

*Artículos Originales*

## **Worldwide Wisdom of the Crowd in Education and Development**

### **La sabiduría mundial de la multitud en la educación y el desarrollo**

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#### **Abstract:**

The paper outlines the global challenges faced and particularly highlights the challenges in education, which has the potential to impact the achievement of all the 17 Sustainable Development Goals (SDGs), if planned and designed well. Using the framework of the wisdom of crowd and crowdsourcing, the paper presents two educational innovations that have the potential to change the educational landscape. Open educational resources (OER) and massive open online courses (MOOCs) use the power of the web to provide access to quality education and lower the cost making education affordable to all. It makes a case for rethinking education and development through the prism of harnessing the power of the masses to offer 21st Century learning beyond the four walls of educational institutions.

*Keywords:* Open Educational Resources, Massive Open Online Courses, Wisdom of Crowd, Crowdsourcing, Education and Development.

#### **Resumen**

En este documento se esbozan los desafíos mundiales que se enfrentan y se destacan en particular los desafíos en materia de educación, que tiene el potencial de influir en el logro de los 17 Objetivos de Desarrollo Sostenible (SDG), si se planifica y diseña bien. Utilizando el marco de la sabiduría del crowdsourcing o 'sabiduría de la multitud', el documento presenta dos innovaciones educativas que tienen el potencial de cambiar el panorama educativo. Los recursos educativos abiertos (REA) y los cursos masivos abiertos en línea (MOOC) utilizan el poder de la web para proporcionar acceso a una educación de calidad y reducir el costo haciendo que la educación sea asequible para todos. Se trata de un argumento a favor de repensar la educación y el desarrollo a través del prisma de aprovechar el poder de las masas para ofrecer el aprendizaje del siglo XXI más allá de las cuatro paredes de las instituciones educativas.

*Palabras clave:* Recursos educativos abiertos, Cursos masivos abiertos en línea, Sabiduría de la multitud, Crowdsourcing, Educación y desarrollo.

## **EDUCATION AND DEVELOPMENT: CHALLENGES**

Education is a human right. It is the backbone of a developed society. Broadly there are three basic premises related to education and developments: (i) education improves the overall skills and abilities of the workforce thereby improving productivity and economic growth; (ii) education is linked to the ability to innovate and improve the capacity to develop new ideas and technologies; and (iii) education allow transfer of knowledge from one generation to another helping growth of knowledge and their application for human development (OECD, 2010). Despite consensus amongst leaders around the world, there were 264 million primary and secondary age children and youth out of school in 2015; more than 100 million young people still cannot read; only 7% of teacher education programmes covered education for sustainable development (UNESCO, 2017). Across the world 387 million children of primary school age can't complete a reading task and most adults in low and middle-income countries do not have even basic computer skills. While access to educational opportunities

*Recibido: 20/05/2020*

*Aceptado: 15/07/2020*



has increased over the years, there is a ‘learning crisis’ (World Bank, 2018). In 2014, the gross enrolment rate in tertiary education in sub-Saharan Africa was just 8% (UNESCO, 2016). In 2015, of the 522,000 applicants to public universities in Kenya, only 74,000 could be accommodated, while in Nigeria only 28% secondary school graduates are admitted to tertiary level institutions. In the previous decade, we have also seen an unprecedented demand for higher education. In 2007, there were 150 million tertiary students globally (Altbach, Reisberg, & Rumbley, 2009). We find that the number has increased to 165 million in 2012 with an estimate that this is expected to rise to 262 million in 2025 (Maslen, 2012) and 522 million by 2035 (Calderon, 2012). There are challenges related both to access and quality at all levels of education. A recent World Bank report (Nadir, Angrist, & Patrinos, 2018) highlights that learning outcomes in developing countries are often clustered at the bottom of the global scale; the top performers in developing countries still often perform worse than the bottom performers in developed countries; and there is a positive and significant association between educational achievement and economic growth.

At the one end there is growing demand for educational opportunities, and on the other the number of jobs is shrinking due to the advent of the fourth industrial revolution. The WEF (2016b) report on the Future of Jobs quoted an interesting fact that has become a common reference point in many educational debates. It is said “By one popular estimate, 65% of children entering primary school today will ultimately end up working in completely new job types that don’t yet exist” (p.3). This indicated that rapid technological changes would require an education system that is geared towards meeting the needs of the future. It also recognises that the requirements of the job market are changing, and our educational systems need to be re-engineered to be able to adequately cope with the demands. The requirements of the 21st Century workplace involve lifelong learning, covering foundational literacies, competencies, and character qualities to survive and perform effectively. These skills are (WEF, 2016a):

- Foundational literacies are core skills that a learner needs to perform in workplace. These skills are literacy, numeracy, scientific literacy, ICT literacy, financial literacy and cultural and civic literacy.
- 4Cs as core competencies involve critical thinking/ problem-solving, creativity, communication, and collaboration.
- The third group of skills ‘Character qualities’ describe the abilities of the learners to adapt to their changing environment. These include curiosity, persistence/grit, adaptability, leadership, social and cultural awareness.

Recognising the numerous challenges before us, the world adopted a new international development agenda at the United Nations General Assembly in 2015. While there are 17 goals in various areas, Goal 4 emphasises to “Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all” by 2030. It is also important to note that SDG4 will also contribute significantly to the achievement of other goals as well due to direct relationship of education and development, including gender empowerment, food security, health, etc. (Vladimirovaa, & Le Blanc, 2015). However, on current trends, universal primary education will only be achieved in 2042; universal lower secondary by 2059 and universal upper secondary by 2084 (UNESCO, 2016). A major challenge identified by UNESCO Global Education Monitoring Report 2017 is accountability in education. While many agree that not all is well in the education sector, there is utter confusion about who is responsible for this situation. There are several stakeholders and each one of them accusing the other of the mess. While this shows that accountability is poorly defined in educational systems, there is also a need for all the stakeholders to understand that “education is a collective responsibility” (UNESCO, 2017). In this paper, an attempt has been made to review two important develop-

ments in the field of education to highlight how the ‘wisdom of the crowd’ can contribute to the strengthening of the education and sustainable development.

### **Worldwide Wisdom**

The idea that a group’s judgement can be surprisingly better than that of an individual was demonstrated in the book “The Wisdom of Crowds” (Surowiecki, 2004). While the idea of crowd can be traced to the beginning of democracy, the advent of technology and the World Wide Web (WWW) had made it possible to gather information from the crowd at a greater speed and from around the world. Around the same time in 2005, Jeff Howe and Mark Robinson coined the term “crowdsourcing” (Wikipedia, n.d.), which is defined as “the act of a company or institution taking a function once performed by employees and outsourcing it to an undefined (and generally large) network of people in the form of an open call. This can take the form of peer-production (when the job is performed collaboratively) but is also often undertaken by sole individuals. The crucial prerequisite is the use of the open call format and the large network of potential laborers” (Howe, 2006). Both crowdsourcing and wisdom of the crowd have one thing in common, which is about people working together on the web. It is useful to look at the examples and models emerging out of these and derive implications for education and development. Table 1 shows the conceptual similarities of both wisdom of crowd and crowdsourcing, and these are important to develop a collective understanding of how best we can use these for education.

There are new developments in education that take advantages of these and we will discuss these in the next section. The power of the web as a network of networks is at the heart of these developments. Also, new technologies to harness the power of big data and collaboration technologies are making it possible to create infrastructures for lifelong learning that can contribute to sustainable development. Two such important developments that are based on the principles of the ‘wisdom of the crowd’ and ‘crowdsourcing’ that governments and educational institutions can take advantage of are open educational resources (OER) and massive open online courses (MOOC). Let’s discuss these in the next sections.

Table 1. Lessons from two concepts

<b>Facets of understanding</b>	<b>Wisdom of Crowd</b>	<b>Crowdsourcing</b>
What it is?	A goal	A process
How?	Aggregation of individual knowledge over a network	Distributed labour over a network
Examples	Wikipedia <sup>1</sup> , Quora <sup>2</sup>	Kickstarter <sup>3</sup> , social bookmarking (Scoopit <sup>4</sup> )
Advantages	Much faster, more reliable decision making; accuracy based on cultural understanding; cooperative network without a central system	Lower cost; faster solution; solutions may be provided by individuals and not moderated by groups
Challenges	Moderation of contributions; needs critical mass	Needs critical mass; motivating the crowd
Participation	Open	Open

### **Open Educational Resources**

<sup>1</sup> [https://en.wikipedia.org/wiki/Main\\_Page](https://en.wikipedia.org/wiki/Main_Page)

<sup>2</sup> <https://www.quora.com/>

<sup>3</sup> <https://www.kickstarter.com/>

<sup>4</sup> <https://www.scoop.it/>

The term OER was coined at the Forum on the Impact of Open Courseware for Higher Education in Developing Countries, held in 2002 (UNESCO, 2002). While the forum was called to discuss the contemporary developments related to emergence of the freely available educational resources (such as the MIT's OpenCourseWare and Rice University's Connexion, now OpenStax), the participants in the forum discussed several issues, including the new ways of sharing content on the Web, opportunities for meeting the training and re-training needs of a knowledge society, the perennial problem of insufficient library resources, the need for access to materials in languages other than English, and the "philosophical view of knowledge as a collective social product" (UNESCO, 2002, p. 15). Taking an altruistic view, the forum agreed to "develop together a universal educational resource available for the whole of humanity, to be referred to henceforth as Open Educational Resources" (UNESCO, 2002, p. 28). Since then several agencies, including UNESCO and the Commonwealth of Learning (COL) have been involved in promoting OER and/or developing repositories and platforms to share educational materials in the open. The OER Global Report 2017 published at the time of the second World OER Congress in September 2017 listed 101 OER repositories and platforms around the world (COL, 2017). This may not even be an exhaustive list, as several initiatives go unreported due to difference in understanding what constitute OER (Mishra, 2017).

Broadly OER are recognized as any teaching and learning materials that are either available in public domain or with an open license. Public domain here means that the copyright has expired, or the author has relinquished rights to the public. Open licenses are those licenses that allow users to reuse, repurpose, revise, remix, and redistribute without the permission of the original creator/ author. While the open nature of the OER bring obvious advantages as shown in Table 2, the world-wide wisdom of the crowd framework indicates how the movement is far from achieving its true potential to make available educational resources to anyone, anywhere.

As indicated in Table 1, Wikipedia is a participatory platform growing through the intellectual contributions of the crowd. It uses the wiki technology to help fast sharing of knowledge and all the contents are shared using the Creative Commons Attribution ShareAlike license. A controversial Nature article in 2005 reported that "the difference in accuracy was not particularly great" for Encyclopaedia Britannica in comparison to Wikipedia (Giles, 2005). Notwithstanding the concerns for quality (Holman Rector, 2008), Wikipedia has emerged as a key source for teaching and learning (Jemielniak, 2019, Meishar-Tal, 2015). But, in practice not all OER are developed following the approaches of wisdom of crowd or crowdsourcing. Many OER are developed by individual teachers and are not necessarily produced using the wisdom of the crowd. For example, in many North American countries, OER movement is about making open textbooks available to learners (Bowness, 2017). This is a product view of OER, while there is also a process view of OER that can improve the quality of teaching and learning when the teacher and learners are engaged in co-creation of OER (Elhers, 2016). Despite the process of development, anyone can take an existing OER and further improve their quality through crowdsourcing. Over 100 OER repositories currently available are providing platforms to aggregate individual knowledge over a network, and some of these resources are also developed as course teams of people from round the world, as in TESSA<sup>5</sup>, OER Africa<sup>6</sup> and OpenMed<sup>7</sup>. Even though many times the participation is not as open as it should be to leverage the wisdom of the crowd, OER provides the advantages of both the wisdom of the crowd and crowdsourcing. Availability of resources makes it easier for a teacher to bundle a package of resources for learners easily, and the content could come

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<sup>5</sup> <http://www.tessafrica.net/>

<sup>6</sup> <https://www.oerafrica.org/>

<sup>7</sup> <https://openmedproject.eu/>

from a range of intellectuals from anywhere in the world, leading to saving of time and resources and also improving the quality of teaching and learning. A major challenge is less opportunities for global collaboration, and specific nature of curricula across the geographical boundaries of nation states. Nevertheless, there are attempts to provide unified search facilities to the federated OER repositories (e.g. CORE<sup>8</sup> and X5GON<sup>9</sup>). These search facilities are expected to improve the possibilities of global collaboration, as issue of language and grade level appropriateness will be resolved through finding resource that could be subjected to wisdom of the crowd.

Table 2. Advantages of OER

<b>Stakeholders</b>	<b>Advantages</b>
Government Perspective	Advancing knowledge by unlocking information for the benefit of all
	Widening participation in higher education by expanding access to non-traditional learners
	Promoting lifelong learning
	Bridging the gap between formal, informal and non-formal
Institutional Perspective	Leveraging taxpayers' money by sharing and reuse between institutions
	Sharing knowledge is congruent with the academic tradition
	The public image of the institution may be enhanced & new students attracted
	Improving recruitment by helping the right students find the right programmes
	Provides a resource for students & faculty that supports learning and collaboration
Educator's Perspective	Attracting alumni as life-long learners
	Personal gain through increased reputation
	Gaining publicity or reaching the market more quickly may result in an economic advantage
	Fostering connections with colleagues around the world
	Preserving a record of teaching innovations allowing others to build upon them
Learner's perspective	Leaving a legacy after leaving academia
	An independent learner who has access to the Internet can access material from the best universities in the world
	OER can promote informal learning, where a credential is not needed
	Prospective students may access institutions by looking at their materials made available by other institutions

Source: Adapted from Hodgkinson-Williams (2010).

## Massive Open Online Courses

In 2008, George Siemens and Stephen Downes offered an online course called Connectivism and Connective Knowledge (CCK08) at the University of Manitoba, Canada, in which 25 tuition-paying students as well as over 2,200 online students from all over the world participated for free (Porter, & Beale, 2015). In response to this course, the term massive open online course (MOOC) was coined by Dave Cormier in 2008. Since then the concept has attracted many educationists, computer professionals and entrepreneurs to take the movement further. By 2012, there were already 25 million learners registered in different MOOCs (Chen et al, 2015). The New York Times declared 2012 as the year of the MOOC. Over the years, enrollment in MOOC have increased substantially reaching 110 million by 2019. There are about 13,500 MOOCs offered by over 900 universities (Shah, 2019). The idea of the MOOC has been picked up by the leading universities of the world offering the three big English language MOOC platforms: Coursera (Started at Stanford University), EdX (started at MIT and Harvard University) and FutureLearn (Open University, UK. While each of the words in MOOC provide support to the idea of the world wide wisdom of the crowd, MOOCs are interpreted differently by different stakeholders and there is no common understanding, except

<sup>8</sup> <https://core.ac.uk/>

<sup>9</sup> <https://www.x5gon.org/>

that it can provide learning opportunities to a large number of people in a short time and cost-effectively.

There are mainly two types of MOOCs from the pedagogical perspectives: cMOOC and xMOOC. The approach in cMOOC is to provide a platform to the learners to connect to individuals and resources, and emphasises learning through creativity, autonomy and social networking. On the other hand, the xMOOC approach is to focus on traditional video presentation and testing (Mishra, 2012). MOOCs, in reality, come with many other variations (Clark, 2013). Margaryan, Bianco and Littlejohn (2015) found that the combinations of technology, pedagogical frameworks and instructional designs vary considerably between individual MOOCs. They also found that MOOCs have used offline models of teaching and learning focusing on the organisation and presentation of course material whilst drawing on the Internet to open these opportunities to a wider audience.

MOOCs are by and large developed by individual institutions or Professors, and do not necessarily use the Wisdom of the crowd or are not developed through crowdsourcing. But, based on the types of the MOOC, we can use the wisdom of the crowd lens to consider MOOCs as a 'product' or a 'process'. While MOOCs have become educational commodity (product) that can be made available to many learners at low cost, the engagements (process) in MOOC could provide rich learning experience and leverage the wisdom of the crowd. For example, the network-based theory of connectivism used in cMOOCs follows on the principle of learning as the ability to construct and traverse networks (Downes, 2012) making meaning through aggregation of contents, remixing and discussions amongst various nodes. Most MOOCs provide free and open participation to anyone with Internet access, though credentialing or a verified certificate is priced. Even though most of the MOOCs are not crowdsourced, the online nature of the course provides opportunities to develop courses through global collaboration. There are several MOOCs in the FutureLearn platform that are developed through collaboration amongst universities in the North and South. Though a small number of MOOCs are developed by a diverse group of intellectuals, the range of discussions generated within the MOOCs are wisdom of the crowd. The advantages of economies of scale and participation can foster designing of learning experiences in MOOCs as wisdom of crowd, if the cMOOCs approach is followed. A new platform – LabXchange is using the power of the technologies behind MOOCs to create an online community for learning, sharing, and collaboration.

A MOOC with 100,000 students could achieve a marginal cost of under \$1 per student. There would be no need to hire instructors to answer students' questions or grade assignments, as the peers could answer questions, and either computers or peers could grade assignments (Saltzman, 2014). In addition to the economies of scale, MOOCs provide new business models for revenue generation through fees for certificate, employee recruitment, sponsorships of students, tutoring services, and meet-ups, etc. From the context of achieving SDG4, there are several benefits of MOOC as indicated in Table 3.

Early research (Chen et al, 2015) indicates that MOOCs are helping people to find a job (26%), enhanced skill for current job (62%) and improved candidacy for a new job (43%). Chen et al (2015) also reported that learners with lower levels of socioeconomic status and education from developing countries are significantly more likely to report tangible career benefits.

Table 3. Advantages of MOOCs

<b>Stakeholders</b>	<b>Advantages</b>
Government Perspective	Improve quality of education by offering courses by experts
	Avoid duplication of efforts in content development
	Increase access to education and training opportunities
	Promote lifelong learning
	Create a network of large number of potential “subjects”, which can solve the problems of the society
Institutional Perspective	Provide professional development and continuing personal education of learners
	Provide an opportunity to design, implement and evaluate new learning innovations in parallel with the day-to-day working of the institution
	Enhance the reputations of the participating educators and institutions
	Foster research and development activities taking place within the university, fulfilling another aspect of the institution’s service mission
Educator’s Perspective	Improve personal reputation
	Supporting learners globally and creating a sphere of influence
	Strengthening research and development through increased collaboration
Learner’s perspective	Demonstrating innovations in teaching and learning
	A range of choice to learn anytime, anywhere
	Learn free or at low cost from best teachers and institutions
	Receive credentials

Adapted from: Porter and Beale (2015).

## **CONCLUSIÓN/Where is Wisdom?**

“Where is the wisdom we have lost in knowledge?  
Where is the knowledge we have lost in information?”  
— T.S. Eliot

Above discussions show that OERs and MOOCs provide a huge opportunity to create a new infrastructure by which we can ensure lifelong learning opportunities for all. At least the idea of open as in both educational innovations could further enhance the possibility of massive to offer increased quality learning opportunities. As for MOOCs, they are also indicating towards a disruptive future for educational institutions where learning and certification would be separated. The implicit proposition in this article is to highlight the possibilities of the wisdom of the crowd and crowdsourcing approaches and encourage creation of educational resources, including courses that will truly help achieve the SDGs. One such example is World’s largest lesson , which has been designed for educators and all those who would like to teach children and young people about the SDGs. Teaching young people, the importance of the SDGs would help achievement of these goals through their actions.

Today, there is abundance of information on any topic. But it is also important to note that we are learning more and more about less and less leading to high specialisation. However, the opportunity to learn is not equal around the world, and that is the biggest challenge to the world we live. While information is abundant, access to these resources are not equal, and it is expected that creation and making available OER in all areas would help improve the situation considerably. The lack of textbooks to learn and develop basic literacy is still a problem for many places such as Malawi (Nhan-O'Reilly, 2018). If the wisdom of the crowd and crowdsourcing approaches to develop OER and MOOC are used in designing educational projects, it may be possible to solve many of the challenges. Each one of us can develop lessons/ knowledge resources to share with others using the power of the web and open licenses to allow reuse, revision, remix and redistribution. Granny Cloud is one such example, where volunteers, from the age group of 24-78, from all walks of life, are voluntarily supporting children around the world to learn.

There is a huge amount of misinformation circulating around in the social media sphere without attribution and usage rights. These make our societies volatile, uncertain, complex and ambiguous further emphasising the need for the 21st Century skills such media and information literacy to differentiate the fake from the truth and make appropriate decisions. The wisdom of the society remains in recognising the power of the commons to create and distribute knowledge equitably around the world. To make this a reality, we need to raise the consciousness of the humanity to global challenges and harnessing the wisdom of the crowd is the only solution.

## **ACKNOWLEDGEMENTS**

This article was originally written for Distance Education in China (to be published in Chinese as translation) and the author sincerely thank Professor Junhong Xiao, Shantou Radio & Television University, P.R. China for feedback and comments to improve the paper.

**Disclaimer:** The views expressed in this paper is that of the author and does not necessarily reflect the opinion of Commonwealth of Learning.

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