and they provide rich opportunities for facilitating communication and interactions. Teachers mainly make use of forums.

Less intensively, they use online lectures. It is important that most of teachers provide learners with rules, regulations, and terms of network interactions since it is a significant condition for an effective mediated communication.

Table 2.
Differences in the use of ICT tools for organising educational communication in the electronic environment

	Forums				Online lectures				Rules, regulations, terms of network interaction			
	M	N	M±SE	M±SD	M	N	M±SE	M±SD	M	N	M±SE	M±SD
Russia	2.63	46	1.47	0.22	2.22	46	1.55	0.23	3.02	46	1.58	0.23
Spain	4.21	19	1.18	0.27	3.26	19	1.63	0.37	4.16	19	1.34	0.31
Total	3.09	65	1.56	0.19	2.52	65	1.63	0.20	3.35	65	1.60	0.20

S o u r c e: Own work.

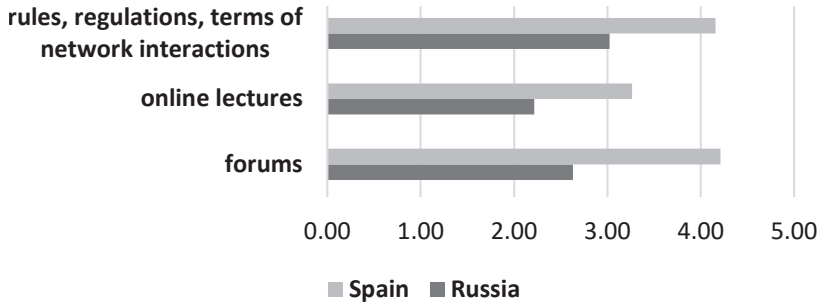

Figure 3. The use of ICT tools for educational communication on the web.

S o u r c e: Own work.

ICT tools for managing educational and cognitive activities in the electronic environment

The differences between the two countries are presented in Table 3 and Figure 4. In both countries, teachers tend to use ICT tools for organising learning information acquisition in order to know students' academic achievements by using online polls. However, there are some differences in choosing criterial rubrics and electronic organisers, with different frequency for both tools. In general terms, it seems to be that Spanish teachers repeatedly use this kind of tools, unlike their Russian colleagues. We can again logically relate this trend to the usage of LMS application by Spanish teachers. The latest editions of the most well-known LMS have wide built-in capabilities for implementing objectives of educational and cognitive activities management.

Table 3.
Differences in the use of ICT tools for managing educational and cognitive activities in the electronic environment

	Electronic organisers				Criterial rubrics				Online polls			
	M	N	M±SE	M±SD	M	N	M±SE	M±SD	M	N	M±SE	M±SD
Russia	2.78	46	1.59	0.23	2.04	46	1.43	0.21	2.89	46	1.62	0.24
Spain	3.84	19	1.61	0.37	3.42	19	1.64	0.38	3.79	19	1.51	0.35
Total	3.09	65	1.66	0.21	2.45	65	1.61	0.20	3.15	65	1.63	0.20

S o u r c e: Own work.

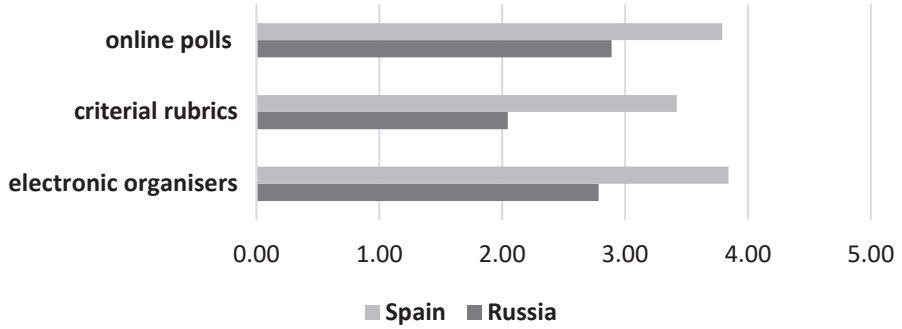

Figure 4. The use of ICT tools for managing educational and cognitive activities.
S o u r c e: Own work.

Conclusion

The results show the current tendency of teachers from Russia and Spain regarding the ICT tools use. Teachers take advantage of the electronic content capabilities – for example, multimedia and interactivity – for fostering motivation. In addition, they benefit from ICT tools' efficiency and performance, for instance while actively implementing automated tests and learning analytics. Moreover, they use cloud technologies not merely as a tribute to fashion, but for supporting networking and collaboration. Teachers tend to understand that the main advantage of ICT tools is an opportunity for a teacher to go beyond in-class interactions and 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 make it possible for teachers to create electronic educational environments where learners not only master the necessary competencies, but also get the opportunity for self-

realisation, personal development, and professional development. Teachers are aware of students' aspirations regarding ICT tools offered; however, the extent of such awareness still needs further investigation.

E-resources that teachers use influence their communication preferences and ways to manage teaching and learners' cognitive activities. For example, the active use of LMS by Spanish teachers induces the application of available communication means (e.g., forums, online lectures, etc.) together with the appropriate management capabilities (e.g., electronic organisers, criterial rubrics, online polls, etc.).

ICT tools allow implementing the necessary transformations in the activities of a modern teacher, which are aspects of new professional competencies related to pedagogical activity in the electronic educational environment. Teachers of the 21st century should learn how to use different types of pedagogical ICT tools and design with their help an electronic educational environment for creating conditions for professional formation, self-education, and self-realisation of the digital learners. Consequently, in the process of advanced training and education of teachers today, it is necessary to strengthen the direction of the ICT competencies development as the basis for effective professional activity in the electronic educational environment.

A feature of modern ICT tools is their rapid development and renewal. In this regard, the possibilities of using pedagogical ICT tools are constantly expanding. Among the current trends, we can name the switch to mobile formats, the expansion of the augmented and virtual reality, etc. Thus, teachers need to improve ICT competencies constantly to show professional creativity in the search of effective methods of educational interaction in the electronic environment.

The results of the conducted survey can help identifying problem areas in teachers' ICT competencies. For example, which ICT tools should be learnt, what educational opportunities in the electronic environment should be paid attention to, what digital educational resources are needed for this, and how to take into account students' preferences? Moreover, the further study directions can include the overview of the results from the sociocultural prospective, since the countries participating in the research have significantly different pedagogical and ideological backgrounds.

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References

Aguiar, V. & Llorente, M. (2008). Sobre competencias y otras habilidades...TIC. *Comunicación y Pedagogía*, *224*, 58–62.

Avdeeva, S. M. & Uvarov, A. Yu. (2016). О разработке квалификационных требований к икт-компетенциям педагогов. *Наука и школа*, *6*, 146–160.

Area, M., Gutiérrez, A., & Vidal, F. (2012). *Alfabetización digital y Competencias informacionales*. Madrid: Ariel-Fundación Encuentro-Fundación Telefónica.

Cabero, J., Llorente, M. C., Leal, F., & Lucero, F. (2009). La alfabetización digital de los alumnos universitarios mexicanos: una investigación en la Universidad Autónoma de Tamaulipas. *Enseñanza & Teaching*, *27*, 41–59.

Dabbagh, N., Kitsantas, A., Al-Freih, M., & Fake, H. (2015). Using social media to develop personal learning environments and self-regulated learning skills: A case study. *International Journal of Social Media and Interactive Learning Environments*, *3*(3), 163–183.

De Marcos, L., García López, E., & García Cabot, A. (2016). On the effectiveness of game-like and social approaches in learning: Comparing educational gaming, gamification & social networking. *Computers & Education*, *95*, 99–113.

European Commission. (2003). Education & training 2010 (COM (2003) 685 final). Brussels, Commission of the European Communities.

Gibert, A., Tozer, W. C., & Westoby, M. (2017). Teamwork, soft skills, and research training. *Trends in Ecology and Evolution*, *32*(2), 81–84.

Graña, J. (2011). Categorización dos Recursos TIC. Accessed 30 August 2017. Retrieved from https://sfticaldan.wordpress.com/2011/10/31/categorizacion-dos-recursos-tic/.

Gutiérrez Esteban, P. & Camacho, M. (2017). You hold the world: Harnessing the power of Mobile Personal Learning Environments (mPLEs) in next-generation teacher education. In O. Alegre de la Rosa, (Ed.), *Research on university teaching and faculty development. International perspectives* (pp. 357–372). New York: Nova Science Publishers.

Gutiérrez Esteban, P. & Luengo González, M. R. (2008). ¿Qué piensa el alumnado egresado de la Facultad de Educación de la Universidad de Extremadura sobre su formación tecnológica? *Revista Latinoamericana de Tecnología Educativa*, *7*(2), 135–141. Accessed 30 August 2017. Retrieved from http://dehesa.unex.es/bitstream/handle/10662/1303/1695-288X_7_2_135.pdf?sequence=1.

Ilomäki, L. & Kankaanranta, M. (2009). The information and communication technology (ICT) competence of the young. In L. Tan Wee Hin & R. Subramaniam (Eds.), *Handbook of research on new media literacy at the K-12 level: Issues and challenges* (pp. 101–118). Hershey, PA: IGI Global. doi:10.4018/978-1-60566-120-9.ch007.

ITE. (2008). *Competencia Digital*. Madrid: Instituto de Tecnologías Educativas, Departamento de Proyectos Europeos, Ministerio de Educación.

Jiménez Cortés, R., Vico Bosch, A., & Rebollo Catalán, A. (2017). Female university student's ICT learning strategies and their influence on digital competence. *International Journal of Educational Technology in Higher Education*, *14*, 10.

Johnson, L., Adams Becker, S., Estrada, V., & Freeman, A. (2015). *NMC Horizon Report: 2015 Higher Education Edition*. Austin, Texas: The New Media Consortium.

Kharbach, M. (2012). *The 20 digital skills every 21st century teacher should have*. Accessed 30 August 2017. Retrieved from http://www.educatorstechnology.com/2012/06/33-digital-skills-every-21st-century.html.

LOMCE. Law on Educational Quality Improvement (Ley Orgánica 8/2013, de 9 de diciembre, para la mejora de la calidad educativa). (2013). Madrid: Ministry of Education. Accessed 30 August 2017. Retrieved from https://www.boe.es/diario_boe/txt.php?id=BOE-A-2013-12886.

Lim, W., Hung, D., & Cheah, H. (2009). An interactive and digital media literacy framework for the 21st century. In L. Tan Wee Hin & R. Subramaniam (Eds.), *Handbook of research on new media literacy at the K-12 level: Issues and challenges* (pp. 119–127). Hershey, PA: IGI Global. doi:10.4018/978-1-60566-120-9.ch008.

Lucke, T., Dunn, P. K., & Christie, M. (2017). Activating learning in engineering education using ICT and the concept of "Flipping the classroom." *European Journal of Engineering Education*, *42*(1), 45–57.

Makrakis, V. (2005). Training teachers for new roles in the new era: Experiences from the United Arab Emirates ICT program. Accessed 30 August 2017. Retrieved from http://www.etpe.gr/custom/pdf/etpe658.pdf.

Osin, A. V. (2007). *Электронные образовательные ресурсы нового поколения в вопросах и ответах*. Moscow: Агентство "Социальный проект."

Preparing Millennials to lead in cyberspace. A Raytheon-commissioned study of attitudes, behaviors and career aspirations among young American adults online. (2013). Accessed 30 August 2017. Retrieved from https://www.zogbyanalytics.com/images/PDF/Raytheon%20Zogby%20Cyber%20Millennial%20survey%20report.pdf.

Resolution of 2nd June 2015 from the Education General Secretary in Extremadura that regulates the Digital Teacher Competence Portfolio of Extremadura. (2015). Mérida: Junta de Extremadura. Accessed 30 August 2017. Retrieved from http://recursos.educarex.es/pdf/porfolio/porfoliopublicadoendoe.pdf.

Sarantsev, G. I. (2016). Исследование влияния гармонизации профессионального образования по направлению «Педагогическое образование» на процесс обучения бакалавров. *Интеграция образования*, *3*(20), 342–351.

Smyrnova-Trybulska, E., Noskova, T., Pavlova, T., Yakovleva, O., & Morze, N. (2016). New educational strategies in contemporary digital environment. *International Journal of Continuing Engineering Education and Lifelong Learning*, *26*(1), 6–24.

The digital agenda for Europe. (2015). Accessed 30 August 2017. Retrieved from https://ec.europa.eu/digital-single-market/en/europe-2020-strategy.

Top tools for learning. (2016). Accessed 30 August 2017. Retrieved from http://c4lpt.co.uk/top100tools/.

Valverde, J. (2015). La formación inicial del profesorado en el Grado de Educación Primaria. Una valoración cualitativa del diseño y desarrollo curricular de la asignatura RTDI. *Tendencias Pedagógicas*, *25*, 207–227.

Yamada, T. (2016). New component technologies and development strategies of e-learning in MOOC and post-MOOC eras. Accessed 30 August 2017. Retrieved from https://www.researchgate.net/publication/284887522_New_Component_Technologies_and_Development_Strategies_of_e-Learning_in_MOOC_and_Post-MOOC_Eras.

Zhuravlev, I. A. (2015). Развитие универсальных учебных действий учащихся с использованием ИКТ-инструментов. *Педагогическое образование в России*, *1*, 7–10.

Tatiana Noskova, Tatiana Pavlova, Olga Yakovleva, Prudencia Gutiérrez Esteban, Rafael Martín Espada, Sixto Cubo Delgado, Juan Arias Masa, Gemma Delicado Puerto, Laura Alonso Díaz, Rocío Yuste Tosina

Rozwój kompetencji współczesnych nauczycieli: analiza narzędzi ICT dla działalności zawodowej w Rosji i Hiszpanii

S t r e s z c z e n i e

Artykuł analizuje powiązania między kompetencjami nauczycieli a specyfiką wykorzystania narzędzi ICT w działalności zawodowej. Badanie przeprowadzono w ramach projektu IRNet z udziałem dwóch uczelni – Państwowego Uniwersytetu Pedagogicznego Rosji im. A.I. Herzena i Uniwersytetu Extremadura w Hiszpanii. Wyniki zawierają przegląd intensywności korzystania z różnych narzędzi ICT w obu krajach. Ogólnie nauczyciele wykorzystują możliwości treści elektronicznych do stymulowania motywacji uczniów. Korzystają z technologii informacyjno-komunikacyjnych dla zwiększenia produktywności i wykorzystują technologię chmury w celu wspierania pracy zespołowej studentów. Nauczyciele hiszpańscy aktywniej korzystają z niektórych narzędzi ICT. Bardziej intensywnie stosują LMS wraz z własnymi wykładami i zasobami elektronicznymi w językach obcych. Fora dyskusyjne i wykłady online intensywnie wspierają interakcję uczniów. W rozwiązywaniu problemów związanych z zarządzaniem najbardziej popularne są organizacja elektroniczna, kategorie kryterialne i kwestionariusze online. Zasoby elektroniczne, z których korzystają nauczyciele, w dużej mierze wyjaśniają ich preferencje komunikacyjne, sposoby zarządzania uczeniem się i przyczyniają się do aktywności poznawczej uczniów. Podobnie jak w przypadku aktywnego korzystania z LMS, system elektroniczny zachęca do korzystania z dostępnych środków interakcji (na przykład forów, wykładów online) oraz z odpowiednich możliwości zarządzania (np. elektronicznej organizacji, kwestionariuszy online itp.). Wyniki badań pozwoliły zidentyfikować obszary problemowe w rozwoju kompetencji nauczycieli ICT.

S ł o w a k l u c z o w e: narzędzia ICT, kompetencje nauczycieli, działalność dydaktyczna, IRNet

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Развитие компетенций современных учителей: исследование ИКТ-инструментов профессиональной деятельности в России и Испании

А н н о т а ц и я

В статье рассматриваются связи между компетенциями преподавателей и спецификой использования ИКТ-инструментов в профессиональной деятельности. Исследование проводилось в рамках проекта IRNet с участием двух университетов – Российского государственного педагогического университета им. А.И. Герцена и Университета Эстремадуры, Испания. Результаты дают общее представление об интенсивности использования различных ИКТ-инструментов в двух странах. В целом, учителя используют возможности электронного контента для стимулирования мотивации студентов. Они применяют ИКТ для повышения производительности и используют облачные технологии для поддержки совместной работы

студентов. Испанские учителя более активно используют некоторые инструменты ИКТ. Они более интенсивно применяют LMS вместе с записями собственных лекций и электронными ресурсами на иностранных языках. Для поддержки взаимодействия студентов интенсивно применяют дискуссионные форумы и онлайн-лекции. Для решения задач управления наиболее популярными являются электронные органайзеры, критериальные рубрики и онлайн-опросы. Электронные ресурсы, которые используют преподаватели, в значительной степени объясняют их коммуникационные предпочтения, способы управления обучением и способствуют познавательной деятельности учащихся. Как в случае активного использования LMS, электронная система стимулирует применение доступных средств взаимодействия (например, форумы, онлайн-лекции), вместе с соответствующими возможностями управления (например, электронные организаторы, критерии, онлайн-опросы и т. д.). результаты исследования позволили выявить проблемные области в развитии ИКТ-компетенций педагогов.

Ключевые слова: ИКТ-инструменты, компетенции преподавателей, преподавательская деятельность, IRNet

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Desarrollo de competencias docentes: un estudio del uso de las herramientas TIC en las actividades profesionales en Rusia y España

Resumen

El artículo estudia las relaciones entre las competencias docentes y el uso de las herramientas TIC en las actividades profesionales. Esta investigación se llevó a cabo en el marco del proyecto IRNet con la participación de dos universidades – Herzen State Pedagogical University of Russia y la Universidad de Extremadura, España. Los resultados de la encuesta dan una idea general de las diversas herramientas de TIC que se utilizan intensamente en ambos países. En general, el profesorado aprovecha las herramientas de contenido digital para fomentar la motivación de los estudiantes. Se benefician de la eficiencia de las herramientas TIC, el rendimiento y el uso de tecnologías en la nube para apoyar el trabajo en red y la colaboración. El profesorado en España parece ser usuarios más activos de las herramientas TIC. Éstos emplean de manera más frecuente LMS, junto con grabaciones propias de conferencias y e-recursos de lenguas extranjeras. Para facilitar la comunicación con los estudiantes, utilizan intensivamente foros de debate y conferencias en línea. Para la gestión, los más frecuentemente utilizados son las bases de datos, rúbricas y encuestas en línea. Los e-recursos que usa el profesorado con más asiduidad, traen aparejadas sus preferencias de comunicación, el modo en el que administran la enseñanza y facilitan las actividades cognitivas de los alumnos. Como en el caso del uso activo de LMS, el sistema digital induce a la aplicación de los medios de comunicación disponibles (por ejemplo, foros, conferencias en línea, etc.), junto con otras herramientas de gestión apropiadas (por ejemplo, bases de datos, rúbricas, encuestas en línea, etc.). Los resultados de esta investigación pueden ayudar a identificar áreas problemáticas en la formación de competencias TIC del profesorado.

Palabras clave: herramientas TIC, competencias docentes, actividades docentes, IRNet