

Co-creation of training activities in responsible research and innovation

**RRIL-Presentation
RRIL - Responsible Research and Innovation Learning**

Laureano Jiménez Esteller; Alba Molas; Dieter Boer; Karsten Krüger



***Co-creation of training activities in responsible
research and innovation
RRIL presentations***

Laureano Jiménez; Alba Molas; Dieter Boer & Karsten Krüger

Citation: Jiménez, L.; Molas, A.; Boer, D. & Krüger; K. (2019) Co-creation of training activities in responsible research and innovation. RRIL-Presentations. Barcelona.

Original Presentation: Jiménez, L.; Molas, A.; Boer, D. & Krüger; K. (2019) Co-creation of training activities in responsible research and innovation. at IATED - EDULEARN19 (11th annual International Conference on Education and New Learning Technologies). 1st-3rd of July, 2019. Palma de Mallorca (Spain). Published at Gómez Chova, L.; López Martínez, A. & Candel Torres, I. (eds), EDULEARN19 Proceedings 11th International Conference on Education and New Learning Technologies: Palma, Spain. 1-3 July, ISBN 978-84-09-12031-4, págs. 145-149

This publication is based on the results of the project RRIL Responsible Research & Innovation Learning. It is co-funded with support from the European Commission.
RRIL-project nº 2018-1-ES01-KA203-050890.

Co-funded by the
Erasmus+ Programme
of the European Union



The European Commission's support for the production of this publication does not constitute an endorsement of the contents, which reflect the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained therein.



This work is under the licence of Attribution-NonCommercial-ShareAlike 4.0 International
(CC BY-NC-SA 4.0)

You are free to:

Share: copy and redistribute the material in any medium or format; and

Adapt: remix, transform, and build upon the material

The licensor cannot revoke these freedoms as long as you follow the license terms.

Under the following terms:



Attribution: You must give appropriate credit, provide a link to the license, and indicate if changes were made. You may do so in any reasonable manner, but not in any way that suggests the licensor endorses you or your use



NonCommercial: You may not use the material for commercial purposes.



ShareAlike: If you remix, transform, or build upon the material, you must distribute your contributions under the same license as the original.

No additional restrictions - You may not apply legal terms or technological measures that legally restrict others from doing anything the license permits

Notices:

You do not have to comply with the license for elements of the material in the public domain or where your use is permitted by an applicable exception or limitation.

No warranties are given. The license may not give you all of the permissions necessary for your intended use. For example, other rights such as publicity, privacy, or moral rights may limit how you use the material

Introduction	5
Power point presentation.....	6
Text of the presentation.....	18

Introduction

Responsible Research & Innovation (RRI) is a concept developed by the European Commission for the governance of research and innovation processes with a view on the (ethical) acceptability, sustainability and societal desirability of the innovation process and its marketable products. It aims to shape, maintain, develop, coordinate and align existing and novel research and innovation-related processes, actors and responsibilities with a view to ensuring desirable and acceptable research outcomes. H2020 funded projects (e.g., EnRRICH and HEIRRI) to focus on RRI training needs of the different actors involved.

A detailed analysis of the educational needs regarding to RRI shows that:

- a) RRI is addressed in HE programmes but not expressively;
- b) there is a potential for co-creating based on learning communities;
- c) the relevance to link RRI learning activities to real world problems.

But there is no substantial attempt observable to develop continuous higher education programmes supporting the implementation RRI and the respective reorganisation processes in universities, research centres, research and innovation oriented enterprises and public authorities like cities or regional governments.

The RRIL project pretends to fulfil this gap through the co-creation of higher education modules between different research and innovation actors. In the RRIL (Responsible Research and Innovation Learning) ERASMUS+ project, learning material are developed/under development by the partner universities (Finland, Poland and Spain). To be successful one of the key issues is the public engagement as it goes far beyond the researchers' activity and the relevant stakeholders at local/regional/national level (non-profit organizations, cities, companies...) and include small players (neighbourhoods' associations, social actors...).

Due to the limited resources available, the project will focus its activity in three different domains: economics, social sciences and energy management. The material will be tested in formal education (BSc or MSc) or in non-academic environments (for example, as a module for entrepreneurship that create their start-up companies). The modules will focus in engagement, gender and ethics, were training is multidisciplinary and transversal. We advocate for a combination on transnational and local co-creation of training and learning modules on RRI, as innovation processes are global, but regional and local idiosyncrasy of the innovation systems and processes must be taken into account. In a later project stage, the modules will be offered to research and innovation actors capacitating the learners to develop jointly innovative solution for societal problems.

In the following, we present power point and text of a presentation on co-creation hold at IATED - EDULEARN19 (11th annual International Conference on Education and New Learning Technologies). 1st-3rd of July, 2019. Palma de Mallorca (Spain).

Power point presentation

Co-creation of training activities in **responsible** research and innovation

L. Jiménez¹, A. Molas¹, K. Krüger² & D. Boer¹

¹ University Rovira i Virgili, Tarragona, Spain

² Fundación Bosch i Gimpera, Barcelona, Spain

Laureano.Jimenez@urv.cat

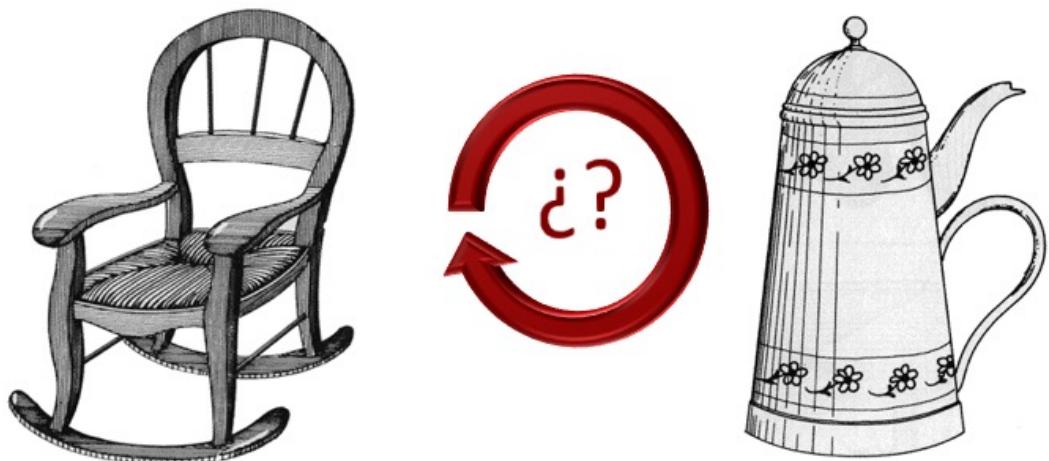
Talk outline

1. What is RRI?
2. Which are the dimensions of RRI?
3. Which type of learning material?
4. RRIL Erasmus+ project
5. Take-home message(s)



Alternative title # 1

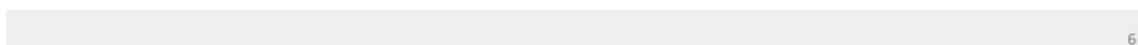
What is RRI?



3



4



Top-down approach in RRI

- Concept developed by the European Commission for the governance of research and innovation processes with a view on the (ethical) acceptability, sustainability and societal desirability of the innovation process and its marketable products



Pursuit of happiness or sustainability?

- RRI → societal, global common challenges , reinforcing collaborative research

- Collective co-responsibility



Alternative title # 2

Which are the dimensions of RRI?



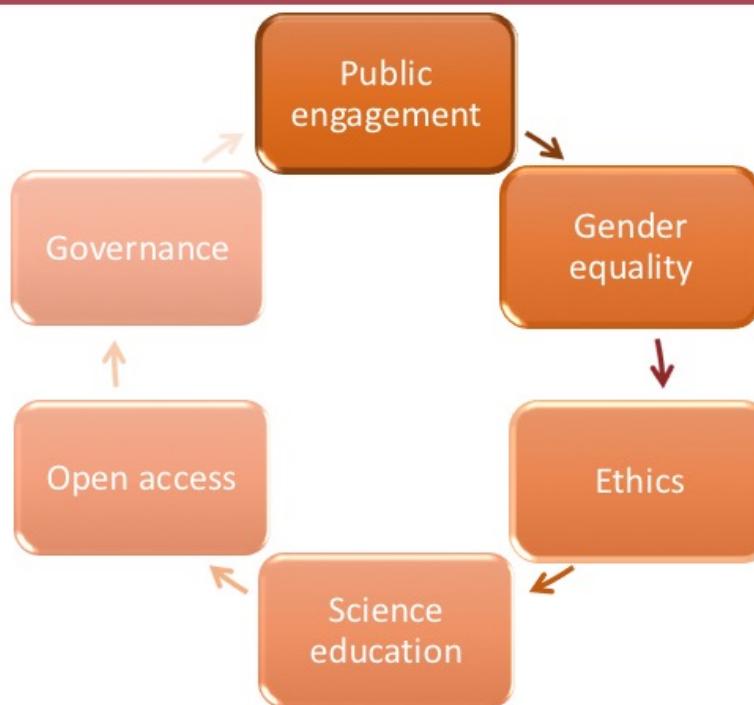
9



10



Core elements of RRI



13

From ivory tower to RRI

- Transition process towards RRI
- Changing world
 - Inclusive
 - Innovative
 - Reflective societies



14

Alternative title # 3

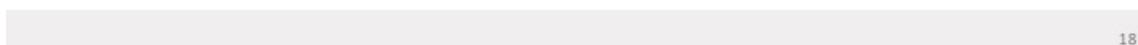
Which type of learning material?



15



16



Modular training material

- Modules → individual learning
 - Energy
 - Economy
 - Big data
- Co-creation → learners are knowledgeable and critical partner in designing and implementation of the learning material
 - Multidisciplinary and transversal among actors as HEI, research centers, NGO's and cities



19

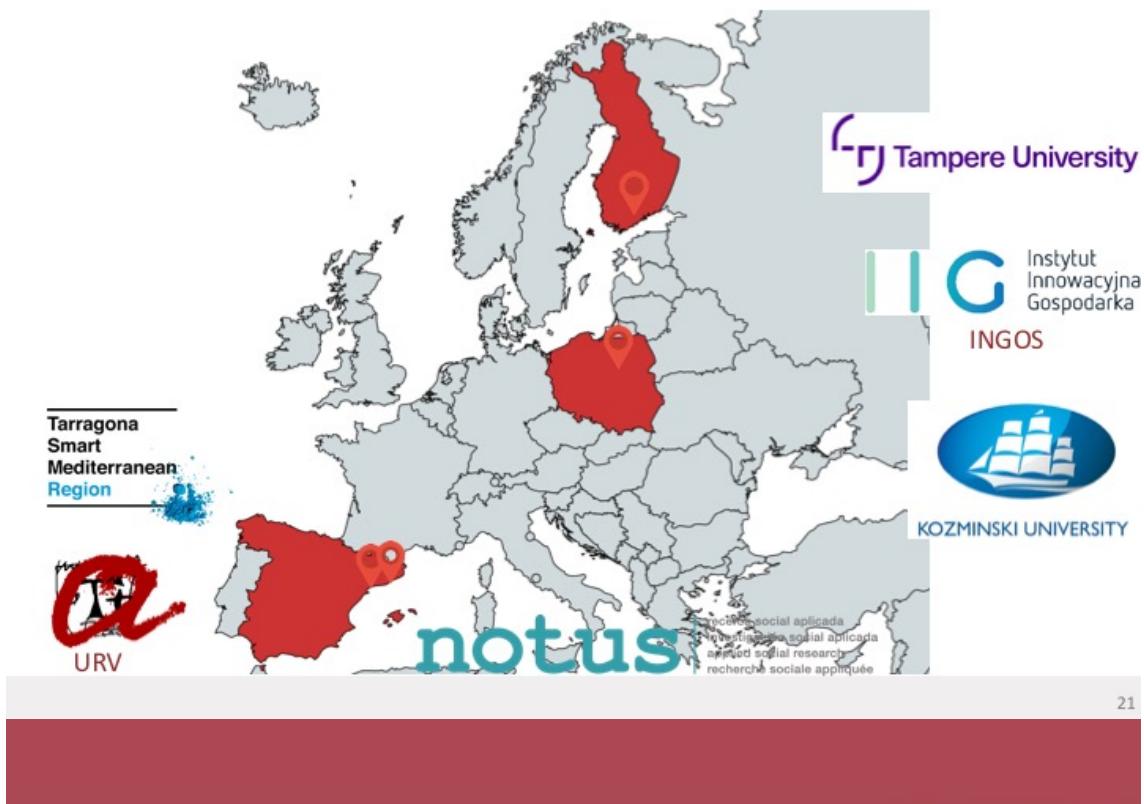
Outputs

- Combined with F2F learning (blended learning):
 - xMOOCs: lecturer-centered. Modular units in form of videos, which are accompanied by multiple-choice tests as feedback
 - cMOOCs: learner-centered. Social learning experiences and networking among tutors, teachers and peers are highly relevant



20

Responsible research and innovation



21



This project has been funded with support from the European Commission. This publication [communication] reflects the views only of the author, and the Commission cannot be held responsible for any use which may be made of the information contained therein"

Co-funded by the
Erasmus+ Programme
of the European Union



22

Text of the presentation

CO-CREATION OF TRAINING ACTIVITIES IN RESPONSIBLE RESEARCH AND INNOVATION

Laureano Jiménez¹, Alba Molas¹, Dieter Thomas Boer², Karsten Krüger³

¹*Department of Chemical Engineering, Universitat Rovira i Virgili, Tarragona (SPAIN).*

Laureano.Jimenez@urv.cat

²*Department of Mechanical Engineering, Universitat Rovira i Virgili, Tarragona (SPAIN).*

³*XREAP – Catalan Network for Research in Applied Economics, Barcelona (SPAIN)*

Abstract

In the RRIL (Responsible Research and Innovation Learning) ERASMUS+ project, learning material are developed/under development by the partner universities (Finland, Poland and Spain). To be successful one of the key issues is the public engagement as it goes far beyond the researchers activity and the relevant stakeholders at local/regional/national level (non-profit organizations, cities, companies...), and include small players (neighbourhoods associations, social actors...). Responsible Research & Innovation (RRI) is a concept developed by the European Commission for the governance of research and innovation processes with a view on the (ethical) acceptability, sustainability and societal desirability of the innovation process and its marketable products. It aims to shape, maintain, develop, coordinate and align existing and novel research and innovation-related processes, actors and responsibilities with a view to ensuring desirable and acceptable research outcomes. The RRIL project pretends to fulfil this gap through the co-creation of higher education modules between different research and innovation actors.

Keywords: Responsible research and innovation, adult education, lifelong learning, education and research management.

INTRODUCTION

The point of departure of the project is the definition of the concept of Responsible Research and Innovation (RRI), and how it is developed by the European Union [1]. Responsible Research and Innovation is:

- Involving society in science and innovation ‘very upstream’ in the processes of R&I to align its outcomes with the values of society.
- A wide umbrella connecting different aspects of the relationship between R&I and society: public engagement, open access, gender equality, science education, ethics, and governance.
- A paradigmatic change of the governance of the Public Research and Innovation system: from outcome control to input and structural regulation.

H2020 funded projects (*e.g.*, EnRRICH [2], HEIRRI [3], New Horrizon [4]) to focus on RRI training needs of the different actors involved. A detailed analysis of the educational needs regarding to RRI shows that:

- a) RRI is addressed in HE programmes but not expressively.
- b) There is a potential for co-creating based on learning communities.

- c) The relevance to link RRI learning activities to real world problems.

But there is no substantial attempt observable to develop continuous higher education programmes supporting the implementation RRI and the respective reorganisation processes in universities, research centres, research and innovation oriented enterprises and public authorities like cities or regional governments. Each one of the RRI modules developed within the RRIL ERASMUS+ project will use a combination of face-to-face and blended learning methodologies, thus aiming at modularization of the training materials developed so they can be used in a more flexible and efficient way.

The RRI concept has identified six core elements, as shown in Table 1 [5].

Table 1. Dimensions of Responsible Research and Innovation.

Public engagement	Foster collaborative and multi actor R&I processes: all societal actors work together during the whole process in order to align its outcomes to the values, needs and expectations of society.
Gender equality	Promote gender balanced teams, ensuring gender balance in decision-making bodies, and considering always the gender dimension in R&I to improve the quality and social relevance of the results.
Ethics	Focus on (1) research integrity: the prevention of unacceptable research and research practices; and (2) science and society: the ethical acceptability of scientific and technological developments.
Science education	Focus on (1) enhancing the current education process to better equip citizens with the necessary knowledge and skills so they can participate in R&I debates; and (2) increasing the number of researchers (promote scientific vocations).
Open access	Address accessibility to and ownership of scientific information. Free and earlier access to scientific work might improve the quality of scientific research and facilitate fast innovation, constructive collaborations among peers, and productive dialogue with civil society.
Governance	Arrangements that lead to acceptable and desirable futures have to (1) be robust and adaptable to the unpredictable development of R&I (<i>de facto</i> governance); (2) be familiar enough to align with existing practices in R&I; (3) share responsibility and accountability among all actors; and (4) provide governance instruments to actually foster this shared responsibility.

METHODOLOGY

The approach, here presented, is a recommendation serving as a framework for the development of the learning tools of RRIL aimed for successful implementation of RRI training for researchers and stakeholders. The teaching and learning concept of RRIL is based on a module design, which permits an individual learning to adapt the RRI principles in accordance to the need of the individual learner and of the respect of organizations.

Due to the limited resources available, the project will focus its activity in three different domains: economics, social sciences and energy management. The material will be tested in formal education (BSc or MSc) or in non-academic environments (for example, as a module for entrepreneurship that create their start-up companies). The modules will focus in engagement, gender and ethics, were training is multidisciplinary and transversal.

RRI plans to use an approach of an active involvement of experts and potential learners in the development of the modules. RRIL is based on the idea that an institutional learning process will accompany the development of the modules. The implementation of the RRI principle is conceived as an organizational learning process. For this reason, it foresees first a mapping of the national and institutional landscape aimed to evaluate the potential to implement RRI in the institutions and to develop jointly the learning modules.

The elaboration of the learning module must include the following elements:

- 1) Definition of learning outcomes in terms of knowledge, skills and responsibility & autonomy (formerly competences), which the learner should be able to demonstrate at the end of the learning process [6]. The definition of the learning outcomes of each module will require a continuous revision in the reflection process organized in the course of the project (see point 5).
- 2) Status of the module within the higher education system: integrated in formal education; adult higher education offers, etc.
- 3) Learning strategy: one of the first decisions that must be taken is related with the type of learning (F2F, blended, online, etc...). The development of the courses must provide indications about methods and activities, and its relation to institutional practices.
- 4) Support documentation and feedback: the development of the models in each participant country and institution must document the process and its outcomes (e.g., through a learning logbook or portfolio). This allows interchanging experience, to give mutual feedback and support, and assures joint development of tools (formative feedback).
- 5) Reflection: the development of the models will be supported by continuous reflection process through debriefing-methods and feedback. Virtual meetings and face-to-face meetings in the reflection process and the process of the joint development of the tools. It allows to supervise if the expected outcomes are achieved, share experience, resume the state of the art and to plan next steps.

RESULTS

As RRIL considers the development of its modules as an intended learning process, we propose to apply learning methods in the process of modules' development. For this reason, we propose to define, first, the specific steps and outcomes for the development of each module at project level and at the level of partner institutions and associated partners.

Planning Learning Strategies at Institution

RRIL conceive the development of the modules also as a learning process in the organization advancing in the implementation of the principles of RRI. For this reason, it is relevant to mapping first the national and institutional landscape of RRI also with the intention to identify persons to participate in the module development. The project team members should be able to support the RRI- learning processes in the institutions. For this reason, it is necessary that they understand the conditions and the context of the institution to guide the elaboration of the learning module.

Documentation and Feedback

The mayor part of learning on RRI is informal by nature and depends on the detailed environment of the institution. The output of the elaboration process must be explicitly specified, creating frame for the development of the modules. Within this frame, secondary, but individually relevant learning outputs must be defined for each module. RRIL must evaluate the use of digital tools, not only for the learning modules, but also for the work on the modules to share knowledge and experience. These digital tools should facilitate the communication between the project partners, document the processes at each institution, support the work process of the modules and allow formative evaluation of work progress.

Community of Practice and Alumni Networks

A key issue is the interchange of experience among project partners or the creation of Communities of Practice [7]. This refers not only to the members of the project teams, but also to the participants in the different activities (*e.g.*, institutional and national events). A Community of Practice (CoP) is set-up among people with the similar interest. The CoP is set up through collective activities interchanging their experience, which in consequence reinforced the professional identity of its members and enrich and fine-tune the day-to-day practice. For this objective, we must check the viability of digital tools (learning management systems), the related work efforts and strategies to reinforce the setting up of virtual CoPs. Within the virtual learning, more open ways of cooperation can be introduced, for instance, in the sense of the Working Out Loud-approach. It assumes that an open cooperation, communication and positive "error culture" will encourage strongly learning and personal development. Working results will be documented and communicated to other [8]. This will lay the fundament for the successful set-up and cultivation of a Community of Practice. The CoPs can be open for a broader circle of interested persons, for instance through Facebook-groups, hashtags and Twitter chats.

Modules' Development

Our training concept include the possibility to create an Open Online Course (MOOC) recommended in combination with F2F learning (blended learning). Two types of MOOCs can be distinguished [9]:

- xMOOCs: focus on the content and lecturer-centered. Often, this type of MOOC offers modulised units of learning in form of videos, which are accompanied by Multiple-Choice Tests as automatized Feedback. These MOOCs typically do not include social learning experience.
- cMOOCs: characterized by learner-centered approaches. Social learning experiences and networking among tutors, teachers and peers are highly relevant.

In general, the xMOOCs are limiting their learning and teaching activities to view videos or read a script (passive actions). The quality of the transmission of information is controlled through Multiple Choice-Tests. However, this is not enough to assure the quality of an online training course on RRI. Especially elements of social activities, which are characterizing the cMOOC could produce more in deep learning experience [10]. They promote more activities of the learners and increment their affective and cognitive engagement. For this reason, we recommend combining cMOOC-activities and xMOOC-elements with f2f sessions in the teaching and learning design of the RRIL-modules. This should assure the quality of the continuous training provision. Which activities, in particular, are more appropriate will be discussed in the following subsection.

Learning and Teaching Methods

Adequate learning and teaching activities must be selected. Especial attention must be paid to the interrelation of the individual learning process to organization learning. For orientation proposal some key concepts:

1. Problem-based learning and teaching: problems taken from practice should be used to refer to the complexity of organizations.
2. Activation of previous knowledge: the previous knowledge of the learners should be taken as starting point for the learning experience for the different modules. It must go beyond the simple recall of previous learning experience. It requires activities allowing to integrate the new experiences in existing mental models or to develop new mental models.
3. Demonstration: learning should be easier of the skills to be learned. For this proposal, successful, but also less successful scenarios for the application of the acquired skills are useful.
4. Application: the application of the acquired skills on problems related to praxis is an important requisite for effective learning. This refers also to the interrelation of the use of the learning module for restructuration processes in the respective organizations.
5. Integration: a successful learning will be encouraged if linked to reflection and discuss about what they are learning. One topic should be how the learner could integrate and use

the new knowledge and new skills in his day-to-day activities. The reflection and discussion will show, how the newly learned has changed their behavior or their mental models.

CONCLUSIONS

We advocate for a combination on transnational and local co-creation of training and learning modules on RRI, as innovation processes are global, but regional and local idiosyncrasy of the innovation systems and processes must be taken into account. In a later project stage, the modules will be offered to research and innovation actors capacitating the learners to develop jointly innovative solution for societal problems.

Acknowledgements

Co-funded by the Erasmus+ Programme of the European Union.

Co-funded by the
Erasmus+ Programme
of the European Union



Disclaimer

This project has been funded with support from the European Commission. This communication reflects the views only of the author, and the Commission cannot be held responsible for any use which may be made of the information contained therein.

References

- [1] Responsible Research & innovation, <https://ec.europa.eu/programmes/horizon2020/en/h2020-section/responsible-research-innovation> (Accessed 06/06/2019).
- [2] ENRROCH project web page, <https://www.livingknowledge.org/projects/enrich/> (accessed 06-06-2019).
- [3] Heirri project web page, <http://heirri.eu/> (accessed 06-06-2019).
- [4] New Horizon web page, <https://newhorizon.eu/> (accessed 06-06-2019).
- [5] B.C. Stahl, “Responsible research and innovation: The role of privacy in an emerging framework”, *Science & Public Policy*, 40 (6), 708-716, 2013.
- [6] European Commission; Cedefop; ICF International. European inventory on validation of non-formal and informal learning 2014: country report Netherlands. 2014. Available at: http://libserver.cedefop.europa.eu/vetelib/2014/87070_NL.pdf (accessed 06-06-2019).
- [7] E. Wenger, R. McDermott, W.A. Snyder, Williams C., A community of leading knowledge-based organizations dedicated to networking, benchmarking and sharing best knowledge practices. *Cultivating Communities of Practice: A Guide to Managing Knowledge*, Harvard Business School Press, Cambridge, USA, 2002.
- [8] J. Stepper, *Working Out Loud: For a better career and life*, Ikigai Pres, 2015.
- [9] A. Margaryan, M. Bianco, A. Littlejohn, Instructional quality of massive open online courses (MOOCs). *Computational education*, 80, 77-83, 2015.
- [10] L. Yuan, S. Powell, MOOCs and Open Education: Implications for Higher Education A white paper. White paper, The University of Bolton, 2013.

