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Editorial: Models, technologies and approaches toward widening the open access to learning and education

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Editorial: Models, technologies and approaches toward widening the open access to learning and education

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Abstract: This special issue is devoted to novel models and technologies as well as current methodical approaches and best practices in the field of Open Learning and Open Education as enablers of personal growth, social inclusion, open innovation, and sustainable economic development in the challenging conditions of globalization and world-wide competition in productivity and services. The Open Access to Learning and Education embraces not only various technologies, such as mobile and intelligent technologies, content and data management, user-centered design, but also diverse directions of use, such as e-learning and training, organizational development, Massive Open Online Courses, special needs education, all building an excellent basis for various educational and business arrangements that widen the learning and education opportunities for all people around the globe. Against this background, this special issue demonstrates the immense speed and relentlessness of the Open Access concept growth presenting a wide range of examples toward supporting competency and skills development to ensure highly capable human capital, and solve individual, business, urban, demographic, health as well as social inclusion issues in today's highly demanding digital economy environment.

Keywords: Open access; Open education; Open learning; Higher education; Special needs education; Healthcare management; Knowledge management; Open innovation

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Dr. Fanny Klett assumed the Directorship of the German Workforce Advanced Distributed Learning Partnership Laboratory, which is run in cooperation with the US Government, in 2009. Prior to this position, she has been with leading research institutions in principal positions. Fanny Klett is regularly invited as Visiting Professor and Distinguished Lecturer at universities worldwide. Her research involves advanced ICT solutions in the areas of information, data and content management, competency and job performance management, assessment, knowledge management, data mining as well as metadata, repositories, data fusion and interoperability. Dr. Klett actively works in standardization bodies, such as IEEE Learning Technology Standards Committee, US Advanced Distributed Learning Initiative, and is CEN WS-LT LTSO expert. She chaired and served on more than 30 conference planning and program committees of UNESCO, IEEE, APSCE, etc. Fanny Klett is associated editor of IEEE publications and serves on the editorial boards of many international journals on advanced technology themes including IEEE Transactions on Education, and IEEE Educational Technology and Society Journal. In addition, she assists various governmental research sponsoring organizations worldwide, as an expert. Dr. Klett is IEEE Fellow. She is Member of the Sponsor Executive Committee and Secretary of the IEEE Learning Technology Standards Committee, and Member of the Council and the Academic Board of the European Association for Education in Electrical and Information Engineering.

Dr. Minhong (Maggie) Wang is an Associate Professor with the Faculty of Education at the University of Hong Kong, and Director of the KM&EL Lab. She was a visiting scholar at Harvard Graduate School of Education, University of Cambridge, and MIT Sloan School of Management. Her recent studies focus on thoughtful design and implementation of computer-based learning environments, and analysis of learning in such environments in the sectors of workplace learning, higher education, and school education. Her research aims to provide learners with necessary support to achieve high levels of autonomy, confidence, and performance when they are faced with challenges, for example in performing authentic tasks to solve complex real-world problems and constructing knowledge from the problems. She is the Editor-in-Chief of Knowledge Management & E-Learning, and Associate Editor of Information & Management. She also serves on the editorial board of several international journals including Educational Technology Research and Development, and Educational Technology & Society. More details can be found at <http://web3.edu.hku.hk/magwang/>.

1. Introduction

Learning is central to economic success and social cohesion, especially with the challenges of the rapid technological changes and global digital economy. Open Access to learning and education is key to increasing participation and achievement in learning. Equity and viability dictate that all should have the opportunity for access to learning, and public policy must be redirected towards widening participation in further education with special focus on those who are unemployed, economically inactive, and health

impaired. The key concept in the right to education is access to the means to gain knowledge, skills and competencies to learners at all ages. Recent advances in Information and Communication Technology (ICT) played an important role to enable access to various sources of information, data and knowledge. However, little progress has been made toward developing new pedagogical approaches and models for Open Access learning across the diversity of social, cultural and educational backgrounds.

In 2002, UNESCO adopted the term Open Educational Resources (OER) to refer to the “open provision of educational resources enabled by ICT, for consultation, use and adaptation by a community of users for non-commercial purposes” (Albright, 2015). OER are “teaching, learning and research materials in any medium, digital or otherwise, that reside in the public domain or have been released under an open license that permits no-cost access, use, adaptation and redistribution by others with no or limited restrictions. As emphasized in the recently published Paris OER Declaration by UNESCO (2012), the term “open” generally means that the resource can be accessed and used by everyone in a non-discriminatory manner, and also that it can be adapted, modified, and shared. More specifically, the characteristic of openness addresses the removal of technical, economic, and legal barriers to gain access to and make use of OER. Furthermore, The ‘4-A Conceptual Framework’ by Tomasevski (2001) emphasizes rights to as well as rights in education in four aspects of access as follows:

- Availability. This aspect concerns the availability of learning institutions and instructors, including Open Universities and virtual learning centers;
- Accessibility. This aspect refers to the elimination of legal, administrative and financial barriers, as well as discriminatory denials of access;
- Acceptability. This aspect correlates with meeting minimum standards for quality, safety and environmental health; using an acceptable language of instruction; and
- Adaptability. This aspect addresses the obligation to adapt to the unique needs and cultures of a wide range of constituents such as minorities, indigenous people, workers, people with disabilities and migrants.

The phenomenon of OER is part of a broader trend toward participatory innovation processes and Open Access to knowledge, embodied in several movements that are committed to the “open”, including the Open Access (OA) movement, the Open Source Software (OSS) movement, and the Open Licensing (OL) movement (Mikroyannidis et al., 2016). Open licensing is built within the existing framework of intellectual property rights as defined by relevant international conventions and respects the authorship of the work. Creative Commons licenses play a significant role in making “openness” possible, and it has a particular interest in and engagement with educational materials. Ahrash Bissell, Director of the CC-Learn initiative of Creative Commons describes the effort as follows: “Open Educational Resources (OER) represent the efforts of a worldwide community, empowered by the Internet, to help equalize the access to knowledge and educational opportunities throughout the world. OER are released under an intellectual-property license that permits their free use or customization by others. It is the granting of freedoms to share, reprint, translate, combine, or adapt that makes them educationally different from those that can merely be read online for free” (Bissell, 2005). Creative Commons licenses are currently being used in a broad range of open educational content projects worldwide, including the notable Open Course Ware (OCW) from MIT. Launched in 2001, MIT OCW is usually considered as a key initiator of the OER movement and the subsequent international OCW Consortium created in 2005.

The OER movement has also played a key role in improving both, quality and quantity of free online courses. Over the last few years, the MOOCs (Massive Open Online Courses) phenomenon has become widely acknowledged as crucial for freely accessible high quality courses provided by many higher education institutions, including elite universities such as MIT and Stanford. Access to such high quality free courses has allowed students to obtain a level of education that many only could dream of in the past (Yousef, Chatti, Schroeder, Wosnitza, & Jakobs, 2014). Through MOOCs, hundreds of thousands of students from developing countries have now access to elite universities without paying tuition or collecting a university degree (Brown, 2013). In recent years, topics around MOOCs are extensively discussed across a range of academic publications from different theoretical and practical perspectives, including numerous implementations and design concepts of MOOCs.

MIT OCW, the OCW Consortium, MOOCs, and many others dealing with open textbooks, instructional videos, and a broad range of materials at repositories and digital libraries rely on Creative Commons Licensing. Though most OER providers are academic institutions, corporations have also started to share their training courses through OER (Grayson, Coughanour, & Cannon, 2007). OER are now available in multiple languages in portals and gateways, institutional repositories, subject portals/collections and community-developed content (Yousef et al., 2014). OER repositories include Merlot (<https://www.merlot.org/>); Curriki (<http://www.curriki.org/>); OER Commons (<http://www.oercommons.org/>); and Connexions (<http://cnx.org/>), to name just a few. Creative Commons is also partnering with academic publishers of educational content.

An important key issue in financial sustainability is whether the production of OER uses a producer-consumer model or a co-producer model (OECD, 2007). A producer-consumer model is typically more centralized. This is usually a form of institutional publishing such as the MIT OCW initiative. This model usually has higher costs associated with the publishing staffing and workflow for providing quality review, production consistency and copyright clearance of third-party resources. A co-producer model however, is typically decentralized and based on a community of volunteers that work together to create resources for the community. Examples of this include LabSpace of the Open University in the UK and WikiEducator of the Commonwealth of Learning. Many OER initiatives today are a form of institution-based publishing using the producer-consumer model.

OER and online learning, mainly provided through Open Universities, may help provide scalable solutions to address the education gap in society, independently of a geographic location. OER and Open Universities can increase access to knowledge through amplified opportunities for learning, improved availability of cost-effective resources; boosting quality and variety in resources; and through bridging formal and informal learning (Venkaiah, 2007). The Open University of the United Kingdom and the Open University of the Netherlands are early pioneers with OER in this direction. Innovative Concepts for new institutions using online learning and OER have been proposed. Fay and Sjogren (2007) have outlined an open source online degree-granting institution. They rely on OER to lower costs and increase scalability by creating a new publishing mechanism for faculty while it creates a global online open curriculum, with many variations, to be openly shared around the world. In another model, Taylor (2007) describes a concept for an Open Courseware University. In this concept, selflearners using OER from OCW Consortium members would be supported by volunteer tutors and gain credit on-demand from providing institutions. Credits earned in this way from

various institutions would be aggregated by a new mechanism that would award accredited degrees.

An additional effect of the Open Education movement and OER is the stimuli arising from several participants of a same community of interest, where people become part of a collaborative co-creation process. Viewed this way, active “creative spaces” arise, namely innovation communities, where people can exchange their ideas and share knowledge without restriction. These processes not only facilitate collaborative reflective learning, but stimulate open innovation activities. This aspect of the Open Access to data and knowledge is broadly exploited in organizational structures in terms of knowledge as well as innovation management and organizational development (Siemens, 2015).

The various initiatives that evolved from Open Learning to Open Access education make us aware that technology and infrastructures are the enabling aspect of these concepts. There is no single approach to Open Learning, and no one-size-fits-all approach to Open Access education. Reflecting the research and application directions introduced in this section, the next section contains an overview of the contributions in this special issue that present original technological as well as methodical approaches by addressing the key challenge of Open Education, namely exploiting data and knowledge resources and improving personal, organizational, business, and urban development as well as social inclusion processes toward a socio-economic impact and benefit for all stakeholders involved in these processes.

2. Preview of papers

This special issue of the *KM&EL International Journal* is dedicated to recent chances, concerns as well as best practices affecting a rapidly increasing number of organizations that apply the Open Access concept. It reveals current experience in shaping, implementing and delivering the new generation of formal, non-formal and informal education, namely Open Education. The special issue covers leading Open Access research and development from the United States, Italy, Austria and the United Kingdom, Japan, and Iran, and addresses tangible implementations spread over developed and developing countries. The distinctive approaches of the multi-faceted Open Access concept refer to applications in the fields of learning, competence and skills development, health management, organizational management, knowledge management, integration and reuse of OER, MOOCs as well as Open Access learning systems for people with disabilities, aligned toward a shared goal, namely the improvement of the conditions for individual, business and social wealth by equally delivering knowledge and education for all.

The first paper presented in this special issue, is devoted to illustrating the fundamental role that OER increasingly play in education and training processes on a global basis. Mosharraf and Taghiyareh provide an original overview of opportunities and advantages resulting from the use of OER by distinguishing between three groups of eLearning stakeholders, namely learners, teachers, and educational institutions. The clarification of the roles, intentions, and driving forces behind those stakeholders in the Open Access education processes is a unique contribution toward the current and future investigation of the OER utilization from the technological, personal, economical, historical, cultural, and social perspectives. Moreover, this fundamental observation paper discusses open questions related to the identified limitations and challenges that

affect the design as well as the distribution of OER in today's rapidly transforming global educational environment.

Bourrie, Jones-Farmer, and Sankar set a special focus on innovation in formal education in the United States by investigating in a non-traditional study variables that influence the intention of faculty members at electrical engineering and computer science ABET certified programs to adopt new educational innovations, such as Open Access to learning, and conclude on the conditions for a widespread effect of this concept. Toward this goal, the authors investigate: 1) the characteristics of the educational innovation that meaningfully impact the intention to adopt educational innovations, 2) the variables that model the readiness of faculty members intention to adopt educational innovations, and 3) the characteristics of the innovations that form the correlation between faculty readiness and intention to adopt the innovations. The research study represents a crucial source for innovative Open CourseWare developers and institutions demonstrating that ease of use, and care about student learning outcomes directly influence intention to adopt educational innovations. Against this background, the authors call for new grant strategies to ensure a broad utilization of easy-to-use Open Learning technologies.

Devoted to the context of primary school education in correlation with an Open Learning approach, the third paper investigates the proper combination of the serious games and Open Learning advantages to enhance the learning abilities of young children. Lunn, Khalaf, Hussain, Al-Jumeily, Pich, and McCarthy spot in a research study on the movement initiated in the United Kingdom, where from the age of 5, children will be taught computing knowledge and skills by stressing on algorithms, storing digital content, creating and testing simple programs. The authors seek for innovative ways to design an Open Learning environment based on serious games, which offers interpreted and shared experience by creating a genuine platform for user generated experience. Their major contribution concerns the identification of the success factors for future developments with regard to ensuring a direct experience for learners alongside with increasing their learning ability, excitement and entertainment and providing immediate feedback. The research described in this paper represents a valuable support to all researchers and practitioners dealing with Open Learning environments for early child education.

In view of the present digital economy, the fourth paper leaves the educational grounds and demonstrates the utilization of Open Learning in the business reality to enable professional development. Mwaikambo and Dolphyne present the research and results from applying an Open Learning approach to health care development in Ghana by incorporating mobile technology utilized to access OER. The lessons learnt clearly show the benefits of a widely accessible open content, on the one hand for individual professional development, namely health workers, who need to continually update their skills and knowledge throughout their adult lives, and on the other hand for organizational development, namely governments, regulatory bodies, and professional associations to more easily and effectively implement high quality continuing education programs. Furthermore, the authors systematically investigate the OER challenges and issues by referring especially to the adaptation process of Open Learning materials in terms of technical relevance to the target audience, fitting local context as well as appropriateness for a mobile phone delivery. In following this line, Mwaikambo and Dolphyne state a demand for a strong collaboration between all stakeholders engaged in the professional development to effectively understand one's target audience along with the culture of the Open Education movement.

Devoted over again to child education, the fifth paper adds a new focus –special needs education– and provides an original contribution to mastering the delivery of

special needs education in case of speech and language deficiency. Al-Jumeily, Hussain, Abuelmaatti, Fergus, and Lunn demonstrate innovative research that goes far beyond existing solutions designed as an exact digital representation of the current paper-based methods for special needs education. Utilizing Internet and mobile technology, the authors create a modern Open Learning system that constitutes an evolution in language learning in the context of understanding spoken instruction, and benefits from open content with novel presentation of keywords and associated context, whereas the learning algorithm is derived from the field of applied computing in human biology using the concept of spaced repetition. Moreover, this paper serves as a guideline for shaping a novel augmentation of the memorization process for special needs education in a global Open Education setting.

The sixth paper addresses once more the use of Open Learning in the business environment by targeting particularly the challenging organizational development toward participatory knowledge management. Stary presents a unique concept for understanding process design as Open Learning facility. The author provides evidence of the high demand for a sufficient support for stakeholders to actively participate in developing work knowledge and implementing changes after reflecting the impact on the level of operation. Stary's crucial contribution refers to defining, investigating as well as summarizing the effects of the features, constitutive elements and processes of the open organizational learning processes. The research presented in this paper introduces a novel way of defining Open Participatory Learning Infrastructures from an OER and Open Access perspective on the individual and collective level by embracing semantic technologies, social media, and contextual design to trigger and implement Open Learning processes.

Following the OER movement, the MOOCs have become an essential factor for adding a new viewpoint on the education and knowledge development by allowing more people to access education, irrespective of their learning history, the content delivery mode and a standard physical presence at lectures. The next two papers deal with this challenging MOOCs phenomenon mirrored on both, higher education and business organization processes, from a market-relevant innovation management and entrepreneurship perspective.

Cirulli, Elia, Lorenzo, Margherita, and Solazzo demonstrate a beneficial application of MOOCs toward the design and provision of personalized learning paths that serve competencies development processes and the formation of entrepreneurial behaviour in the technology entrepreneurship domain. The authors exploit the design science approach to create a modern platform for the MOOCs delivery along with a set of experimental courses and user guidelines. They constructively identify a two-fold dimension of the designed MOOCs system, namely a process-oriented view –related to the roadmap applied to transform an idea into an entrepreneurial venture, and a technology-oriented view –based on the platform and software components used for the system implementation. The inherent roadmap purposefully directs the processes of course classification, competence mapping as well as learning gap analysis, and self-evaluation of the status of the entrepreneurial journey together with offering appropriate recommendations in terms of activities to accomplish and courses to access. The system is evaluated in a trial setting to obtain feedback for the iterative system design approaching future real time monitoring of the learners' progress interrelated to individual performance in addition to social network dynamics.

Siddike and Kohda also address the incessant societal and business demand for creation, adoption, and diffusion of innovation, which is commonly seen as the driver for

economic value. More specifically, the novel research described in this paper drives the development process of social innovation in learning and education by proposing a new service system as well as a new social innovation in terms of increasing literacy through the application of MOOCs. The authors thoroughly illustrate the MOOCs vast potential and opportunities for the initiated expansion of social innovation in a developing country like Bangladesh where rural environments are in the majority but mobile and Internet connections are available on a broad basis. The authors make trends visible, observe dynamic factors, develop a model for social innovation in education, and show how it can facilitate social innovation by obtaining access to additional educational resources, setting up the basis for better future employment as well as self-employment opportunities, and establishing a bridge to innovative education provider organizations and donor agencies. In following this line, Siddike and Kohda not only detect the distinctive features of this model for a developing country but also its added value that allows for sustaining and scaling the social innovation and opening up various possibilities for different organizations to collaborate with the social entrepreneurs, considering also feedback on the user acceptance and satisfaction toward future content adaptation demands. By applying open educational technologies, the social enterprises can take the advantage of MOOCs to ensure higher literacy to rural people, including computing skills, and financial knowledge, and moreover, the institutionalization of social innovation, whereas the findings are applicable to many other developing countries showing similar education demand.

3. Conclusion

This special issue of the KM&EL International Journal depicts unique research and recent results about the utilization of the Open Access approach and open educational technologies around the globe, providing valuable experiences from developed as well as developing countries. It serves as an essential source toward mastering innovative educational change management and education transformation at national and international campuses, and modern business organizations, and designing a sustainable future for the people. The findings of the studies presented in the distinguished papers provide indispensable insights on valuable practices toward models, technologies and approaches to effectively supply the interrelationship between learners, and education and business stakeholders toward successfully shaping personal as well organizational development by taking advantage of the remarkable popularity and acceptance of the Open Access concept for learning and education delivery. The research outcomes are fundamental for a broad audience of local, national and international educational experts and leaders, open innovation communities, system developers, content providers, repository managers as well as academics, researchers and practitioners, involved in strengthening education, the socio-economic development and the quality of life for people on a global scale.

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