DOI: 10.1515/rpp-2016-0008

Postgraduate Student, **IRYNA DEMCHENKO**
A. S. Makarenko State Pedagogical University of Sumy, Ukraine
Address: 87 Romenska St., Sumy, 40002, Ukraine
E-mail: canada-ukraine@meta.ua

FORMING OF FUTURE TEACHERS' ICT-COMPETENCE: CANADIAN EXPERIENCE

ABSTRACT

The article deals with the phenomenon of digital divide in the education in Canada. The domestic and foreign scientific and educational publications have been studied and analyzed. It has been found out that traditional means for training pedagogical specialists are gradually losing their relevance due to lack of educational dialogue between a teacher and a student. Information and communication technologies have entered today's youth everyday life and become an essential means of communication, receiving and transmitting information. Based on the source study, the essence and reasons of digital divide have been revealed. Canadian researchers consider that it is possible to overcome this problem by revising the approach to teacher training which will focus on the forming of future teachers' information and communication competence. Various definitions of the terms "information competence", "ICT competence", "digital literacy", "e-literacy" have been described. The model of ICT competence, its structure and the process of its integration into education have been analyzed. The examples of forming future teachers' ICT competence in universities of Canada have been given. It has been revealed that the problem of effective ICT implementation into educational activities is in the range of many Canadian studies, but in fact the phenomenon of digital divide in education is still topical due to insufficient activity of teachers of pedagogical faculties and students' ignoring the problem. A number of studies have been examined, the authors of which give practical recommendations aimed at enhancing the role of new technologies in teacher training in Canada.

Key words: digital divide, Canadian teacher education, information and communication competence, digital literacy, information and communication technologies, the structure of information and communication competence, the integration of information and communication technologies, the readiness for implementation of information and communication technologies.

INTRODUCTION

"Our students have changed radically. Today's students are no longer the people our educational system was designed to teach".
Marc Prensky

From generation to generation the humanity transmits its knowledge, accumulated through centuries, using various means of communication. Revolutionary for its time was the appearance of written language, printing, and later – media technologies. Today, when information is being updated every minute, the traditional media often lose their relevance and effectiveness. The generation born in the era of digital technology cannot imagine their life without using it.

Despite the priority of the use of information and communication technologies (ICT), the latter have not yet become dominant in modern education. Digital generation, born in 2000s, presupposes the future of states and the whole world and moves away from the older generation. That is why the gap between them is becoming larger and more inevitable. Most often pupils and students use information technologies not for educational purposes, and that is why one of the ways to solve this problem is to overcome the so-called cultural, educational and digital divide between a teacher and a student. This requires from the education to develop a fundamentally new approach that will train teachers as active motivators and organizers of the educational process, where the use of ICT acquires an extensive application.

THE AIM OF THE STUDY

The aim of the paper is to study the Canadian research and educational publications to disclose the peculiarities of forming future teachers' information and communication competence.

THEORETICAL FRAMEWORK AND RESEARCH METHODS

In domestic research and educational literature, the issue of competent approach is studied in the works of such authors as N. Apatova, L. Babenko, V. Bykov, A. Khutorskyi, S. Klepko, O. Lokshina, L. Makarenko, I. Malyska, N. Morze, O. Ovcharuk, L. Parashchenko, O. Pavlenko, O. Pekhota, O. Pometun, O. Savchenko, H. Selevko, O. Spirin et al. The problem of training pedagogical specialists for the competent use of ICT is discussed in the works by O. Anishchenko, L. Basyi, V. Bykov, O. Furman, R. Hurevych, M. Kademiya, L. Kartashova, L. Konoshevskyi, O. Konoshevskyi, N. Morze, O. Padalka, N. Popovych, L. Sobko, M. Zhaldak et al. In Canada the issue of teachers' digital literacy has been revealed at international, national and provincial levels, namely, in works of C. Brett, N. Briffa, J. Duncan, T. Karsenti, T. Laferriere, D. Martinovic, P. Resta, B. Todd, A. Varcoe, Z. Zhang; the studies of Canadian Centre of digital and media literacy MediaSmarts, International Research of Computer and Information Literacy (ICILS 2013); the publications of the Ministry of Education of British Columbia, university studies, etc.

The main methods of our study are the following: analysis, synthesis and comparison of domestic and Canadian scientific and educational literature on the issues of the phenomenon of digital divide in education and its overcoming by creating ICT competence of future teachers.

RESULTS

"Digital divide", "digital inequality", "digital literacy", "digital immigrant", "digital native" and "digital generation": these concepts characterize the present, when information is updated at a furious speed as well as new means of its acquisition, transfer and accumulation appear.

The term "digital divide" was traditionally regarded as an access to computers and the Internet by groups of people with different social, economic, cultural or national levels. But, as T. Laferriere (Canada) and P. Resta (USA) note, in order to achieve digital equality one should not only have access to a computer or network; students need first of all an access to comprehensive, high-quality, culturally relevant content in corresponding language; secondly, they need an access to the creation of digital content and exchange of information; access to teachers who know how to use digital means and resources; access to high quality research of the opportunities of using digital technologies and, as a result, improving the quality of education (Laferriere, Resta, 2006).

M. Prensky claims that in the digital world, children and young people are able to use digital technologies intuitively and easily. Older people – "immigrants" – are not

familiar with the digital world and they must fight or at least catch up with digital natives. Modern students study and reconsider information fundamentally differently than their predecessors. These differences extend farther and deeper than the majority of teachers cannot imagine and understand (Prensky, 2001).

Canadian researcher N. Briffa marks that technologies were originally developed and presented, and then they were used. But the most important step is to use them competently because if to regard it as a learning tool the technology must be implemented as much as possible (Briffa, 2015).

One of the components of a teacher's professional competence is the competence in the sphere of information and communication technologies.

Canada is considered to be one of the most advanced countries in studying the ICT competency (digital literacy) of teachers. It should be mentioned that the country participates in International Computer and Information Literacy Study (ICILS 2013), launched in 2013 by researchers of 20 countries. ICILS 2013 defines computer and information literacy as the personal ability to use a personal computer for research, development and communication for conducting effective activities at home, school, work and society in whole (Labrecque, Dionne, 2013).

The Ministry of Education of British Columbia (Canada) considers digital literacy as interest, attitude and ability of the individual to use competently digital technologies and communication tools for access, management, integration, analysis and evaluation of information, new knowledge construction, creativity and communication aiming at effective activity in the society.

Canadian scholar M. Hoechsmann considers that digital literacy involves a combination of technological capabilities, intellectual competences and ethical and behavioral components. According to the author, digital competence is not a technical category which describes the minimum functional level of technological skills as this concept is much broader and means the ability to function in the society which uses digital communication technologies for the professional activity, public administration, education, culture, home use and recreational sphere (Hoechsmann, DeWaard, 2015).

N. Briffa uses the term "e-literacy", which, in his view, means a responsible use of ICT and consists of technological and traditional competences. Technological competencies include digital literacy, ICT literacy and media literacy. The author calls the traditional competences as "four domains of e-competence": the capability, critical literacy, citizenship and security. The capability is the access to technologies and also knowledge, skills and abilities necessary for dealing with ICT equipment and software. Critical literacy emphasizes and extends critical skills necessary for responsible consumption and creation of content and media using ICT. Being a citizen means inclusion, cooperation and positive communication both in the real world and in the virtual environment. Safety stimulates the creation of warning and preventive measures aimed at protecting ICT users from dangers, characteristic for the online and offline environment (Briffa, 2015).

Canadian Centre of digital and media literacy MediaSmarts suggests "the concept of digital competence", based on three components: skills and ability to use digital tools and applications; the ability for critical understanding of media assets and content; knowledge and experience for the creation of one's own product and communication through digital technologies. The block "use" includes technical skills necessary for dealing with computers and the Internet. The basic technical skills should include the ability to use general and special technologies, software and platforms. The block "understanding"

operates the ability to understand and evaluate digital resources critically and substantially that helps users leverage their knowledge and reduce the risk to obtain the information of poor quality. The block “creativity and communication” provides the ability to create content and share it with the help of digital means; to adapt the created content for various audiences; to create and use effectively Web 2.0 technologies (blogs, forums, social networks, etc.) (Hoechsmann, DeWaard, 2015).

Digital literacy includes the necessary set of competences: technological (knowledge about technologies and the ability to use them), information (the ability to be selective in the consumption of information, know how to find it online, evaluate it critically and apply properly), visual (the ability to understand and create visual messages using objects, actions or symbols), social (the active participation of citizens in the digital environment, regardless of their positive or negative attitude), communication (thinking, organization and relationship with other users of network society and media literacy (the ability to quickly access, analyze, assess new information and create one’s own by using ICT) (Hoechsmann, DeWaard, 2015).

The Ministry of Education of British Columbia has developed a Matrix of integrating the standards of digital literacy that reflects the possibilities of ICT in the learning process: creativity and innovation, communication and collaboration, fluent research information skills, critical thinking, problematic way of teaching, decision-making, digital citizenship, technological operations and concepts. The matrix makes it possible to determine students’ level of digital literacy and to select relevant ICT tools to each standard for their effective implementation into teaching and future professional activity.

A significant number of education faculties in Canada are actively using ICT resources. Thus, on the base of the Faculty of Education at the University in British Columbia there was established the Center of Digital Literacy, which offers students and teachers to attend various events and participate in joint projects, involving innovative technologies aimed at raising the level of ICT competence. One of the objectives of the Centre is to facilitate and encourage students’ and teachers’ scientific studies. ICT tools for the diagnosis contribute to the mending of dialogue, introduction of innovations into scientific, teaching and educational work. Future teachers are offered to participate in conferences on digital literacy, discussions, interactive workshops, which invite well-known domestic and foreign scientists (Ministry of Education of British Columbia, 2010).

The Institute of Education at the University of Toronto has developed a “program” for future and practicing teachers as to competent ICT implementation in training activities. C. Brett offers to determine the tasks of highest priority of studying a certain topic: to gather as much as possible of real-world information about the problem under study to help students effectively generate online queries. It is also necessary to help the participants of the teaching process to navigate the online network for finding information, using special means of ICT for its selection, or choosing “useful” sites in advance; develop the students’ basic abilities of searching necessary sites; “read” URL; know how to find the author of the publication or blog; provide students with the information about educational web-resources (Brett, 2012).

It should be noted that despite a targeted course of higher education of Canada to integrate ICT into the learning process, according to many Canadian researchers (J. April, M. Beaudoin, J. Cornut, G. Dumouchel, H. Fournier, M. Gagnon, P. Giroux, S. Harvey, T. Karsenti, C. Laverty, E. Lee, S. Lefebvre, S. Lessard, J. Loiselle, F. Perreault, B. Reed), the Canadian teaching education only partly meets the needs of the society of ICT-competent qualified teachers.

The students of pedagogical specialties often satisfy their need for information only by “superficial” search in the Internet. Independent learning activities do not have a

clear plan, students rely on a so-called “hit-or-miss” strategy (where hit – means hit the target, miss – not hit the target; this is the so-called trial-and-error method). In addition, the reliability and the ethical component of this search is not a priority. According to the author, less than half of students check whether the information is error-free and most of future teachers do not keep to ethical rules, so the plagiarism phenomenon is common in the professional activity of teachers. The insufficient provision of future Canadian teachers by the program, aimed at improving ICT competence, generates a significant number of Canadian studies of this issue (Karsenti, Dumouchel, Collin, 2014).

Canadian scholars Th. Karsenti, G. Dumouchel and S. Collin studied several alternative decisions to overcome this problem. The scientists propose to increase the number of courses on ICT-competence at Canadian universities. For example, the Faculty of Education at the University of Montreal suggested the following solution: to distribute the course of pedagogical integration of ICT for three years in the curriculum, rather than concentrate it within one term. It allows students to continually develop their competences in the ICT sphere during the major portion of the academic program. In addition, technological competences, and, in particular, those that are necessary for online research, can be assessed as part of entrance examinations for the programs of teacher training (Karsenti, Dumouchel, Collin, 2014).

CONCLUSIONS

Thus, one of the most important demands to education system in the 21st century is to train highly qualified teachers who are capable of learning throughout their whole life using all the arsenal of innovative means of information technologies. ICT-competence is being studied by many domestic and foreign researchers. Canadian scientific and educational literature uses different terms of its identification: digital literacy, information competence, e-competence, ICT-literacy, etc. But the basic definition is the integrated ability of the individual to use information and communication technologies competently and responsibly. We believe that ICT competence should be considered broader than just the ability to operate certain knowledge and skills; it is a complex set of motives, knowledge and skills of a teacher: cognitive, analytical, diagnostic, creative, required for the participants of learning process for the effective co-existence and activity in the information environment.

A teacher who is really ICT-competent is not the one who uses modern gadgets and is registered in social networks. He/she must be a “digital citizen”, understand and follow the rules of using Internet resources. Information and communication competence includes cross-training skills that are used in all academic training programs of Canadian universities. All the teachers, not just those who teach ICT course, must have ICT experience. So, the issue of university teachers training for the effective integration of ICT into teaching process also requires a thorough study and research.

Digital literacy helps the individual fully participate in the process of creating a new system of knowledge that becomes a prerequisite of the worldwide scientific progress. Being ICT-competent, one person can complement the chain of discoveries not only because one has comprehensively studied the issue but also because of promulgating the results of one’s research in the worldwide scientific space.

REFERENCES

1. Brett, C. (2012). *Using Digital Technologies to Support Literacy Instruction across the Curriculum*. Retrieved 12.09.2015 from : <http://oere.oise.utoronto.ca/wp->

content/uploads/2012/11/+Research-for-Teachers-Number-11-Using-Digital-Technologies-to-Support-Literacy-Instruction-Across-the-Curriculum.pdf.

2. Briffa, N. (2015). *E-Literacy Trends in Ontario's 21st Century Education: Successes, Challenges, and Possibilities*. Retrieved 14.01.2016 from : <http://scholar.uwindsor.ca/etd/5471>.

3. Ministry of Education of British Columbia. (2010). *Digital Literacy Standards*. Retrieved 16.12.2015 from : http://www.bced.gov.bc.ca/dist_learning/dig_lit_standards.htm.

4. Duncan, A., Varcoe, J. (2012). *Information Literacy Competency Standards for Students: A Measure of the Effectiveness of Information Literacy Initiatives in Higher Education*. Retrieved 10.09.2015 from : <http://www.nipissingu.ca/departments/presidents-office/Documents/Literacy%20Competency%20Standards%20for%20Students%20A%20Measure%20of%20Effectiveness%20-%20HEQCO.pdf>.

5. Hoechsmann, M, DeWaard, H. (2015). *Mapping Digital Literacy Policy and Practice in the Canadian Education Landscape: MediaSmarts*. Retrieved 22.12.2015 from : <http://mediasmarts.ca/teacher-resources/digital-literacyframework/mapping-digital-literacy-policy-practice-canadian-education-landscape>.

6. Karsenti, T., Dumouchel, G., Collin, S. (2014). *Overview of the Levels of ICT and Information Literacy Skills in Canada's Preservice Teachers*. Retrieved 12.11.2015 from : https://www.academia.edu/9065383/Overview_of_the_levels_of_ICT_and_information_literacy_skills_in_Canada_s_preservice_teachers.

7. Labrecque, M., Dionne, J. (2013). *Preparing for Life in a Digital Age: Results for Ontario and Newfoundland and Labrador*. Retrieved 24.10.2015 from : http://www.cmec.ca/Publications/Lists/Publications/Attachments/340/ICILS2013_CdnReport_EN.pdf.

8. Laferriere, T., Resta, P. (2006). IT and the Digital Divide Section. In : *Proceedings of Society for Information Technology & Teacher Education International Conference* (15.03.2006). Chesapeake, VA : Association for the Advancement of Computing in Education (AACE), pp. 1981–1986.

9. Magliaro, J., Ezeife, A. (2007). Preservice Teachers' Preparedness to Integrate Computer Technology into the Curriculum. *Canadian Journal of Learning and Technology*, Volume 33, No 3, pp. 95–111.

10. Prensky, M. (2001). Digital Natives, Digital Immigrants. *On the Horizon*, Volume 9, No 5, pp. 1–6. Retrieved 12.11.2015 from : <http://www.marcprensky.com/writing/Prensky%20-%20Digital%20Natives,%20Digital%20Immigrants%20-%20Part1.pdf>, DOI: 10.1108/10748120110424816.

11. Todd, B. (2012). *The Digital Divide Within Education Caused by the Internet*. Bachelor thesis, Acadia University, 180 p.

12. Биков, В., Білоус, О., Богачков, Ю. та ін. (2010). *Основи стандартизації інформаційно-комунікаційних компетентностей в системі освіти України : метод. рекомендації* [Fundamentals of Standardization of Information and Communication Competencies in Education of Ukraine: Guidelines]. Київ : Атіка, 88 p. (in Ukrainian).

13. Макаренко, Л. (2007). *Комп'ютерна грамотність як складова професійної підготовки майбутніх учителів початкової школи* [Computer Literacy as a Component of Professional Training of Future Elementary School Teachers]. Abstract of thesis for PhD in Pedagogical Sciences. Педагогічний університет імені М. П. Драгоманова, 22 p. (in Ukrainian).

14. Малицька, І. (2009). ІКТ-грамотність – вимога сучасних систем освіти зарубіжних країн (досвід США) [ICT Literacy – the Requirement of Modern Education

Systems in Foreign Countries (US experience)]. *Інформаційні технології в освіті : збірник наукових праць* [Information Technologies in Education : the Collected Papers], No 4, pp. 243–249 (in Ukrainian).

15. Повова, Ю. (2013). Формування інформаційно-комунікативної компетентності вчителів Великої Британії [Forming of Teachers' Information and Communication Competence in Great Britain]. *Вісник Луганського національного університету імені Тараса Шевченка. Педагогічні науки* [Bulletin of the National Taras Shevchenko Lugansk University. Teaching Science], No 3, pp. 216–221 (in Ukrainian).