

THE USE CLOUD SERVICES WITH STEM-BASED EDUCATION IN GENERAL SCHOOL

The research is devoted to the problems of using cloud services for the organization of STEM-based education in a general school. There is considered the foreign experience of solving the main issues on the implementation of STEM-oriented approach at all levels of education with the help of information and communication technologies.

The purpose of the research is to analyze the foreign experience of using cloud computing services for the organization and implementation of STEM in the educational process of a general school and highlight the main problems arising in this process.

Researchers M. Nikirk (2012) [1], Heidi Sublette (2013) [2], Koutsopoulos K.C. (2015) [3], Vimala Judy Kamalodeen (2017) [4], etc., determine such main problems:

- Using ICT for providing the interactivity of the educational process, for example, to search and present educational resources; creation and application of virtual laboratories, electronic educational games, software, blogs, etc.
- Creation and adaptation cloud services to the needs of STEM-education;
- Continuous development teacher's information and communication competence for their promotion of STEM education through ICT, in particular cloud computing services.

Among the cloud services that provide collaborative learning activities for students and teachers, scientists point out: Microsoft Office 365, Google Docs, Microsoft OneDrive, Padlet, Skype, etc. [4].

Among the cloud services that provide STEM-oriented approach, scientists point out Cloud-based Simulations and Cloud-Based Distributed Network Simulation Environment for students to conduct research, particularly in the STEM industries. For example, such as Google Maps, NetLogo, HubNet, etc. [3].

The problem "development teacher's information and communication competence for their promotion of STEM education through ICT, in particular cloud computing services" researchers offer to decide through the creation of Massive open online courses (MOOC).

For example, European Schoolnet Academy courses (<http://www.europeanschoolnetacademy.eu>) «Boosting a Sense of Initiative and Entrepreneurship in Your Students; «Opening minds to STEM careers», «Opening Schools to STEM Careers», etc. Scientists explain the effectiveness of these courses because of the fact that a large number of teachers from different countries are involved in them, which facilitates the exchange of positive experiences

between them on the use of ICTs, the identification of common educational problems that require discussion and decision, etc.

It is concluded that STEM-education is one of the most important areas of development and reform of education, which is explained by the significant demand of the world labor market for specialists in the STEM industries. To ensure effective implementation of the STEM-oriented approach in the educational process of the general educational institution at all levels of education is the use of information and communication technologies, in particular cloud services.

Key words: *information and communication technologies, teacher's information and communication competence, cloud computing services, general school, STEM-education.*

References:

1. Nikirk, M. Teaching STEM to millennial students. Tech Directions, 2012, 71(7), 13-15. [online]. — Available from: <http://www.omagdigital.com/publication/?i=98503>
2. Heidi Sublette. An effective model of developing teacher leaders in STEM education. A dissertation submitted in partial satisfaction of the requirements for the degree of Doctor of Education in Organizational Leadership. October, 2013 June Schmieder-Ramirez, Ph.D. – Published by ProQuest LLC (2013). 177 p. [online]. — Available from: <https://search.proquest.com/openview/3bc3018bb4000c7c84e8bd3ac2ed9cfd/1?pq-origsite=gscholar&cbl=18750&diss=y>
3. Koutsopoulos K.C. School on the Cloud: Connecting for Digital Citizenship. European Commission: Lifelong Learning Program - ICT Key Action 3 European Project. 2015. – 126 p. [online]. — Available from: <http://www.schoolonthecloud.net/outputs04>.
4. Vimala Judy Kamalodeen, Sandra Figaro-Henry, Nalini Ramsawak-Jodha and Zhanna Dedovets. The Development of Teacher ICT competence and confidence in using Web 2.0 tools in a STEM professional development initiative in Trinidad/ Caribbean Teaching Scholar-Vol. 7, April 2017, 25–46 [online]. — Available from: <https://www.researchgate.net/publication/316678345>.