II. THEORETICAL AND METHODOLOGICAL ASPECTS OF DISTANCE LEARNING

SOME METHODOLOGICAL ASPECTS OF MOOCS DEVELOPING

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Abstract: The authors of this article conducted analyses of some methodological aspects of MOOCs developing, such as microlearning, subscription learning, peer assessment as well as presenting and analysing the research outcomes, research results of a survey conducted among students of several countries within the framework of the European Union project IRNet (www.irnet.us.edu.pl), limitations and future research.

Keywords: MOOCs, microlearning, subscription learning, peer assessment, IRNet

INTRODUCTION

Because the design of educational interventions is typically carried out in an iterative cycle, this method is also recommended for the development of a MOOC. A design methodology can support this. An example is the ADDIE model, an educational development programme consisting of five phases: analysis, design, development, implementation and evaluation (Bates, 2015).

Quality remains a major concern for all concerned stakeholders: HEIs, government agencies, students and MOOC providers. The successful uptake of online courses, including MOOCs, in developing countries largely depends on the development of effective quality assurance processes that are informed by explicit indicators and clear methodology to ensure the course quality and thus provide a meaningful learning experience to each and every learner. (Patru, Balaji, 2016).

The article presents the conception of the MOOC entitled: "ICT-tools for e-learning", developed within the framework of the European IRNet project. Chapter I includes some methodological aspects of MOOCs developing, based in particular on such methods as *microlearning, subscription learning*, *peer assessment.* Besides, the study includes a comparison of the structure of DLC and MOOC. Chapter II and III contains the case study – authors project of MOOC and some research results..

I.   SOME   METHODOLOGICAL   ASPECTS   OF   MOOCS DEVELOPING

The researchers, having analysed background research and their own experience, stressed: "The development of a MOOC can occur iteratively between different runs of the MOOC, but one can also choose either a slower pace (improvement after a few MOOC runs) or a faster pace (improvement as part of the MOOC run itself). It is essential to start with analysing the context, conceptualising the design, and setting goals — determining why the MOOC is being developed and for whom (from a user's point of view and from the institutional and societal points of view). Then, the iteration cycle should be designed right from the start (including instruments for continuous analysis and evaluation)". (Patru, Balaji, 2016: 53)

This and other development cycles can be applied at different levels of granularity (e.g., learning activity, module, course or programme). For the learning design cycle as a whole, and at each level of granularity, there are common concepts for which services can be delivered to enhance and support the different development phases of MOOCs. The Larnaca Declaration on Learning Design (Dalziel et al., 2013) provides an excellent overview of these common concepts (Patru, Balaji, 2016).

Methodology of a MOOC's design

As stressed by Spanish researchers: „The development of a MOOC involves the implementation of a complex process of planning, design and development. This process requires the participation of different professionals and work areas. The efficiency of the production system needs to establish specific methodologies. These should address the specific characteristics of the context of development, and they must combine strategies and techniques from different areas: instructional design, audiovisual production and multimedia development." (Barrio, Fernandez, Garcia, 2017: p. 183). In own study Olazabalaga, Garrido, Ruiz (2016) analysed the Trends and Methodologies in area research on MOOCs. K.Gurba (2015) described the MOOC history and future. In A.M.F.Yousef et al. (2014) presented an

empirical examination of criteria to assure design quality of MOOCs, 29 criteria were identified to measure the instructional design and assessment categories which represented the pedagogical dimension. T. Daradoumis, R. Bassi, F. Xhafa, S. Caballe (2013) focuses on th review on massive e-learning (mooc) design, delivery and assessment. In the article prepared by international team of authors (Smyrnova-Trybulska et al, 2016) was described some *Theoretical and Practical Aspects: Comparison of Selected Research Results: Poland, Russia, Ukraine, and Australia on MOOCs.*

Microlearning

We could stress that Microlearning can be regarded as a one of the more effective methods in MOOCs. According to Hug (2005: 4) "The following dimensions can be used to describe or design microlearning activities:

- Time: relatively short effort, operating expense, degree of time consumption, measurable time, subjective time, etc.

- Content: small or very small units, narrow topics, rather simple issues, etc.

- Curriculum: small part of curricular setting, parts of modules, elements of informal learning, etc.

- Form: fragments, facets, episodes, "knowledge nuggets", skill elements, etc.

- Process: separate, concomitant or actual, situated or integrated activities, iterative method, attention management, awareness (getting into or being in a process), etc.

- Mediality: print media, electronic media, mono-media vs. multi-media, (inter-)mediated forms, etc.

- Learning type: repetitive, activist, reflective, pragmatist, conceptualist, constructivist, connectivist, behaviourist; also: action learning, classroom learning, corporate learning, etc". (Hug 2005: 4)

John Eades (2015) in particular notes that "Now that we agree Microlearning is where training is headed, the next most important thing to consider is the medium you choose to deliver your content" and described 3 Reasons Why Video Is The Best Medium For Microlearning:

1. **"Alignment.** 75% of Millennials visit YouTube monthly. Millennials coincidentally are going to make up 75% of the workforce by 2025. But they aren't alone. Regardless of age, people simply prefer video over other mediums. According to Neilson, video is the most popular content consumed globally. Think about it; if given a choice between watching an instructional video and reading a 3 page document, which would you choose?

2. **Retention and Transfer of Knowledge.** Video is the most effective medium for communicating information in a short period of time. Most people are visual learners, so combining visual examples with audio creates a higher likelihood

of knowledge transfer. Studies show that humans only retain 10% of heard information after 3 days Vs 65% when visuals are added.

3. **Easily Produced.** Because of the advances in cameras and software, video is the easiest and cheapest to produce than it's ever been. Check out this one minute video we built using an iPhone and the Splice App to show how we make Microlearning. It no longer takes an expert in video production to produce high-quality video that people want to consume." (John Eades (2015)

Subscription learning characteristics:

- "Learners subscribe or are subscribed to a series ("threads") of short informational interactions ("nuggets").

- Interactions usually last less than five or ten minutes.

- Learners usually receive these nuggets through some form of push technology.

- Subscription-learning threads are usually—and preferably—designed using the scientific find known as the spacing effect." (Thalheimer, 2013).

Besides, "the experience of those countries using complementary methodologies such as *peer assessment,* portfolios, individual learning and/or school assessment plans, and project-based assessment should be further examined and built upon." (Official Journal of the European Union 2010)

The importance of this category was stressed by a lot of researchers from different countries: Hoi K. Suen (2014), who noted that: "The teach-learn-assess cycle in education is broken in a typical massive open online course (MOOC). Without formative assessment and feedback, MOOCs amount to an information dump or broadcasting shows, not educational experiences. A number of remedies have been attempted to bring formative assessment back into MOOCs, each with its own limits and problems. The most widely applicable approach for all MOOCs to date is to use *peer assessment* to provide the necessary feedback."

The pedagogical strategies and technologies for peer assessment in Massive Open Online Courses (MOOCs) analysed in his own study Robert O'Toole (2013)

This and other contemporary methods were used in elaborating a MOOC entitled: "ICT-tools for e-learning", developed within the framework of the European IRNet project.

Figure 1 below shows the structure of one of the MOOC's Modules and Table 1 presents „The Comparison of the structure of a DLC and a MOOC".
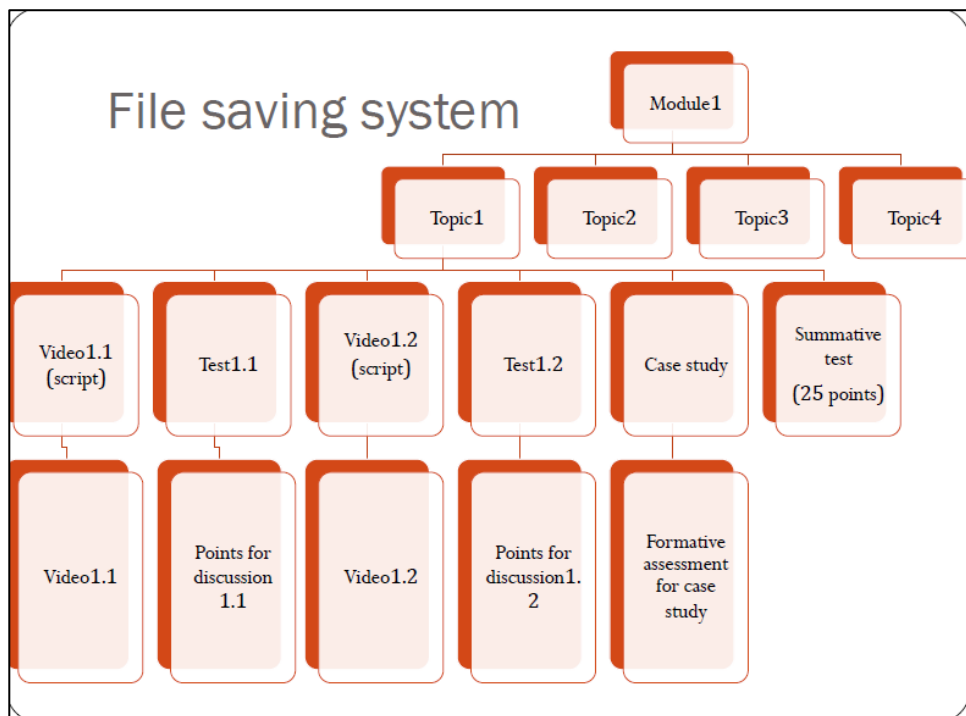
Figure 1. Methodology of MOOCs design
Source*: Own research*

Table 1.

Comparison of the structure of a DLC and a MOOC

Detailed structure of an Internet-based distance course	MOOC: Module study scheme
Introduction	Module study scheme
• Course description: goals, objectives, registration procedures, course structure, skills and knowledge (both in terms of IT and course subject matter) required prior to taking the course and upon its completion, information on documents, assignments required to obtain credit for the course (text or html documents).	•Video, Points for discussion+ Individual tasks (Interactive tasks) +Self-assessment test – no points

•video Points for discussion+ Individual tasks (Interactive tasks) +Self-assessment test – no points

•Presentation on the topic

•Lecture notes

•Selected bibliography

•Additional bibliography |
| • Reading list: core reading, additional reading, Internet resources (a listing of recommended core and additional sources with which participants need to | |

familiarize themselves during the course – a text, PDF or html document).

- Glossary of terms containing basic concepts and key terms related to the course topics (types of dictionary: Encyclopaedias', ordinary Glossaries, FAQ's, etc.).

- Forum, a course feature facilitating discussion on a given course (News Forum, Discussion Forum).

- Participant registration survey designed to collect information on the profile of potential students, contains questions relating to various issues (Survey, Questionnaire).

Thematic Modules N (1<N<10):

- *Pre-test (a diagnostic test)* (*a package of quizzes (tests) designed to gauge participant knowledge of the course material*)*.*

- *Core didactic materials* for a given course subject area (*Lessons (didactic materials and self-testing quiz), Glossaries, Encyclopaedias, links , files (text files, PDF, audio files, video files, multimedia presentations, others.*

- *Package of tasks* designed to help participants assimilate material, to help the instructor check student understanding of the material, to consolidate and apply the knowledge.

- *Checking students' knowledge* (*Lessons, Glossaries, Encyclopaedias, reference links to Internet resources, files stored in folders (text files, PDF, audio files, video files, multimedia presentations, other material)*

• Graded test

Topic 1

•video Points for discussion+ Individual tasks (Interactive tasks) +Self-assessment test – no points

•video Points for discussion+ Individual tasks (Interactive tasks) +Self-assessment test – no points

•Presentation on the topic

•Lecture notes

•Selected bibliography

•Additional bibliography

•Graded test

Topic 2

....

   Summative test

- *Creative tasks block* designed to help the student to work independently to assimilate knowledge, skills and to develop ways to solve specific problems, to complete individual projects; practical tasks (individual and group ones) (*Assignments (various types: Advanced uploading of files, Online text, Upload a single file, Offline activity), Journals, Workshops, Forums, AudioRecorder, WIKI, etc.)*

- *Interactive communication feature,* *enabling students to communicate with one another and with instructors synchronously (Chat, instant messaging software (Skype, NetMeeting, Gadu-Gadu, Yahoo Messenger, ICQ, etc.), and asynchronously (Forum, E-mail, Internal Messaging System, etc.)*

- *Additional reference material for a given subject area* (*Lessons, Glossaries, Encyclopaedias, reference links to Internet resources, files stored in folders (text files, PDF, audio files, video files, multimedia presentations, other material)*

- *Checking students' knowledge* (Test quiz) *(Quiz, Hot Potatoes Quiz)*

  Conclusion module (Conclusion of the course)

- *Examination designed to test* (*Quiz*).

- *Final evaluation survey* (*Survey, Questionnaire*).

- *Self-reflective survey* (*Survey, Questionnaire*) (Smyrnova-Trybulska, 2009)

Source: *Own research*

II. CASE STUDY

The structure of the course "ICT-tools for e-learning", elaborated within the framework of the IRNet Project includes:

Introduction.

1. **ICT-tools for presentation of multimedia content and tools for making didactic videos (Figure 2, 3)**

   - Preview of Analysing Tools for presentation of content.
   - Comparison and evaluating of Tools for presentation of content.
   - Developing of the practical skills of use Tools for presentation of content in education.
   - Preview of Analysing Tools for making didactic video**s**.
   - Comparison and evaluating of Tools for making didactic video**s**.
   - Developing of the practical skills of use Tools for making didactic video**s**.

2. **Tools for adaptive learning. Learning Styles**

   - Cognitive domain.
   - Psychomotor domain.
   - Affective domain.

3. **Tools for mind maps and infographics knowledge**

   - Preview of Analysing Tools for mind maps and infographics knowledge.
   - Comparison and evaluating of Tools for mind maps and infographics knowledge.
   - Developing of the practical skills of use Tools for mind maps and infographics knowledge.

4. **Gamification in education)**

   - Learn what game elements are used in gamification of learning process
   - Learn about types of gamification
   - Learn about motivation and techniques for improving knowledge
   - Learn about different types of games

5. **Tools for communication and collaboration (Figure 4)**

The topic applies to:

   - University faculty and management, teachers, professionals, MSc students who want to use ICT tools for collaboration in education online and in blended learning, privately or as part of an educational institution or company;
   - General public, keen on getting familiar with blended learning and to implement it in their educational institution;

6. **Tools for formative assessment and control (Figure 5)**

- Preview of analysis of ICT tools for formative assessment and control.
- Comparison and evaluation of ICT tools for formative assessment and control.
- Developing of the practical skills of use of ICT tools for formative assessment and control.

7. **Digital Storytelling**

- Preview of Analysing Tools for Storytelling.
- Comparison and evaluation of Tools for Storytelling.
- Developing of practical skills of using Storytelling Tools.
- Previous tasks for testing in real scenarios.

8. **ICT-tools for developing Intercultural competences in e-learning**

- Preview of Analysing ICT-tools for developing Intercultural competences in e-learning
- Comparison and evaluating of ICT-tools for developing Intercultural competences in e-learning
- Developing of the practical skills of use ICT-tools for developing Intercultural competences in e-learning.

9. **Social Presence and online tutoring**

- To define online tutoring and its methodology.
- To outline clusters of ICT tools applied for the purposes of online tutoring.
- To define the role and functions of social media in the context of online tutoring,
- To provide recommendations on enhancing interactivity and social presence in online tutoring,
- To outline competences required for online tutors.

10. **ICT Tools for Teaching Students with Special Needs**

- To outline the learning problems students with visual impairment/hearing loss experience in the classroom;
- To define ICT tools designed for the students with special needs, their availability, characteristics, specifics of implementation in the classroom, etc.;
- To analyse practices and ways how commonly available ICT tools can be adjusted to the needs of special learners;
- To provide recommendations to the teachers on special methods of teaching students with visual impairment / hearing loss placed in the classroom with the students with normalised abilities applying specially designed ICT tools;
- To discuss practices of experts in teaching students with special needs and ways of facilitating their teaching with ICT tools
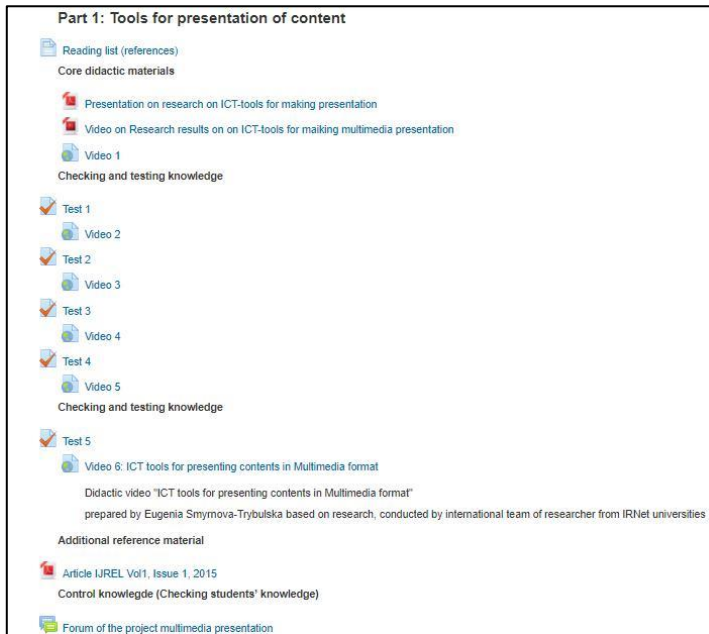
Figure 2. Copy screen of the part of Module ICT-tools for presentation of multimedia content
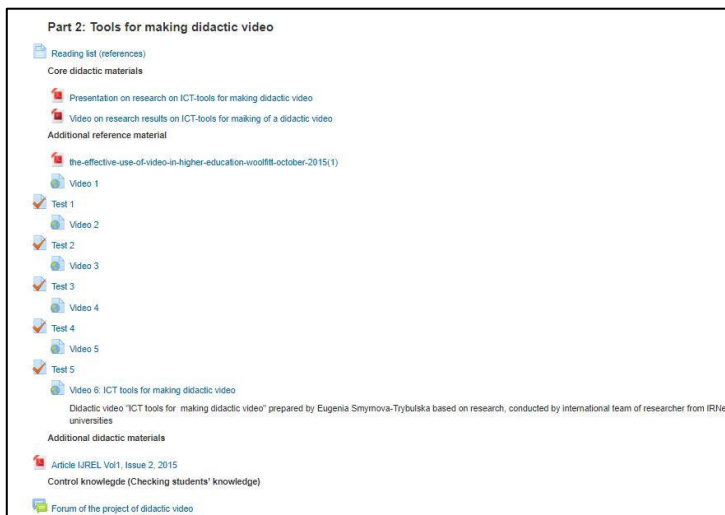
Source: *Own Work, http://el.us.edu.pl/irnet*

Figure 3. Copy screen of the part of Module ICT-tools for making didactic videos

Source: *Own Work, http://el.us.edu.pl/irnet*
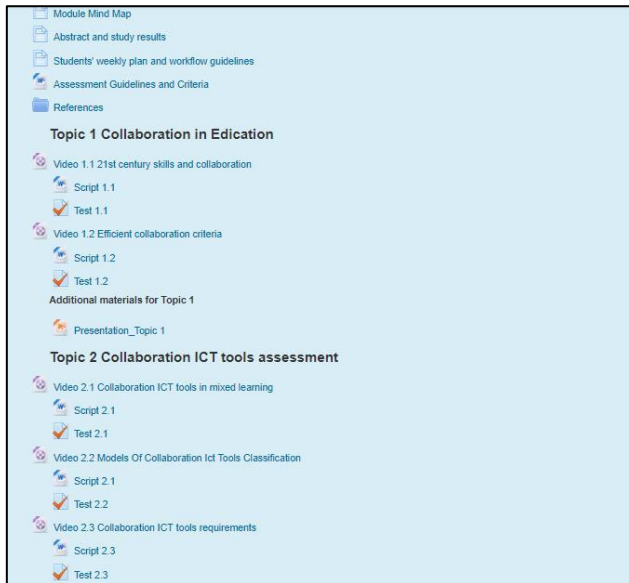
Figure 4. Copy screen of the part of Module Tools for communication and collaboration

Source*: Own Work, http://el.us.edu.pl/irnet*
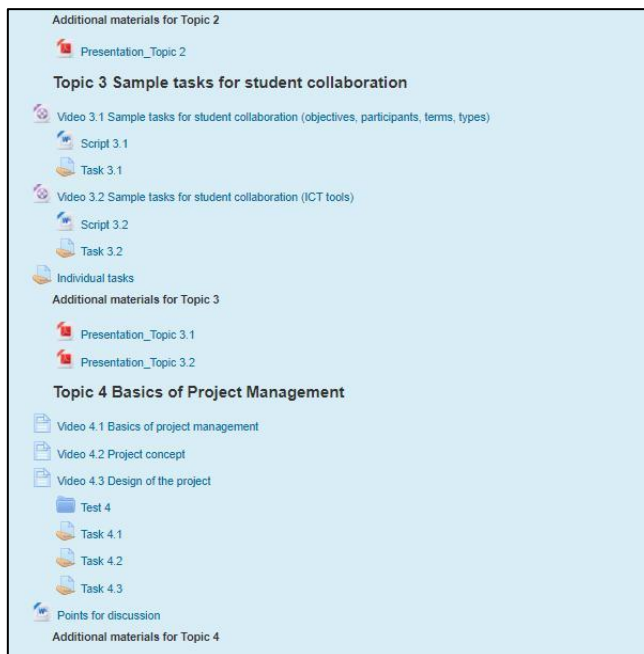
Figure 5. Copy screen of the part of Module Tools for communication and collaboration

Source*: Own Work, http://el.us.edu.pl/irnet*
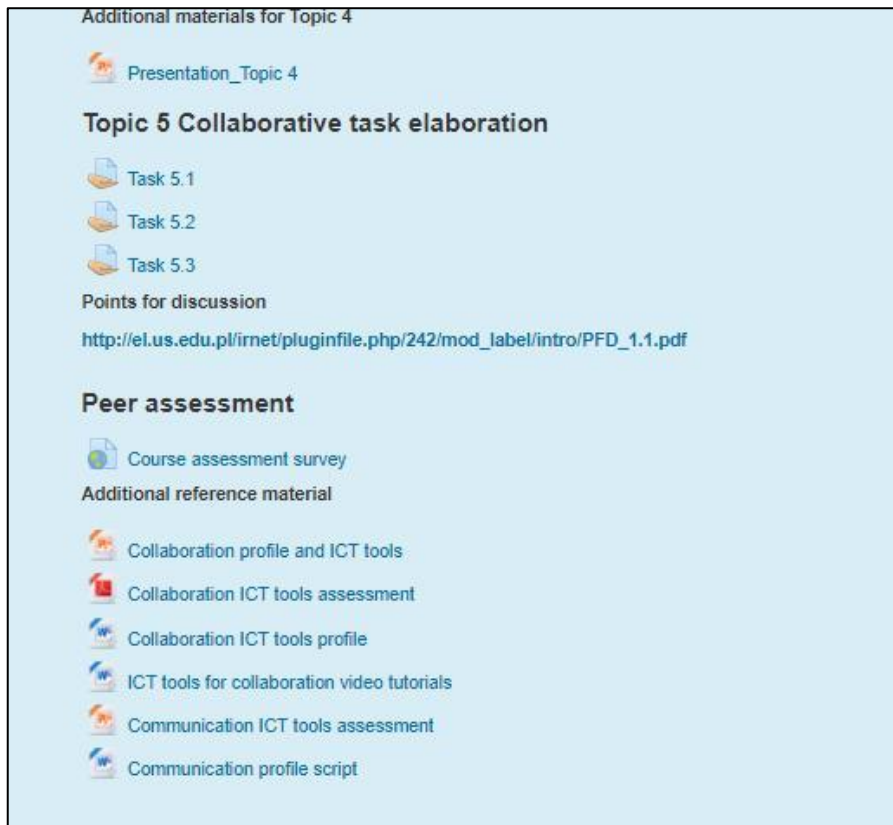
Figure 6. Copy screen of the part of Module Tools for communication and collaboration

Source: *Own Work, http://el.us.edu.pl/irnet*

III. SOME RESEARCH RESULTS

A survey has been conducted in several IRNet project partners universities: University of Silesia (US), Poland, Borys Grinchenko Kiev University (BGKU), Kiev, Herzen State Pedagogical University of Russia (HSPU), Saint Petersburg, Russia). The authors present below results of the survey carried out with participation of 99 respondents (US, PL), (BGKU, UA), (HSPU, RU). The questionnaire was elaborated in Google Drive (Google Form), it was supposed to be filled anonymously by students of different specialization. The University of Silesia conducted the survey at the Faculty of Ethnology and Sciences of Education among students of the humanistic specialization: Integrated Primary Education and Kindergarten Education, Kindergarten Education with Child's Development Early Support, Social-Cultural Animation with Cultural Tourism, Integrated Primary Education and Pedagogical Therapy; A total number of 99 students took part in it.

The purpose of this section is to describe the empirical results derived from the dataset of the MOOCs platform evaluation three research studies (Table 2 – Table 11)

Table 2.

Results of students' responses to the question: *Should the content of LMS Moodle and MOOC (Single choice question)*

	US	BGKU	HSPU
Be different	27,3%	62,3%	84,4%
Be the same	21,2%	37,7%	15,6%
Be partially the same	51,5%	-	0

Source*: Own Research*

Table 3.

Results of answers of students on question: *Should the content of LMS Moodle and MOOC for identical topics (Single choice question):*

	US	BGKU	HSPU
Be different	18,2%	53,6%	87,5%
Be the same	35,4%	46,4%	12,5%
Be partially the same	46,6%	-	0

Source*: Own Research*

Table 4.

Results of students' responses to the question: *What type of course is it better to use in teacher training? (Single choice question):*

	US	BGKU	HSPU
MOOC	16,2%	63,8%	46,9%
LMS Moodle	34,3%	36,2%	53,1%
Both types	49,5%	-	0

Source*: Own Research*

Table 5.

Results of students' responses to the question: *What type of course is it better to use to extend your basic knowledge? (Single choice question)*

	US	BGKU	HSPU
MOOC	21,2%	63,8%	43,8%

LMS Moodle	28,3%	36,2%	56,3%
Both types	50,5%	-	0

Source: Own Research

<div align="right">

Table 6.

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Results of students' responses to the question: *What type of course is it better to use to gain new knowledge?:*

	US	BGKU	HSPU
MOOC	15,2%	68,1%	90,6%
LMS Moodle	30,3%	31,9%	9,4%
Both types	54,5%	-	-

Source: Own Research

<div align="right">

Table 7.

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Results of students' responses to the question: *What elements of a MOOC are mandatory? (Multiple choice question)*

	US	BGKU	HSPU
video	45,5%	68,1 %	90,6%
presentations	70,7%	69,6%	78,1%
text	58,6%	52,2%	68,8%
joint-access wiki portal	13,1%	-	21,9%
mind maps	32,3%	-	21,9%
additional links to sources	27,3%	44,9%	50%
self-assessment tests	40,4%	53,6%	68,8%
control tests	31,3%	34,8%	71,9%
useful links	27,3%	-	50%
personal e-portfolio	13,1%	-	28,1%
blog	17,2%	-	21,9%
spreadsheets for formative assessment	20,2%	24,6%	34,4%
individual tasks for further assessment by a tutor	12,1%	-	37,5%
pair work	17,2%	29%	9,4%
group work	18,2%	-	34,4%

	US	BGKU	HSPU
peer review	28,3%	-	28,1%
joint project	19,2%	43,5%	31,3%
discussion forum	27,3%	52,2%	71,9%

Source*: Own Research*

Table 8.

Results of students' responses to the question: *Can MOOC materials be used in groundwork courses of blended learning?*

	US	BGKU	HSPU
Yes	68,7%	85,5%	96,9%
No	31,3%	14,5%	3,1%

Source*: Own Research*

Table 9.

Results of students' responses to the question: *What do you find appealing in a MOOC? (Multiple choice question)*

	US	BGKU	HSPU
Interesting|topical thematic scope	44,4%	66,7%	18,8%
Self-improvement	44,4%	60,9%	65,6%
Certification	27,3%	53,6%	15,6%
Acquiring additional competitive skills	28,3%	52,2%	56,3%
Lack of scope/content of university curriculum	15,2%	14,5%	21,9%
Attractive lecturer	15,2%	11,6%	9,4%
Course popularity	20,2%	20,3%	15,6%
Other	2%	-	3,1%

Source*: Own Research*

One of the survey questions was: Reasons to unsubscribe from MOOC. Among the most important reasons to unsubscribe from the course given by the respondents who participated in the survey is too long duration of the course. In addition, as emphasized in the study (Gurba 2015), the authors of massive courses recognize more and more the need for more practical approach and implement their courses in a manner which allows for keeping their participants longer and preventing the still very high rate of the participants leaving the course too soon, long before its completion. Not only the design of the course - the design approach to a problem - is salvation, but also a good set of partners from outside the academic world, and so is the industry, services and areas of practical applications. The development of

design types of massive courses is one of the important directions in the modification of the MOOC base. Some authors use an even longer new name MOOP, in which instead of the word course the last expression is a "project". We are therefore faced with a creation a massive open online projects, rather than the usual courses MOOCs (T. Toikkanen, MOOP: The Next Step Beyond MOOCs, "Tarmo.fi Blog" http://tarmo.fi/blog/20x5/04/moop-the-next-step-beyond-moocs)   In: (Gurba 2015)).

Table 10.

Results of students' responses to the question: *What activities should be mandatory for a MOOC? (Multiple choice question):*

	US	BGKU	HSPU
Communication	50,5%	29%	46,9%
Collaboration	42,4%	18,8%	43,8%
Storytelling	8,1%	0%	9,4%
Assessment	38,4%	1,4%	59,4%
Feedback	16,2%	13%	81,3%
Problem solving	24,2%	8,7%	59,4%
Brainstorm	30,3%	5,8%	25%
Team work	24,2%	0%	28,1%
Discussion	33,3%	11,6%	53,1%
Tutoring	16,2%	4,3%	50%
Research	20,2%	7,2%	21,9%
Peering	24,2%	0%	28,1%

Source*: Own Research*

Table 11.

Results of students' responses to the question: *What elements of an LMS Moodle are mandatory? (Multiple choice question):?*

	US	BGKU	HSPU
Video	47,5%	17,4%	
presentations	52,5%	21,7%	
Text	55,6%	14,5%	
joint-access wiki portal	17,2%	-	

mind maps	34,3%	-
additional links to sources	25,3%	2,9%
self-assessment tests	44,4%	7,2%
control tests	46,5%	5,8%
useful links	31,3%	-
personal e-portfolio	10,1%	-
Blog	15,2%	-
spreadsheets for formative assessment	22,2%	1,4%
individual tasks for further assessment by a tutor	16,2%	5,8%
pair work	19,2%	4,3%
group work	17,2%	-
peer review	18,2%	-
joint project	11,1%	7,2%
discussion forum	31,3%	7,2%

Source*: Own Research*

Implications for higher education including policy

Widening participation in HE is a major component of the government education policy — to increase not only the numbers of young people entering HE but also the proportion from under-represented groups (e.g., those from lower-income families, people with disabilities and some ethnic minorities) (https://en.wikipedia.org/wiki/Widening_participation)

In their own publication M . Patru and V. Balaji (2016) stressed the promoting a culture of quality in higher education. Quality lies at the heart of higher education policies in all countries around the world. However, the demand for higher education is increasing well beyond the capacity of traditional institutions. Thanks to technology, teaching and learning are now less constrained by time and place. Online learning holds the potential of delivering quality education to anyone, anywhere. Many of the online self-paced courses offered outside of traditional higher education are of high quality, enabling learners' access to new knowledge, new skills and new professional opportunities. In a world of growing virtual mobility, and in an effort to address a more diverse range of learning options for working adults, more and more open and distance teaching universities have expressed their intention to promote the large-scale delivery of certified short learning programmes (SLP) and to incorporate MOOCs into these courses as flexible building blocks. Governments should develop

or strengthen quality assurance frameworks for the recognition, validation and accreditation of flexible learning pathways as part of their broad development agenda. (Patru M., Balaji V. Eds., 2016: 13)

DISCUSSION

Education 2030: A new vision for education. Education 2030 must be seen within the broader context of development today. MOOCs can contribute to SDG 4: Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all. The Education 2030 Framework for Action, adopted at Incheon (Republic of Korea) in May 2015, recognises lifelong learning for all as one of the underpinning principles of this new vision, stating that "all age groups, including adults, should have opportunities to learn and continue learning." It also calls on countries to "develop policies and programmes for the provision of quality distance learning in tertiary education, with appropriate financing and use of technology, including the Internet, massive open online courses (MOOCs) and other modalities that meet accepted quality standards to improve access."

CONCLUSION

MOOCs could be successfully designed and adapted to support the expansion of access to post-secondary education for all categories of learners and to maintain their motivation. They could also play a significant role in providing learning opportunities for those in fragile/emergency situations. (Patru, Balaji, 2016).

The MOOC entitled: "ICT-tools for e-learning", developed within the framework of the European IRNet project based in particular on such methods as *microlearning, subscription learning*, *peer assessment*. In the near future this course will be opened to a focus group from the partners' university and after some improvements to a wider audience.

ACKNOWLEDGEMENT

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