HARNESSING OPEN EDUCATIONAL RESOURCES IN HIGHER EDUCATION: PROGRESS, ISSUES AND CHALLENGES

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Abstract

Technology proliferation, has transformed higher education to a student controlled centered-based teaching and learning environment. The change of attitude towards the students by the institutions has shifted students' learning environment into a more active role as collaborators. This degree of openness through creating and developing of Open Educational Resource (OER) material can be more productive than the traditional learning environment, but main barriers related to copyright law should be addressed. Furthermore, research on comparative effectiveness is required to streamline and optimize the process, in addition to incorporating support of OER creation and development recognition into university policies.

Introduction

Universities and colleges' main mission is the creation and dissemination of knowledge. This is accomplished by providing the necessary development of skills and habits of minds tailored for lifelong learning. This mission is executed in a variety of ways by engaging the learners in stimulating and productive activities (D.C.C, 2009). The Internet has opened interesting opportunities for universities to rebrand their teaching and learning environment and the way to disseminate knowledge. This is attributed to higher education institutions' capability in generating information and communication technologies (ICT) that are being utilized to fulfill and empower their mission. Despite the ICT capabilities, the changes in learning and teaching are less pervasive than in other disciplines, such as in the finance and entertainment industries. This resistance to change perhaps might be recognized to the degree of openness and strict intellectual copyright issues, as well as institutions' rigid policies, which are hampering adaptation of major changes in the learning and teaching environment. The paper will address the issues of openness, an introduction and motivation behind OER, and a discussion on progress and challenges with emphasis on intellectual property, which is considered as one of the main barriers.

To a great extent the degree of openness plays a major role in fostering innovation and creativity by providing wide access, which enables wider participation, and therefore more individuals or groups of people who have a variety of ideas, for example to improve an invention. Yet the main challenge

is how to credit the main or lone creator and how his or role in the invention will not be underestimated. This, in addition, to technology proliferation had promoted the (OER) concept, where the *all rights reserved* model is transformed into *some rights reserved* (Prabhala, 2010). In the learning and teaching environment context, this implies that the content can be used, and shared freely and in some circumstances can be modified as well. It is important to highlight that not only may educators and learners use the material freely, but, importantly, they may also participate actively in production and modifying such resources. So not only will the knowledge grow, but also the number of knowledge creators will grow. In addition, UNESCO is advocating and promoting the OER model so that developing countries with modest to poor resources will be able to provide good quality education for their citizens regardless of their socioeconomic background and thus, developing countries will be able to catch-up with developed countries.

The main question is how do we define openness? It is worth noting that the concept of openness can be applied to institutions or information or processes. We refer to an institution's degree of openness, as to whether the institution provides access to learning and teaching material and shares the outcome of research output freely or the institution imposes some degree of restriction. So the degree of openness ranges the spectrum, of full restriction to complete free access or no restriction. For example, if a scientific journal provides and shares the data only through subscription, then its degree of openness is much less than a journal that provides the data completely free without a charge to the public. Furthermore, if the creators and the users have the ability to contribute and modify the content and the permissibility of redistributing it, then this is what we call responsiveness, so the degree of responsiveness is associated with the degree of openness. Responsiveness is also an important concept, due to the fact that widespread learners or users can apply the original knowledge further and in some cases contribute to the engine of innovation by active participation in the learning and teaching process. To some degree, ICT or the Internet can enhance responsiveness, but openness is not impacted by technology. It relates to the attitude and the degree of welcome of potential contributions, from expected and unexpected resources: even from those whose contribution is unanticipated, due, for example, to being affiliated with a different institution or related to a completely different discipline. Not only the attitude of the institution, but also its members can influence and impact the degree of openness, if, for example, researchers recognize students as fellow investigators this implies a greater degree of openness.

A good example of openness is an open source software. The software is distributed as broadly as possible to the public, the hope being that some programmers and users out there, can detect the errors and bugs and make suggestions on how to fix them. So there is an influx of ideas and feedback from many users on how to improve the software and fix the bugs, but not all suggestions are good, and if we change the software every time there is a suggestion, then we will not be able to use it. The conclusion from this discussion is that openness has some limitation, in this particular case limits on the responsiveness for the proposals to improve it. It is worth noting that

this limit of responsiveness is essential to maintain a good strategy to improve the software by the wider participation of the community, but with emphasis on maintaining quality control and stability. This example highlights the necessity of exercising some degree of limitation on openness, and greater openness is not always the right way to achieve a certain purpose. We are inundated with lots of open source information, and we are experiencing some degree of difficulties to filter those that are reliable and trustworthy from those that are not.

The progress in the technology development of the Internet from a vehicle that provides vast amount of information to users, to one that encourages and fosters collaboration of individuals and groups regardless of their geographical area has made a great impact on higher education teaching and learning environment. This environment has created and empowered teachers and students to collaborate, but also made a shift in the teachers' and students' roles as the reciprocation of knowledge is bouncing back and forth between the two parties. This certainly has fostered and encouraged innovation as the students can built upon the ideas of the teachers, but also can participate actively on adding their own ideas and refine and improve the ideas of their masters. So the environment of teaching and learning is transformed to an interesting vehicle of collaboration where the teachers and the students can learn from each other. This transformation has influenced higher education policy makers to make the learning environment more open. To that end, the degree of openness is enhanced, and this is the current trend that the higher education environment is adopting. In addition, many of the students might feel somehow constrained by universities or institution with less connectivity as compared to what they used to have at home or at high schools, as many of them have used the Internet from a very young age and never used a printed encyclopedia or dictionary. The Internet has accelerated the effect of globalization through the greater openness in many domains. A key aspect of this is that knowledge is a public good that should widely be available for everyone. This has been demonstrated by the addition of knowledge as an item in the European commission's list of items that should be moving freely through the European Union internal borders ("Summit Backs,"2008, March 14). Degree of openness can be influenced by geopolitical events, for example, post 9/11/2001 the number of foreign students from Muslim countries attending higher education institutions in the US remains significantly lower as compared to the number of students from other countries. Furthermore, the number of US students attending and visiting Middle Eastern countries remains significantly lower; this highlights the importance of policymakers in higher education to act to alter this situation to promote better understanding of the Muslim world especially among the younger generation where future US leadership is nurtured.

The State of OER and Its Progress

Due to the advancement in technology, and enhanced access of knowledge through a variety of ICT,, the Open Access (OA) movement arose. This movement had advocated for authors to publish preprints or archive their papers electronically, and recommended the creation of ePrints archives by universities and scientific organizations (Kiel-Chisholm & Fitzgerald, 2006).

Subsequently, they have published software that facilitates management of such ePrints archives, advocated utilization of the Open Access metadata standards to enhance the ease of discovery, and the communication with various governments that support and not impose obstacles on open access to authors of preprints.

The first online archive was created in 1991. The xrXiv.org, started as preprint services to physicists, and soon after self-archiving was popular. In 1997 the US National Medical Library followed suit with Medline, the most comprehensive medical literature index. In 1998, the first open access medical journal was created, *JMIR- Journal of Medical Internet Research*, publishing its first issue in 1999. To further promote the cause of OA, a meeting was held in Budapest, Hungary in 2001. Proponents of Open Access to scientific and scholarly journal literature attended the meeting. In February 2002, the Budapest Open Access Initiative (BOAI) (2017) was signed by 16 academics; the goal of the initiative was to accelerate open access for peer reviewed journal literature, through self-archiving and a new type of open access journals. The Bethesda Statement for Open Access Publishing (2013) created in June 2003, stated that all stakeholders should promote the rapid and efficient transition to open access publishing. The stakeholders are: the organization that fosters and support scientific research, the publishers who facilitate the peer reviewed distribution of the results, and scientists who depend on the knowledge of the published materials. The Berlin Declaration on Open Access to Knowledge in the Sciences and Humanities. (2017) was signed later in October 2003 on the heels of the Bethesda statement to further encourage and promote BOAI.

MIT, through its Open Course Ware (OCW) in 2001, pioneered open access in education (Iiyoshi & Kumar, 2008), and numerous well-known universities followed suit. Though, the concept of Open Educational Resources was introduced the first time in 2002 by UNESCO, to enable free sharing of knowledge through any designed materials intended for teaching and learning. Important documentation (Kurelovic, 2016) for OER, relevant to providing guidance and recommendation for wider acceptance includes: Cape Town Open Education Declaration (2007); the Dakar Declaration on Open Educational Resources (2009); the 2012 Paris OER Declaration; and the Commonwealth of Learning and UNESCO *Guidelines on Open Educational Resources in Higher Education* (2015).

Teaching and Learning Using OER

There has been transformation in the OER in higher education. The transformation is caused by technological development of the World Wide Web, which transformed the teaching and learning environment into a more participatory one. In phase 1 of World Wide Web development, the capability of uploading teaching materials and placing them on the Web enabled students to access the material remotely. With phase 2, the mechanism of active learning was introduced, and therefore students and teachers can participate collaboratively by downloading the course material, modifying it and retransmitting (Hilton & Wiley, 2009) it back to the teacher and other peers. This active participation provided a vehicle of enhanced innovation to be

created. By encouraging this student-centered collaborative approach, teaching and learning is moving away from teacher controlled delivery of discipline-based facts and knowledge into a more student-centered approach where the students have more responsibility and therefore become more independent. To some extent there is similarity in modifying the OER to scholars building upon previous research or findings. This can enhance the ability of solving community problems due to a large population of participants' engagement.

But the main question is whether this theory is capable of delivering superb results. As of today there is no concrete evidence to support this, but things are still evolving. However, the main notion is that there is a great difference between developing top notch materials and tools and developing and identifying the best strategies to incorporate them into critical mass and meaningful learning environments. How OER is affecting the teaching and learning environment is yet to be critically researched since too little information is available regarding how effective it is in higher education. We do know that open educational resources are being downloaded millions of times, but we do not know who the users are, where they are located and how they choose a particular educational resource, what they do with the material, and what the outcome is of the use of such OER material.

Some early research on OER at Carnegie Mellon University (2015) is very encouraging. Results indicate that newly created computer mediated learning material that incorporates embedded assessments, feedback loops and cognitive tutoring is as effective as traditional good lecture delivery. In fact it was noted that OER is more effective due to the fact that it is available 24/7, and it did achieve the learning outcomes of the course. Furthermore, the fact that the assessment is done automatically enabled the tutors to spend more time on material preparation rather than assessment and has cut total time spent substantially. The most important outcome of the studies is that students can master the skills and complete the course at faster pace than in a traditional learning environment. This has enabled them to finish the degree in a shorter time and join the work force and be more productive sooner.

Then the question is why we are not adopting OER more quickly? Unfortunately, lessons learned and sharing what is working as compared to what is not working in the educational environment related to the physical and cyberspace world are not generally effective. There is a great deal to be learned and adopted from the corporate environment. In general information about teaching and learning is hard to capture, tacit and difficult to formalize, and above all there are great challenges in disseminating the information, especially the case for implementation. Moreover, many institutions have not put great emphasis on how to educate their staff to be excellent teachers. The outcome of the above discussion is we need to invest more in research in comparative effectiveness of digital education material including OER and traditional material, and perhaps governments should encourage and support this undertaking.

OER Issues and Challenges

In the above discussion, the status of the art related to OER was discussed and this section is dedicated to challenges and issues associated with OER development and implementation (D.C.C, 2009), in order to gain the most impact and accomplish the learning outcome.

How OER Should Be Defined
Any digital material that is completely free, and can be accessed without restriction by anyone 24/7, and can be modified and redistributed with no restrictions is defined as Open Educational Resource (OER) material. Based on this definition, OER covers the far end of the openness spectrum. The main question is should we comply strictly with the above definition or should we adopt a more flexible definition that complies along the lines of the above definition? For example, if the material can be accessed by a small insignificant fee, then can this digital material be considered OER, or if the digital material is restricted to a certain geographic area to maintain quality and good standard then is this considered as OER? The answer for this question is yes. We should not restrict supporting the good cause of sharing knowledge and contributing to solving challenging problems for the better wellbeing of our community and society and other societies despite the fact that the degree of openness is a bit restricted. Sometimes those restrictions of access to limited people are imposed strategically in order to nudge or persuade right holders to give away more existing closed materials.

The Supply Side -- One Focus
Due to lack of comprehensive information about OER, in terms of who are the users, why they are interested in this specific OER, how they use the downloaded OER, and what is the end use of the modified and repurposed OER, and to what communities it was transmitted, these issues will shift the focus on the user aspect of the OER rather than on the creators. It has been noted, that the notion that with creation users will follow a flock approach is not working, and special attention to the users is required. This implies that there are many OER resources out there, but unfortunately they are not utilized, and therefore a large amount of time is being wasted due to one side being focused on creation rather than tailoring the product and addressing the users' needs.

Locating and Evaluating OER
A recent UNESCO and Commonwealth of Learning report (D'Antoni, 2008) has highlighted OER building capacity, promotions and awareness gaps between users and creators related to certain areas in the world where they are most impactful. It is essential to diminish this gap, in order for OER to be used effectively. Thus, we need to develop ways to emphasize where OER are located, including detailed instruction on how to use those resources so that potential users will be able to make informed decisions about OER. For example, by uploading the OER on a well visible website or OER repository, we can utilize data mining to get better ideas on who are the potential users, from which geographic areas they are from and for what reason they are interested in this type of OER. Evaluating OER is one of the main challenges

facing potential users. Since the OER will be modified on a constant basis, with updating the OER number version, it is difficult to judge whether the new version is better than the older version, so in terms of OER quality it will be difficult to assess. Possible resolutions are to depend on a third party evaluation, or based on crowd sourcing, where potential users can assign a rating; this might help users make more informed judgments of which version to go with. But even those solutions are limited due to barriers in culture and languages associated with particular geographic areas; something that is working in one area might not work as well in another one.

OER Environment and Coordination Is Required
There is a complete lack of collaboration on the supply side by the OER companies. While it is good to have a decentralized supply chain, as this will foster innovation, it is also good to some extent to collaborate on marketing, and to share data to prevent duplication of efforts in product development, in order for potential users to have an ease of discovery. Furthermore, if standards need to be developed for ease of interoperability then some sort of minor coordination is required. This certainly does not imply that users and groups should follow the same path.

OER Creation and Incentives Development
To encourage faculties, institutions and students to be involved in OER creation and development there should be some sort of incentives to embark on this undertaking. One incentive is to promote certain good causes or a goal to help the community in a certain problem. This moral incentive is crucial to the success of OER development and creation. From the point of view of a faculty embarking on this effort, it will require the institution to provide incentives, such as awards, funds and promotion that go beyond the traditional path of research promotion since this effort is tailored to a more effective and productive teaching environment. From the point of view of the institution, , while the initial investment in creation and developing OER is relatively high, the outcome of a successful OER is cutting the assessment time, freeing the faculty to concentrate on preparing materials, in addition to recognition on the national and international level of the quality and the merit of utilizing OER. For example, MIT's Open Course Ware (OCW) has enhanced the reputation of their faculty and the institution and leveraged the students' enrollment through the highly recognized OER courses. From the students' perspective, the material is available 24/7, the students are actively participating and the material will be revised and repurposed by students for variety of projects. In addition the students are engaged actively, and they will be responsible for the maintenance of the repository.

OER, -- the Role of the Government
It is favorable for a government to provide support and funding to OER creation especially in disciplines that lack OER or where underserved OER exists. OER utilization and incorporation of curricula have transformed teaching and learning to create an effective and productive environment. Therefore, a government should provide funding for research on comparative effectiveness of digital materials and traditional material, in order to come-up with the best forms of education and practices to deliver productive and

superb results. But the main question is whether a government should engage in those activities to address certain OER voids and what is the implication of this in terms of competition with private parties? There should be no problem for private vendors to capitalize on governmental funded OERs and develop products around those OERs.

Intellectual Property (IP) Right and OER Development
One of the major barriers of OER development is the ownership of intellectual property rights of the material that will be available freely online. There is great reluctance of copyright holders to make their material accessible freely without a charge. In addition, it is often the case that it is difficult to locate or identify the copyright holder of such materials. Thus, in order to clear those obstacles the only legal avenue to move forward in order not to hamper OER creation and development is to go ahead and purchase the copyrights from the holders, which will add significant cost to OER development. Obviously, no one should undermine copyright protection in spurring innovation; however, for OER to be able to be used freely, be modified and repurposed and transmitted, some more flexible less restrictive, less expensive and less time consuming mechanism of right clearance should be conceived. So, for the long run, purchasing the copyrights from holders is not sustainable. This has prompted looking into other avenues, such as the institution persuading the faculty who created the copyrighted material to be more generous and less restrictive. It has been demonstrated that to a certain extent being more open and less restrictive can enhance the institution's and faculty's reputations by enhancing the sales of textbooks of faculty who created OER material through the recognition of their work, and may increase the enrollment at the university. Recognizing the value of sharing through OER will cause a more even distribution between the rights of the creators and the rights of the users, who may serve as follow on innovators. This recalibration of the relationship between the creators and users will provide more acceleration of innovation through OER, which is the vehicle of quicker diffusion of knowledge. Prior to technology proliferation, recognition was in terms of intellectual property rights in the domain of the creators, but due, to the Internet and the advancement in technology, there has been a shift towards the users, which are the follow on innovators. This shift has caused creators to push for more restrictive copyright protection, which entails less room for user's innovations and underproduction.

Fair Use and Educational Exceptions
The United States compared to other countries has generous and robust use of the fair use doctrine, which allows the use of portions of copyrighted material for educational purposes without the permission of the author or the copyright holder, as this will not be considered as a copyright infringements. Unfortunately, the use of the fair use doctrine for OER material is limited, and, therefore, with maturation of OER, new legislation might be required. This might be accomplished through more exceptions and flexibility being granted towards non-commercial educational users of OER.

Intellectual Property Licenses for OER
The main challenge is how OER should be licensed given the current status of intellectual property law, which enforces strict copyright protection for the holder of an invention. One recent important development in intellectual property arena is the emergence of Creative Commons (CC), where the organizations have created more flexibility of copyright protection and permissions including opening up the work of creators for others to build upon, subject to the requirement of attribution to the original owner. The variety and flexibility of the various CC licenses has created some issues related to interoperability between different OER supporters. This has prevented integrating or mixing and matching of different intellectual property OER. CC recognizes the issues and problems associated with standardization of licenses. These issues need to be addressed in order for CC licenses to be more widely accepted.

Standards and Operability
Identifying, locating and utilizing OER has been impacted negatively by a lack of standards, in analogy to impediment of OER free exchange due to lack of standardized intellectual property. There is great need to have an OER standard that runs across the board, on all platforms, with no restriction such as on desktops, laptops and mobile devices. Furthermore, OER needs to be displayed effectively in many media, including print. In addition, a standard needs to be developed specifying that once OER is created and deposited in a repository it can be visible and accessible on all OER repositories; it is like create once but appear on all. These factors can provide an ease of discovery and will reduce the time and cost of learning due to common educational instructions. Even though standardization can promote openness it has some challenges associated with its adoption. For example, if the standard is adopted too early, this might stifle innovations by freezing the current status of development, and if it was adopted too late, will hamper recognition and utilization on broader scales.

Learning About Co-Creation
OER material based on the definition is digital material that is shared, modified, repurposed and retransmitted among users. This sharing nature of the material necessitates the effective developments of models and best practices for co-creation, in order to deliver clear measurable output, through strict time deadline compliance. For collaboration to be successful there should be recognition from all participating parties of mutual benefit and the common shared sense of ownership.

Sustainability
Is there a need for an OER business model that is sustainable? Is substantial direct support required, and how we can maintain OER existence in the long run? These issues are important, since the initial development of OER was started through the volunteer work of individuals, and then was sustained by faculty members and certain institutions and the vision of private foundations. For example the creation of the open source LINUX was supported by IBM, a major corporation, which maintains strong support for the open source software. This has helped IBM to maintain its dominance in the IT market. Is

a similar business model needed to be developed to maintain the sustainability of OER, or is the emergence of different business model required? We are on hold, wait and see, period, but the reality is that OER is to be sustainable, and, hence, some sort of support is required. This might come from corporations that are developing products or commercial activities building upon OER, or direct support from colleges and universities that broaden the utilization of OER in their courses, or direct government support for OER for the public good and fees collected from institutions based on training their OER users.

Case study: OER Uptake by University Staff

A study (Hart, Chetty, & Archer, 2015) investigated to what extent the institutional intent for developing and utilizing OER was implemented within an organization. Furthermore, what were the inhibiting factors, and what types of support is required to realize this commitment in order to contribute and harness the potential of OER benefits for the learners? The study made an effort to link the adoption initiative with the intervention actions taken to harness OER among staff and learners. The creation of OER by the staff is essential to the success of the OER mission. Therefore, the attitude of staff towards creating OER should be examined and monitored because this can impact OER development, as the institution matures with regards to OER utilization. The major elements that will influence a new idea or innovation (Rogers, 2003) are the innovation or the idea itself, the communication channel, time and a social system. In this case we are considering OER as a disruptive idea or innovation that must be widely adopted by the staff, in order to be self-sustainable. The study followed the uptake progress of staff and highlighted the appropriate support, communications and implementation effects at each stage of the following five stages of the innovation adoption process (Rogers, 2003): knowledge (awareness), persuasion (interest), decision (evaluation); evaluation (trial); and confirmation (adoption). Each stage in the innovation adoption process is associated with information and support needs. The University of South Africa has implemented the first two stages of knowledge and persuasion by raising the awareness of faculty and staff. The institution plays a crucial role in making the community sensitive or more engaged with innovative ideas, then providing scaffolding support in order to grow the knowledge. (The institution demonstrated this via internal communication and by providing the relevant information via a repository.) The stages of decision and implementation were supported by confronting real or perceived barriers related to OER and by trying to find workable solutions. The final stage of implementation will be accomplished through embedding OER in teaching and learning with the appropriate infrastructure of reliable ICT. Also, and essential for the last stage to be successful, the staff that advocated for OER utilization should take the championship and ownership of the OER initiative, which also can provide the sustainability aspect of it. It is realized from the above discussion that institutional policy with regards to OER initiatives and removing barriers are essential for OER uptake among faculty and staff. The barriers can be compiled into three groups: the intrinsic nature of OER, institutional infrastructure, and the personal attributes of the staff. Despite efforts to overcome come them, these barriers were associated with the University of South Africa's staff; previous research in developed countries indicated similar results associated with OER barriers. The barriers

discussed above are related closely to the degree of institutional maturation for OER adoption.

Conclusions

The explosion of technology and advancement of the Web to a second phase where collaboration capability augmentation is experienced, as compared to Web phase 1.0, has transformed higher education to a student controlled-centered based teaching and learning environment. Due to this transformation, universities started to adopt more openness in their teaching and learning, treating students as fellow investigators that can build upon the ideas of their teachers and repurpose the material tailored to their interests. The change of attitude of the universities has transformed students teaching and learning into a more active role as collaborators. This degree of openness through creating and developing OER material can be more effective and productive than a traditional learning environment. However, more research on comparative effectiveness is required to streamline and optimize the process, in addition to incorporating support of OER creation and development into university policies.

OER penetrations in higher education environment are less pervasive compared to other industrial disciplines due to lessons learned sharing ineffectiveness and challenges in disseminating the knowledge across the board with regards to implementation. Therefore, unless a mechanism of disseminating the knowledge focused on implementation is developed and put in place, similar to what is available in the corporate environment, disruptive teaching and learning technologies such as OER will remain less diffusive in higher education environments. It is therefore vital that institutions play a critical role to develop strategies to incorporate and embrace OER. This should be implemented by approving an OER strategy and an OER coordinator appointed in the Provost and/or Vice Chancellor's office. There are also certain barriers that need to be addressed. The role of governments and institutions is critical in support of OER initiatives. Government's role includes: fund projects on comparative research effectiveness of digital material, as well as conventional material; expand the permission of usage beyond the classroom for non-commercial copyrighted material under the educational exception; review the educational exception for non-commercial copyrighted material due to open educational resources; be actively engaged in funding best practices for collaboration and eliminating barriers to enhanced collaboration; and reconsider intellectual property laws, mainly in recognition of individuals follow on innovation. Universities should: consider posting course material online with options for the users to remix; repurpose and redistribute the material; promote the engagement of faculty in creation of OER material, and consider this activity for faculty promotion and tenure; provide faculty training and support to those interested in OER development; encourage student involvement in OER creation and maintaining the repositories through academic credit; work with IP holders to get their approval to make their material open to the public; and promote the use of Creative Commons Licenses by faculty.

References

The Bethesda Statement for Open Access Publishing. (2013, June 20). Retrieved from http://legacy.earlham.edu/~peters/fos/bethesda.htm

The Berlin Declaration on Open Access to Knowledge in the Sciences and Humanities. (2017). Retrieved from https://openaccess.mpg.de/Berlin-Declaration (Signed October 2003)

Budapest Open Access Initiative. (2017). Retrieved from http://www.budapestopenaccessinitiative.org/

Carnegie Mellon University. (2015). *Open Learning Initiative*. Retrieved from http://oli.cmu.edu/

D.C.C. (2009). *Harnessing openness to improve research, teaching and learning in higher education. A report by, 1-101.* Washington, D.C.:Tthe digital connections council of the committee for economic development.

D'Antoni, S. (2008). Open educational resources: The way forward, deliberations of an international community of interest . UNESCO & International Institute for Educational Planning. Retrieved from http://unesdoc.unesco.org/images/0015/001579/157987e.pdf

Hart, K. E., Chetty, Y., & Archer, E. (2015). Uptake of OER by staff in distance education in South Africa. *International Review of Research in Open and Distributed Learning, 16*(2), 18-45.

Hilton, J., & Wiley, D. (2009). The creation and use of open educational resources in Christian higher education. *Christian Higher Education, 9*(1), 49-59.

Iiyoshi, T., & Kumar, M. S. (2008). *Opening up education.* Cambridge, Massachusetts: MIT Press.

Kiel-Chisholm, S., & Fitzgerald, B. (2006). The rise of open access in the creative educational and science commons. *Policy Futures in Education, 4*(4), 366-379.

Kurelovic, E. K. (2016). Advantages and limitations of usage of open educational resources in small countries. *International Journal of Research in Education and Science, 2*(1), 136-142.

Prabhala, A. (2010). *Copyright and open educational resources.* Vancouver, British Columbia, Canada: Commonwealth of Learning.

Rogers, E. M. (2003). *Diffusion of innovations.* New York, NY: Simon & Shuster.

Summit backs 'fifth freedom' for EU scientists. (2008, March 14). *Euroactiv.* Retrieved from https://www.euractiv.com/section/innovation-industry/news/summit-backs-fifth-freedom-for-eu-scientists/

UNESCO and Commonwealth of Learning. (2015). *Guidelines for open educational resources (OER) in higher education.* Paris, France: UNESCO and Commonwealth of Learning 2011, 2015 Vancouver, British Columbia, Canada. Retrieved 03 23, 2017, from http://unesdoc.unesco.org/images/0021/002136/213605E.pdf

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