Use of MOOC for ICT Digital Competences

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Abstract

Information and communication technology has improved access to information. Therefore, we have to ensure that students either teachers have a good Digital Skills. This paper show the situation of e-learning in Republic of Moldova and the heading project developed by "Ion Creangă" Pedagogical State University to launch a MOOC Course using the Technological Pedagogical Content Knowledge (**TPACK**) framework.

1. Theoretical Framework

Information and communication technology has improved access to information. Online courses enhance learning through short videos, self-assessments, discussion forums and networks (Glance, 2013). Massive Open Online Courses (MOOCs) are a new way of online education that includes virtual interaction, feedback, discussions, evaluations and certificates. The MOOCs are massive, so they facilitate access to education through information and network technology (Grover, 2013). In other words, MOOCs allow a lot more individuals to participate in learning activities and they have the potential of improving the quality of the learning experience at the same time. Due to their characteristics MOOCs can be a good tool for developing digital competences (Rivera, 2015).

To achieve the best result with online methodology (such as MOOC), we have to ensure that students either teachers have a good Digital Skills. **Digital skills** are an important element in the educational environment, their development and integration should be a priority in order to address modern society demands (Rivera, 2015). Van Dijk (2013) describe the concept of "digital skills" as a succession of several types of skill. The author divides digital skills into six categories: *medium-related*: operational skills and formal skills; *content-related:* information skills, communication skills, strategic skills and content-creation skills. But, in Van Dijk's opinion is that "the operational skills" are the most basic skill, the capacities to work with hardware and software. This skills have acquired much attention in the literature and in public opinion. The popular view is that skills problems are solved when these skills are mastered.

Also, **Digital literacy** is important because it is the underpinning influence that sustains an individual´s competent and purposeful use of digital technology in education, in the workplace and in the daily activities (Wan Ng, 2015). The European Information Society (Wan Ng, 2015, p. 128) give the following definition:

"Digital Literacy is the awareness, attitude and ability of individuals to appropriately use digital tools and facilities to identify, access, manage, integrate, evaluate, analyze and synthesize digital resources, construct new knowledge, create media expressions, and communicate with

others, in the context of specific life situations, in order to enable constructive social action; and to reflect upon this process."

The American Library Association´s digital task force (Edweek.org, 2016) claimed that "Digital Literacy is the ability to use information and communication technologies to find, evaluate, create, and communicate information, requiring both cognitive and technical skills". Therefore, digital literacy principles and practices must be taken into account to create better content suitable for students with different needs and abilities with technology.

There are other similar approaches of Digital Literacy using online courses, but no MOOC. This is the case of C2I in Tunisia (Daouas, 2012). In countries as New Zealand, Hong Kong, Scotland, Finland and Norway, concepts such as the "information society" and the "knowledge society" have been used by policymakers to argue the need to implement "new technologies" into educational practice, and Digital Literacy has been nominated as a key area of competence in school curriculum statements (Sefton-Green, 2009).

Indeed, we will focus on MOOC due to the following features:

It is Massive, so we can achieve a large student population participation with different skills and needs.

It is Open – so we can offer this course to a wider community. In our case, we are interested in those people who speak Romanian as a native language.

It is Online – so we can follow as you need without mobility barriers, and

it is a Course – so we can evaluate the progress of student with our methodological approach.

The term MOOC was coined in 2008 by Dave Cormier of the University of Prince Edward Island. The Connectivism and Connective Knowledge course (CCK08), led by George Siemens and Stephen Downes was the first to incorporate open learning with distributed content, making it the first true MOOC (Parr, 2015). MOOCs courses have enrolled millions of users. The Class Central (Shah, 2017) relates 81 millions learners (see Figure 1) registered at more than 800 universities in about 9400 MOOC courses, but the rate of those who in reality complete the courses is low, circa 10%.

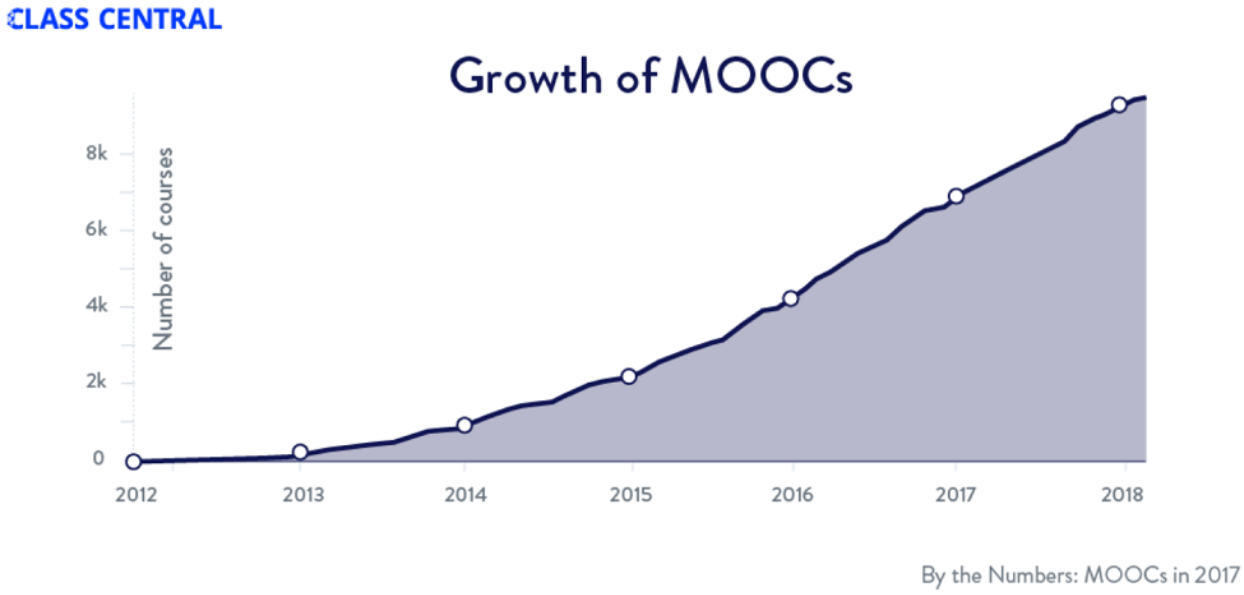

Figure 1. Growth of MOOCs. https://www.class-central.com/moocs-year-in-review-2017

The success of Massive Open Online Courses has stimulated teachers and universities to change the teaching methodologies due to the ability to create online contents for wider student communities (Gea, 2014). These courses are grouped in the following platforms: Coursera, EdX and Udacity (Yousef, 2014), and most of the courses are in English, MiriadaX for Spanish speakers (Annex1, 2), Fun MOOC (France Université Numérique) (Annex1, 9), MOOC Francophone for French speakers (Annex1, 4), Open HPI (Hasso-Plattner-Institut) for German speakers (Annex1, 5), Eduopen for Italian speakers (Annex1, 1), MOOC România (Annex1, 3), UniCampus for Romanian speakers (Annex1, 7), UchiNovoe (Учи Новое) (Annex1, 6), Universarium (Универсариум) for Russian speakers (Annex1, 8), etc.

The education offers for professional development provided by the Moldova higher education institutions are mostly traditional: face-to-face training sessions/courses for several weeks or during weekends, workshops and seminars. There are also some providers that deliver blended courses, namely a mixture of traditional sessions and e-courses. So the MOOC proposal might be a challenge for teachers in Republic of Moldova, and a good experience to increase digital skills for students.

2. E-learning trends in Republic of Moldova

As we progress into the 21st century, our work focuses on preparing teachers and students for success in work, life, knowledge based, technology-rich, changing quickly the world in which they live. This task requires to make connections between the needs for teachers and students´ digital skills development promoting MOOCs and digital literacy in education. In the case of Republic of Moldova, the MOOCs movement is at the very early stage: the concept of MOOCs is new for teachers and students, the level of awareness on availability and usage of MOOCs is quite low among them.

For this reason, “Ion Creangă” State Pedagogical University has launched a project “Teachers’ Continuous Professional Training through Development of Massive Open Online Courses (MOOCs)” (Dumbraveanu, 2017) conceived within the bilateral program of collaboration with West University from Timisoara, Romania. The goal of promoting MOOC was to increase the digital literacy, focusing on the needs of Moldova teachers and students as a means for the accomplishment of continuous professional development requirements. The initiative to elaborate a pilot MOOC intended for teachers, as a premiere for Moldova, has the ambition to investigate the challenges and at the same time to mitigate the risks related with delivering MOOCs for the professional development (Dumbraveanu, 2017).

There are many challenges that influence the students’ learning, personal attitudes and character building being online frequently. But, how effectively they learn with online materials depends on how well they can look for information and how well they can evaluate the trustworthiness and accuracy of the resources and use them ethically to re-synthesize new content (Wan Ng, 2015). A student with a high domain knowledge and web-search expertise would select more relevant information and would not spend more time on evaluating the trustworthiness of the materials. These different learning styles (Advanogy.com, 2004) makes that teachers support and help their students to search effectively on the web because it is an important part of developing their digital literacy. The aims is to enhance digital literacy competences both among teachers and students as well as among adults by this mutual collaborations. Being digitally literate maybe ensures that the teachers and students understand about privacy, security and cyber-safety. Still,

digital literacy courses addressing adults usually face several problems due to the lack of common backgrounds and purposes among learners (Delfino).

In the national strategy for information society development “Digital Moldova 2020”, it was stipulated that Republic of Moldova faces with increasing ICT skills gap and with a low level of digital literacy. ... Since a large part of population does not possess the necessary learning traits, knowledge and digital skills throughout their lives, that have become nowadays something ordinary for many countries population, it reduces the opportunities to participate in the global digital economy”(Strategy “Digital Moldova 2020”, 2012). So, this approach follows the recommendations of the Moldavian Education.

This report claims that Digital literacy of the population starts from the general education system and mainly due to:

- Curriculum adjusted to the needs of society;
- Well trained teaching staff;
- Integration of information technology in the didactic process.

These recommendations agree with Union European priorities for improving teacher quality and teacher education, recalling the need to improve teachers competences. The area in which teachers need continuous professional development concerns knowledge of taught subjects, pedagogical skills, digital skills, research, innovation, collaboration, continuous learning (Dumbraveanu, 2017).

3. Methodological approach

Moldovan teachers may have to enhance their digital skills but some difficulties arises: no enough time to improve their knowledge with new technologies, few suitable learning contents available and also funding to do it. In this case, MOOC course may be a reasonable solution to fulfill some of these requirements.

According to Fyle (2013), the continuing professional development of teachers can be categorized into teachers who already have a teaching qualification but need upgrading, teachers who need reorientation education due to curriculum change, and teachers who seek career development. Teachers can take a MOOC for different reasons, not especially for completing and getting certification. The teachers’ reasons, goals and motivations should be found out through a questionnaire before the elaboration of the MOOC, or at the registration stage with the purpose to make course adjustments for the future.

A questionnaire was distributed online with the purpose to investigate the teachers’ opinions about the digital online courses and to make conclusions about their readiness for MOOC. Around 1300 teachers from Romania and 440 teachers from Republic of Moldova answered the survey questions. The word MOOC did not appear in the text of questions, as this term is quite new for teachers, instead the term online course was used (Dumbraveanu, 2017).

The analysis of the answers showed that about 90% of the respondents intend to learn something new or to update their knowledge in the near future, therefore they seek for continuous professional development. Around 75% are eager to be enrolled in the online courses for accomplishing the mentioned intentions. The most interested and demanded topics selected by teachers from the proposed areas were ICT tools in education, education software and specific

applications with practical examples (ICT area); subject didactic and learning & assessment strategies (pedagogical area) (Dumbraveanu, 2017).

This MOOC pilot in fact is a combination of cMOOC and xMOOC (Downes, 2008). We consider that there should not be strict delimitation in the type of offered MOOC. In reality in traditional classes the teacher follows in an interchangeable way the connectivity learning theories (used mostly in xMOOCs) and the behaviorist ones (used mostly in cMOOCs).

We provide a rich array of resources so that participants can personalize their experience by identifying their own goals, selecting the resources and deciding whether, when, and how could use and implement them. This freedom addresses the most creative and enthusiastic participants, to engage them in further activities for their own classroom learning environment. Through the use of case studies, classroom and school related projects as learning activities the teachers become involved in job-connected teaching and learning situation, another strong reason described by Light & Polin (2010) as good asset for digital skills development via MOOCs.

The mission of the implementation MOOCs in Republic of Moldova is to advance the quality of teaching and learning by:

- Maintaining high and rigorous standards professional and digital competences for what accomplished teachers should know and be able to do;
- Sharing educational tools and software, and
- Providing a national system certifying teachers who meet these standards.

The challenge for the project team as MOOC designers was to select and to structure a coherent, well-balanced set of topics to transpose all the described principles providing at the same time the needed flexibility to address the different goals, contexts, roles, prior knowledge and learning preferences of the participants. For the course "Web 2.0 tools in education" we found a lot of web resources and a MOOC "Powerful Tools for Teaching and Learning: Web 2.0 Tools" delivered by Houston University on Coursera platform (Coursera MOOC). We found this Coursera MOOC after the designing of the structure and scenario for the pilot course. The topics of our MOOC are different; nevertheless, we were inspired from the Coursera MOOC as regarding the methodology of describing the topics and especially on the final research project. The Web 2.0 teaching tools are not magical, but they can bring real benefits in classrooms if harnessed at their potential power. The use of Web 2.0 tools to support education is quite important. The adequate use of these tools is going to make an essential contribution in the students' achievements and in the development of 21st century digital teacher skills.

Creating MOOC courses was based on The Education Code of the Republic of Moldova (2014), Standards for professional competences for school teachers (2016) and Standards for digital skills for school teachers (2015). Also, we were inspired from the National Board for Professional Teaching Standards (NBPTS)(2016). NBPTS standards are based on "Five Core Propositions" for teaching, which are (NBPTS, 2016):

- Teachers are committed to students and their learning (Teachers recognize individual differences in their students and adjust their practice accordingly; understand how students develop and learn; treat students equitably; know their mission transcends the cognitive development of their students.);
- Teachers know the subjects they teach and how to teach those subjects to students (Teachers appreciate how knowledge in their subjects is created, organized, and linked to other

disciplines; control specialized knowledge of how to convey a subject to students; generate multiple paths to knowledge.);

- Teachers are responsible for managing and monitoring student learning (Teachers use a variety of methods to accomplish their instructive objectives; support student learning in settings and varied groups; assess students' progress; involve students in the learning process.);
- Teachers think systematically about their practice and learn from experience (Teachers make difficult choices that test their professional judgment; use feedback and research to improve their practice and positively impact student learning.);
- Teachers are members of learning communities (Teachers collaborate with other professionals to improve school effectiveness; work collaboratively with families; work collaboratively with the community.).

To achieve this goal, we propose to develop new digital practices (Mishra and Koehler's, 2006) by using the Technological Pedagogical Content Knowledge (**TPACK**) framework (see Figure 2). According to Koehler (2009) the outcome of TPACK is to "identify the nature of knowledge required by teachers for technology integration in their teaching, while addressing the complex, multifaceted and situated nature of teacher knowledge". The TPACK framework extends Shulman's idea of Pedagogical Content Knowledge providing a valuable tool for teachers to help them navigate through new digital literacy landscape as part of a professional learning community. As we can observe, effective teaching requires the ability to integrate content, pedagogy and technology flexibly during the act of teaching.

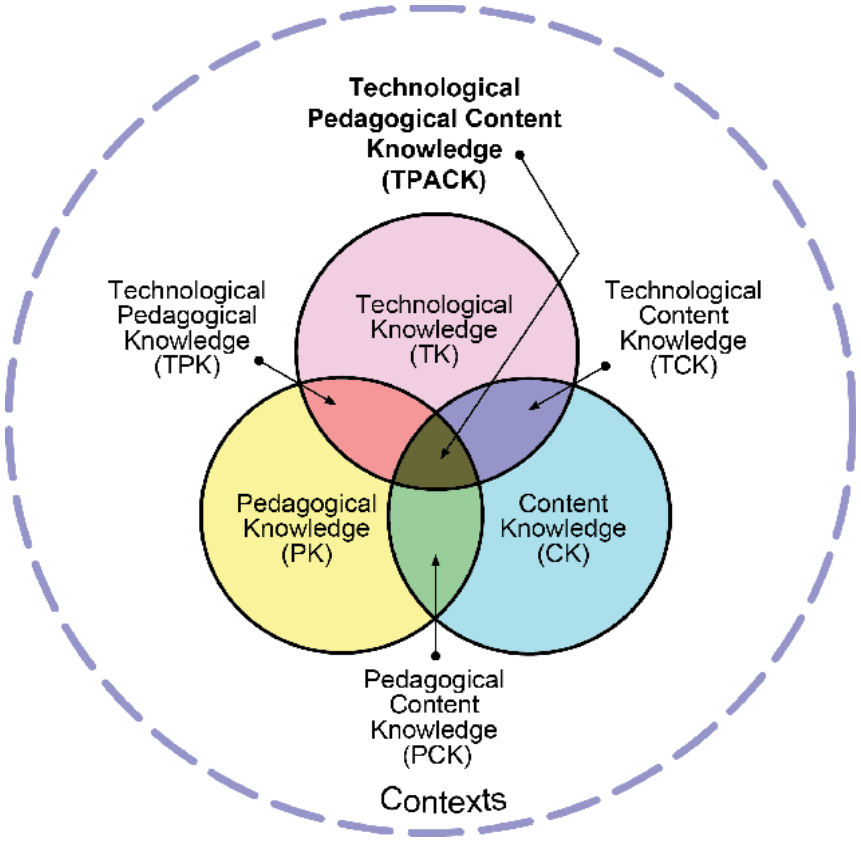

Figure 2. Mishra and Koehler's (2006) technological pedagogical content knowledge (TPACK). http://tpack.org/

At the heart of the TPACK framework, is the complex interplay of three primary forms of knowledge: Content Knowledge (the teachers' knowledge about the subject matter to be learned or taught), Pedagogy Knowledge (the teachers' deep knowledge about the processes and practices or methods of teaching and learning), and Technology Knowledge (the knowledge about certain ways of thinking about, and working with technology, tools and resources). The TPACK approach goes beyond seeing these three knowledge bases in isolation. The TPACK framework goes further by emphasizing the kinds of knowledge that lie at the intersections between three primary forms: Pedagogical Content Knowledge (it is applicable to the teaching of specific content), Technological Content Knowledge (to understand the manner in which technology and content influence and constrain one another), Technological Pedagogical Knowledge (to understand how teaching and learning can change when particular technologies are used in particular ways), and Technological Pedagogical Content Knowledge. Underlying truly meaningful and deeply skilled teaching with technology, TPACK is different from knowledge of all three concepts individually. Matthew Koehler and Punya Mishra expand upon this in much more detail on their site http://tpack.org.

Why is it good to use the TPACK? Here are some recommendations:

- It allows you to create a learning and sharing culture in which there are opportunities to develop your technological abilities;
- Provides students with the opportunity to demonstrate their digital skills;
- It does not allow technology to dictate learning, but combines it with pedagogy and knowledge about content;
- Provides the opportunity for teachers to collaborate to discuss the developments they have encountered using technology;
- It helps build a set of basic applications that the entire teaching staff can use.

Now we are in the process of developing the course with such criteria. We expect that the MOOC course will be finished on September to evaluate the process during next semester.

4. Conclusion

This paper focuses on the digital skills learning in the Republic of Moldova. Therefore, we identified that it is necessary to improve the digital literacy to students and also teachers. And we concluded proposing a MOOC course that fits this needs using a novel methodological approach called TPACK. We are in the beginning of this study, but the expectations are promising to achieve better results in such direction. We are also interested to exchange experiences with other colleagues with similar needs to enrich this project with international collaborations.

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Annex 1

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