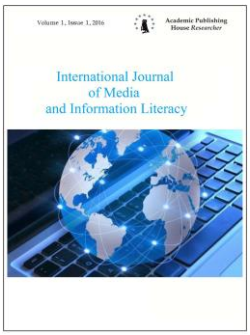
Published in the Slovak Republic
International Journal of Media and Information Literacy
Has been issued since 2016.
E-ISSN: 2500-106X
2019, 4(2): 60-65

DOI: 10.13187/ijmil.2019.2.60
www.ejournal46.com



Communication and Information Technologies in Preparing Students for Research Work

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Abstract

The article is focused on the issue of preparing students for research work, which is being recognized as a critical element in teacher's professional activity. The central element of modern research work is the ability of a professional to use digital technologies that offer instantaneous access to information, new forms of sharing research findings, consolidation and collaboration among researchers, expert participation, etc.

At present university training programs are placing more emphasis on research work in preparation of future teachers.New digital technologies give a variety of opportunities to enhance the preparation of students for this kind of professional activity. The use of new generation of communication and information technologies helps to shape and develop basic knowledge and skills, which are important for adequate research work in educationin a fast-changing world.

Since the introduction of Federal Educational Standards of the "thirdgeneration" the main goal in curriculum design is to prepare students for independent research work. Content of courses in research work includes theoretical and practical elements of research technologies and procedures: problem selection, problem identification and formulation, choosing a methodology, data collection, its analysis and interpretation, experiment and evaluation of research results, formulation of research findings, etc. Beyond doubt, knowledge and use of communication and information technologies strengthen research work at each of these stages.

The article analyzes the practice of Taganrog Chekhov's Institute regarding the process of trainingstudents to organize research work. It is indicated that research competencies are expanded when the students are helped to become more skillful and knowledgeable in research through the use of special strategies and methods of education, curriculum design, and content revision in accordance with modern requirements.

Keywords: education, research, communication and information technologies.

1. Introduction

The relevance of the topic chosen for the articleis justified by the dynamic development of new generation of communication and information technologies and the growing need to explore their impacts on various fields of human life and activities. This also includes the sphere of education.

To outline the scope of our research, we limit ourselves to the issues of using new communicationand information technologies in education of university students to conduct research work in pedagogy. These activities link future teachers with their professional mission:

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systematic investigation, evaluation, experimentation and measuring educational outcomes on the basis of new communication technologies related to the Internet. These technologies offer instantaneous access to information across time and space thanks to new features (online mode, access to big data basis and scientific literature, quickness, breadth and dynamics of information search/dissemination, anonymity/privacy, interactivity, etc.). Newtechnologies give a variety of opportunities to enhance the preparation for the research work and the research per se. These range from forms for sharing research to forms of getting informationand from internet exchange to video conferences, etc. Obviously, the realities of digital technology have already influenced the nature of research and the learning process.That's why much attention in university education should be given to shaping those elements of students' research competencies that are connected with new communication and information technologies.

Professional use of communication and information technologies in research work is an obligation shared by all teachers. That's why all future students study and practice research as part of their curriculum. There is an emphasis on "a research continuum", which encompasses training on undergraduate (bachelor's) and master's levels. At Taganrog Chekhov's Institute both bachelor's and master's students are deeply involved in carrying out research work, writing course projects and final thesis.All teachers' training curricula under the undergraduate and graduate programs in the field of "Education" require the completion of course projects (usually 2 course papers) and a final thesis (graduation paper) on a topic related to education and pedagogy. The main goal in curriculum design is that research courses should prepare students for independent research work on a search for a scientific problem and its theoretical and practical study.Content of courses in research work includes theoretical and practical elements of research technologies and procedures: problem selection, problem identification and formulation, choosing a methodology, data collection, its analysis and interpretation, experiment and evaluation of research results, formulation of research findings, etc. Beyond doubt, knowledge and use of communication and information technologies strengthen research work at each of these stages.

Most of bachelor degree programs offer a course paper at the second year of education. It is a study that requires a student to write about the chosen topic based on survey of scientific sources, literature analysis and reviews. As a result students prepare the text of the course paper in which they generalize in systematic form current scientific information and their understanding of the topic chosen for the study.To fulfill their research projects studentsmust be familiar not only with research concepts, scientific methods which they apply in their studies, but also with new ways of information search. They must have knowledge of ethics for data usage, critical thinking skills, data comparison, confirmation or refutation skills, ability to distinguish between concepts, approaches and opinions.

As for the students of master's degree programs there is a shift in the focus of their training.The primary tasks of education appear to be to developstudents'research competencies: how to learn additional skills, acquire additional knowledge and information, how to presentresearch findings in the forms of articles, reports and presentations with the strong accent on newcommunication and information technologies.

At present the task of the university education is especially complicated. On the one hand, there has been a rapid development of the digital generation of communication and information technologies. On the other, the demands made upon the research competencies of students are increasing and changing rapidly due to the introduction of new generation of Federal Educational Standards.Since the introduction of Federal Educational Standards of the "third" generation the ability to carry out the research work is a core competency for students. Although there are many problems in putting these standards into practice. Moreover,research studies are only one part of the educational process and professional enterprise that scholars and teachers are regularly engaged in. Nevertheless it is critical to strengthen opportunities for developing students' research skillsand provide them with a broad basis for understanding how to use creatively new digital technologies in professional domain.

2. Materials and methods

Our choice of materials and methods has been guided by the views of how new means of digital communication can best serve the development of research competences of future teachers. For this reason we draw attention to the sources that provide theoretical basis and practical

recommendationsfor the development of research skills and competencies of students in a new educational context.

Content analysis is used as a method of research. We analyze works of Russian and English speaking authors that were published during the last decade. Among them are academic writings from such journals as “British Journal of Educational Technology”, British Educational Research Journal”,“Higher Education”, “Philosophy, Sociology and Cultural Science”, “Azimuth of Scientific Research: Pedagogy and Psychology” and others.

Along with the content analysis method, an empirical method of generalizing practical experience of Taganrog Chekhov’s Institute is used.

3. Discussion

Over the past decade, the discussion about the impact of new communication and information technologies and how theyinfluence science, education, industry, and society as a whole has become increasingly complex and controversial. Analysis of modern scientific literature and day to day educational practice proves that the Internet and digital communication technologies significantly changed educational and research activities. Open access to information – the free, immediate, online access to the results of scholarly research, and the possibility to use and re-use those results –transforms the way research and scientific inquiry are conducted. These issues have become the subject of a large literature of monographs, journal articlesand academic materials.

Many authors highlighted the role of research in changing modern society and policy making (Kay, Luckin, 2018; Seldon, Abidoye, 2018; Whitty, 2006 and others). For example, C. Chapman and M. Ainscow raise the issue of the role of research in efforts to address the equity policy challenge (Chapman, Ainscow, 2019). Other authors argue that research can lead to the development of new, context-specific knowledge that can support change processes (Kerr, West, 2010; Mittonet et al, 2007; Starčič, 2019). For education it means that universities have to create such systems that can help students to make better use of research knowledge in their future practice. The most important resource in this sense is the means of multimedia, which helps to establish productive links between science, research, universities, scientists and university students.

A large block of materials on the topic connected with growing use of IT in teaching can be found in English-language sources. Of particular interest to scholars is the ethical side of the use of electronic resources in scientific research. The materials about ethical issues in research work are well developed and well explored (Floridi et al, 2018; Gu, Lai, 2019; Richards, Dignum, 2019). According to Work Programme “Science with and for Society” of European Commission Decision (EC, 2019) the new code of conduct for research **integrity** is unambiguous: "It is of crucial importance that researchers master the knowledge, methodologies and ethical practices associated with their field" (EC, 2019: 12). The programme stresses the necessity to improve educational and training results for responsible conduct of research. And the integrity of research is called a key prerequisite to achieve excellence in research innovation. In the first Council conclusion on research integrity it is indicated that Higher Education Institutions as well as research funding organizations should play an important role in shaping the culture of scientific research.They are expected to "define and implement policies to promote research integrity and to prevent and address research misconduct" (EC, 2019: 13).

Russian and foreign researchers point out that modern communication technologies create a specific context that requires to update methods of education (Krigina, 2009; Edwards et al, 2013; Cuban et al, 2001; Pilkington, 2008), its content (Luckin, Cukurova, 2019; Levin, 2011), role of academics and students (Kovaleva, 2018, Krigina, 2015; Selwyn, 2015) interconnections and contracts between universities, society and economy (Fishman et al, 2013; Jongbloed et al, 2008) in accordance with the necessities of modern digital society. The use of Internet resources has direct implications for the preparation of students to conduct their research work, to focus on critical thinking, reflection and practical reasoning. This is particularly true of university courses on research work.

Scholarly communitynotesa number of benefits and advantages provided by the use of use of new information communication technologies, but they have a strong belief that their inclusion

into the educational process does not necessarily mean that student learningwill be improved. Moreover there is a fear that quantification and autonomous systems provide a new wave of power tools to track and quantify human activity in ever higher resolution (Shum, Luckin, 2019).

Addressing this problem educators try to find answers to different questions: What tools are effective to orchestrate the use of new generation of communication and information technologies in the research teaching? How can the teacher's role be defined? How does the use of IT practices construct teachers' professional identities? What teachers' competences will be needed? It is anticipated that university education will manage to deliver excellent education and research opportunities in diverse settings, ways and forms that are relevant to the productive teaching and learning processes (Baker, Siemens, 2014; Krigina, 2015;Cubbage et al, 2016; Brady et al, 2015). It is therefore essential that more support and scaffolding – such as workshops and peer sharing – are needed to facilitate IT implementation and to ensure its positive effect on teaching and learning (Gu, Lai, 2019).

Thus it is obvious that the use of digital communication technologies in university education offers endless opportunities for the development of the new types of professionalism and research not only for learners but for educators as well.

4. Results

We have found out that the problem of enhancing students' research excellence with the help of the latestcommunication and information technologies in university education is very diverse and multifaceted.

Educators and researchers are struggling with answers to many questions. At practical level educators are expected to gather accurate data about students' problems with their research work, to be cautious in making inferences from these data, to try to use relevant information technologies to increase students' understanding of their research goals, ethical obligations and responsibilities in their research work, and so on.

At this point our own response to these questions can be outlined as follows.

When teaching pedagogical courses for undergraduate program ("Theory of Pedagogy" and "Practical Pedagogy") and for graduate program ("Modern issues of science and education" and "Innovations in education") at Taganrog Chekhov's Institute we pay special attention to the content that we consider as research priorities. In brief, our concern is to train students:

1) tomaster the ways of orientation in professional sources of information by using the possibilities of the information environment (magazines, websites, educational portals, etc.);

2) to select literature on research subject from a variety of sources (including electronic libraries, different journal groups, Russian Index of Science Citation bases (RISC)based on Scientific Electronic Library (elibrary.ru), ResearcherID, Scopus, ORCID, arXiv.org, Ebrary, Google Scholar, etc.);

3) tolearn the ways of work with scientific literature (analyze, generalize, organize, comment, classify, interpret, etc.);

4) tomake use of scientific language in describing pedagogical problems and basic approaches in solving them;

5) todevelop diagnostic techniques for information collection, targeting, forecasting, modelling, design and experimentation in research work;

6) touse theoretical knowledge for the purposes of methodological reflection, i.e. to analyze one's own scientific activities and practical experience on the research problem.

The most important issue for the near future educational process is to bring the concerns of students doing research with the resources represented by new forms of communication and information technologies.

Among potentially important resources for further development of students' research habits are their involvement in research initiatives and grant searching opportunities from both Russian and international sources. In this case a wide variety of national and international digital sources may serve as a basis for informed research and consumership.

5. Conclusion

We have found out that research is essential to the education profession. Research competencies receive greater recognition in the totality of teacher's professionalism. As the

communication and information technologies are increasingly developing they should be used to full advantage to advance these competencies. By this we mean that universities have to lay the basis for giving research a more influential role in education. That's why the content of the courses must be constantly revised to give students acute practical skills in communication and information technologies that can be directly applied to research.

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