Quality indicators within the use of open educational resources in higher education

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A paradigm shift is emerging in higher education especially regarding how universities should address personalized and collaborative mobile learning. Experiences from three international benchmarking-projects through the European Association of Distance teaching Universities (EADTU), the European Centre for Strategic Management of Universities (ESMU) and the First dual mode benchmarking club on quality of e-learning in higher education carried out by Lund University showed that quality has to be valued in a holistic perspective, and to a higher extent from the learners' perspectives and from learning dimensions. In these projects benchmarking was emphasized as a powerful strategic tool to assist decision-makers in improving quality and effectiveness of organizational processes and thereby reaching the position of the best international player in the higher education arena. The studies also showed that other quality dimensions have to be considered, as web 3.0, open educational resources (OER) and collaborative learning radically will extend the learning environment. The classroom will move out into the world, instead of (as in earlier technical revolutions) the technology being integrated into the traditional classroom [1-4]. From a recently completed Swedish project on OER in higher education it became obvious that the issue of resource sharing opens up much wider questions of a structural and cultural nature. Collaborative, ubiquitous-/open learning and cloud learning environments as well as demands from the millennium learners entering higher education will profoundly impact on the current university arena. In addition the global knowledge-based sustainable society will be of utmost importance [5].

This chapter will elaborate on challenges and consequences on the emerging movement on OER especially regarding quality from the learners' perspectives. The chapter will also discuss the consequences of the needs of a changing cultural educational paradigm towards openness, personalization and collaboration and encourage to benchmarking on the use of OER and search for good practice.

Keywords benchmarking; collaborative learning; e-learning; oer; open learning; stakeholders; quality

1. Introduction

Major changes are taking place in European higher education today. The key challenges universities have to face are due to increased globalization, openness and awareness of sustainability. Probably one of the strongest driving forces concerns the use and consequences of rapidly developing technology. In higher education a paradigm shift is emerging that mainly concerns the shift in how universities should address personalized and collaborative mobile learning with learning in focus. There are strong needs for changes in pedagogical and didactic approaches with the learner in focus and where content can be reached with openness, networking and collaborative learning [6]. Quality in education and research is the key to support innovation, creativity and excellence. Enhanced quality, increased openness and transparency are strong driving forces behind competition and collaboration in education and research. Universities have to both collaborate and compete in the international educational arena [1,7]. They are required to be competitive not just in terms of their educational, social, managerial and technological aspects, but they are also called to work globally as drivers for innovation and to contribute to sustainable development [1,2,3,7,8]. In this context, enhancing the performance of universities and modernizing university must be on the agenda for all universities and decision-makers in Europe [9] and internationally.

Findings from research on international benchmarking on e-learning in higher education indicate that quality in e-learning has to be valued from a holistic perspective and to a higher extent from the learners' perspectives and from learning dimensions [1-4]. In these projects benchmarking was emphasized as a powerful strategic tool to assist decision-makers in improving the quality and effectiveness of organizational processes and thereby reaching the position of the best international player in the higher education arena. The studies also showed that other quality dimensions have to be considered, since Open Educational Resources (OER), web 3.0 and collaborative learning will radically extend the extended learning environment. The classroom will move out into the world, instead of (as in earlier technical revolutions) the technology being integrated into the traditional classroom [2,3,5]. Studies by Kroksmark [10] and Kjällander [11] indicate the same, i.e. that learning has to be considered in an extended learning environment and as stretched learning. Collaborative, ubiquitous-/open learning and cloud learning environments as well as demands from the millennium learners entering higher education will profoundly impact on the current university arena. In addition the global knowledge-based sustainable society will be of utmost importance [5]. The issue of resource sharing opens up much wider questions of a structural and cultural nature.

Within the above contexts, open content which can be shared by others will be extremely important for educational institutions. They will have to support and plan in a systemic manner for development and improvement of curricula and course design, development of quality teaching and learning material, design of assessment tools for diverse environments and to organize interactive contact sessions for students. OER can make a significant contribution to this process [6: 5].

2. Open Educational Resources - OER

OER was first introduced as a concept initiated by UNESCO 2002 at the UNESCO forum [6,12-15] as part of the millenium goals[1] and education for all.[2] Now ten years afterwards the OER movement is rapidly developing in most countries. Initially OER was defined as by The Hewlett Foundation, responsible for an extensive program on developing and dissemination of digital learning resources: OER are:

Teaching, learning, and research resources that reside in the public domain or have been released under an intellectual property license that permits their free use or re-purposing by others [16: 3].

Atkins, Brown & Hammond [16] have identified the benefits of OER in their model by the concepts *equalize access* in relation to the learning and access to material, *understand and stimulate use sponsor* i.e. to understand and to stimulate the use of learning resources, *sponsor high-quality open content* i.e. foster quality in OER and finally *to remove barriers* as Figure 1 shows. They describe the model as a circular movement, which characterizes OER. One of the main strengths of OER is developing learning resources that can be used and reused for different learners, different purposes and in different contexts.
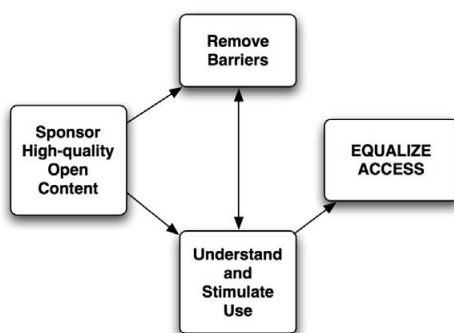

Fig.1 Current Open Educational Resources Logic Model [16:3].

In Figure 1 the four main areas of benefit in the use of OER are identified. The Commonwealth of Learning (COL) and UNESCO consortium has defined OER and the concept will be discussed as:

Open Educational Resources *(OER) OER are teaching, learning, and research materials in any medium that reside in the public domain or have been released under an open license that permits their free use and, in some instances, re-purposing by others. The use of open file formats improves access and reuse potential of OERs which are developed and published digitally. Open educational resources can include full courses, course materials, modules, textbooks, research articles, videos, tests, software, and any other tools, materials, or techniques used to support access to knowledge. OER is not synonymous with online learning or eLearning. Rather, many OER – while shareable in a digital format – are also printable. Given the bandwidth and connectivity challenges common in some developing countries, a high percentage of resources will be shared as printable resources, rather than being designed solely for use in online learning* [6: 3].

The production of OER is not enough; more important is to develop practice and culture in the use of OER and gain from the benefits of OER from the learner's, teacher's and management's perspectives. There is a need to see a radical change in educational practice before any real change can be achieved and so the focus is now shifting towards Open Educational Practices (OEP) and Open Educational Culture (OEC). OER can lead to major changes in teaching and learning but this can only take place in organizations that make conscious choices. Without policies and strategies from those in authority the mere existence of OER will not in itself lead to lasting change [6,14,15].

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[1] http://www.un.org/millenniumgoals/
[2] http://www.unesco.org/education/efa/ed_for_all/

According to UNESCO-COL governments play a crucial role in the development and implementation of OER. Given this role, governments are ideally positioned to encourage or mandate higher educational institutions to produce educational resources in open formats and with open licenses. In this context it is suggested that governments shall:

*…support the use of OER through the revision of policy regulating higher education…contribute to raising awareness of key to OER issues…review national ICT/connectivity strategies for higher education…consider adapting open licenses framework…consider adopting open formats standard…support institutional investments in curriculum design…support the sustainable production of sharing learn*ials and [sic] *to collaborate to find effective ways to harness OER…* [6: 7-8].

Open Educational Resources (OER) are defined by the OPAL project [17,18] towards a practice orientation:

OEP are defined as practices which support the (re)use and production of OER through institutional policies, promote innovative pedagogical models, and respect and empower learners as co-producers on their lifelong learning path. OEP address the whole OER governance community: policy makers, managers/ administrators of organizations, educational professionals and learners [17: 12].

OEC is understood as the entire concept of sharing and having the sharing approach as default. This culture of sharing will be discussed in the next section [18].

2.1 Creative commons

Within the use of OER, which by per definition concerns free educational resources, there are licenses for use and reuse. Creative Commons (CC) licenses[3], the most common tool, provides simple, standardized alternatives to the *all rights reserved* paradigm of traditional copyright, in Fig. 2. With a Creative Commons license, the copyright always belongs to the producer, who always will be credited, but with cc allowance resources can be used for copying, distributing and also for commercial issues but only on the conditions specified and decided by the producer, using the four cc symbols in combinations. The principle of cc is *some rights reserved*.

Fig. 2 Creative Commons

The creative commons symbols are illustrated as above and these can be combined for different kind of licenses i.e. permission to copy, distribute, edit, remix and use commercially or not, all within the boundaries of copyright law.

Although Creative Commons is established in many countries today it is still far from being commonly accepted by teachers and administrators. Clear guidelines from authorities and national policies on how state-employed teachers' material should be shared are essential for a mature use of OER in education.

2.2 On reusability

The simplest form of OER is often the recorded lecture and this format is probably the most common one on many of the major repositories and distribution channels (YouTube Edu, iTunes U, Academic Earth etc). At best these lectures can gain almost viral status, especially if the lecturer is particularly inspiring. However the vast majority of filmed lectures represent a fly-on-the-wall's view often filmed with a static camera at the back of the room and with little or no editing. For the secondary user this type of content is seldom compelling. Recorded fly-on-the-wall lectures are often very difficult for other teachers to reuse since the teacher is clearly addressing the audience in the room and not the net-based audience. From the outset there is a chasm between the recorded teacher and the secondary audience. Dialogue between teacher and students is generally highly context-specific and of little interest to secondary users. As Bates [20] points out, a great deal of OER is made without any regard to secondary use and the result is a recorded lecture that is only of interest to those who attended the live version. OER should always be planned with secondary use in mind:

"… my main point is that if an instructor or institution is intending its digital materials to be used also by third parties, thought should be given to their secondary use before they are developed for classroom use. A simple example: instead of giving a continuous 50 minute lecture, break it into several short, self-standing sections of five to ten minutes, which

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[3] http://creativecommons.org/

can then be simply edited to insert questions, activities for learners, etc. This would not only make it more useful for independent learners, it would also improve the learning experience for the classroom students. Doing this after the event is costly and difficult. By all means let's develop and use open educational resources, but let's do it well." [20]

Depersonalizing OER makes it much easier for other teachers to reuse and adapt material to local contexts. This element of reusability is a key quality aspect for the OER movement. Producing short, concise, depersonalized and independent sections makes it much easier for secondary users to add their own exercises and more culturally specific adaptations.

Many teachers are highly reluctant to use other teachers' material on the grounds that it represents a kind of *lazy* teaching. If OER can provide a high quality framework for a lesson and the secondary user teacher is able to add her/his own expertise to the mix this may lead to a greater adoption of OER. Teachers' fear of OER is often due to insecurity that the OER will somehow undermine their role in the eyes of the students. The OER movement should not underestimate this factor.

2.3   International initiatives

Over the past few years a significant number of initiatives and projects have emerged to support the development and sharing of OER. The concept of OER has its foundation and base in connectivism theory [20] and can thus also be understood in the light of the movements on collaborative education and learning [21]. Initiatives to be mentioned as examples are such as Peer-to-peer University (P2PU)[4] University of the People (UoP),[5] MOOC (Massive Open Online Course),[6] the OER University [22], The OPAL project, the OLCOS project [23] and DoItYourself (DIY) [24] where the use of open and shared resources is fundamental to the course structure. OER Glue,[7] provides an attractive and user-friendly framework for linking together OER into a course platform. Teachers are thus able to build their own course with OER. More commercial initiatives like Udemy[8] offer similar opportunities for teachers to build courses with OER. UNESCO-COL has recently (August 2011) published proposals for policies and guidelines for the urgent implementation of OER around the world [6, 14, 15].

2.5   Barriers

Obstacles for academic teachers are usually expressed as lack of quality control. There are well-established structures for quality control of scientific communication and peer review. For OER there is no corresponding system or common agreement and it is often up to the individual teacher to evaluate the quality and validity of a resource. Social media offer potential solutions in that material that has been reused and recommended by many clearly has a certain degree of quality. More consistent use of tagging, recommendations and linking to related material will become increasingly evident but there is still a need to draw up quality guidelines and a system for metadata describing the relevance and context of resources. One main drawback to the increased use of OER in universities and schools is the difficulty of finding relevant resources. This is due both to the lack of consistent metadata tagging and the lack of effective search and retrieval tools.

The report, *Beyond OER – Shifting focus to open educational practices* [17], names five barriers faced by those who wish to use OER:

> ➢ *Lack of institutional support*
> ➢ *Lack of technological tools*
> ➢ *Lack of skills and time of user*
> ➢ *Lack of quality or fitness of OER*
> ➢ *Personal issues (lack of trust and time)*

Even if teachers understand the benefits of using OER they are often reluctant to take significant initiatives unless there is a positive climate for innovation in the institution and an explicit acceptance of open education principles at management level.

> *It may thus be concluded that, regardless of educational professionals considering OER to be important for themselves or for others (e.g., students), the lesser the fear, insecurity or discomfort vis-a-vis OER, the higher the frequency of OER use. As regards the existence of open resources' programmes or initiatives in the institution, individuals from institutions where such programmes/initiatives already exist did show a higher frequency of OER use.* [17: 8].

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[4]http://p2pu.org/
[5]http://www.uopeople.org/
[6]http://www.youtubr.com/watch?y=eW3gMGgcZQc
[7]http://blog.oerglue.com/
[8]http://www.udemy.com/

As mentioned above barriers can be faced on different levels, and some examples will be discussed as below.

2.5.1 At management level

Institutional support is essential with clear institution-wide guidelines for the use and production of OER [6,17]. Policies to support the use, reuse and creation of OER (at institutional and national levels) are a precondition to development. Common principles and policies between groups of institutions are even more powerful tools. The OPAL report shows that the use and development of OER was highest at institutions that clearly supported such work and had policies [17]. Universities are often highly decentralised with largely self-governing faculties/schools. Internal rivalries and a diversity of policies and cultures can severely limit an institution's attempts to promote a culture of sharing and openness.

2.5.2 At teacher level

The redefinition of teaching and learning towards a more connectivist approach (learning by sharing, networking, defining and redefining) is essential if the full potential of OER is to be attained. Teaching in its traditional sense (i.e. lecturing, teacher as source of knowledge) must give way to the roles of facilitator/mentor/learning advisor and this change forces teachers and leaders to reexamine deeply held beliefs about their own roles. Teachers have always been encouraged to be self-sufficient and to take pride in managing all aspects of their teaching. Teachers' insecurity with OER and the use of the net in education needs to be addressed. Many teachers identify strongly with the traditional role of "sage on the stage" and see the use of net-based resources as undermining their authority. Pride in "my class" and "my course" should not be underestimated and this leads to a natural reluctance to share resources and a suspicion of others' material. This is why quality is such a crucial factor in the widespread acceptance of OER among teachers. Traditional quality criteria (reputable publisher, familiar author) do not apply with OER and it is essential that credibility and authority can be assured. Initiatives such as EPPROBATE,[9] the first international quality label for e-learning courseware, have a crucial role in winning over traditional teachers to the adoption of OER. Even the project CONCEDE, which aims to improve the effectiveness of teaching and learning by enhancing the quantity and quality of user generated content that can be incorporated into higher education learning provision may have an impact on the implementation of OER.[10]

Unfamiliarity with legal aspects leads often to an overly cautious approach to OER. Few teachers are aware of the principles of CC and are unsure of who owns the rights to their material. If the university has no clear guidelines, this will result in a reluctance to challenge the status quo and at best only ad hoc solutions. In addition many teachers write course literature as a secondary source of income and the idea of freely distributing material would of course deny them this opportunity. In countries where academic salaries are low this extra income is extremely important and any attempts to enforce OER as default practice will be met with hostility unless teachers are reimbursed in other ways.

Real or perceived difficulties searching for relevant OER are a further issue that troubles many teachers. Finding suitable OER simply takes too long and is unnecessarily complicated. There is a lack of robust and comprehensive search engines and a large proportion of OER are inadequately tagged. Video and audio material often has inadequate tagging making it extremely difficult to find relevant material. The abundance of low quality OER has lead many teachers to dismiss OER as a realistic source of teaching material. Internationally recognized quality assurance frameworks will eventually enable teachers to dismiss low quality material but it is undoubtedly a negative factor for many teachers at present.

The concept of scholarship of learning and teaching is widely recognized worldwide. However it must now be re-examined to include new ways of networking, sharing ideas and resources. Extending scholarship beyond the walls of the faculty building into virtual networks and arenas for discussion would seem a natural progression.

2.5.3 At student/learner level

In spite of labels like digital natives/net generation many students view education very traditionally and have quite narrow definitions of what a good teacher should do. Students who are focused on exam results and see education primarily as accreditation and the winning of certificates will find concepts like connectivism and open learning highly disconcerting. Teachers who use OER instead of lecturing risk being seen as "not real teachers" and may get lower evaluation results than colleagues who teach more traditionally.

The open publication of student material is another potential problem area. The university can adopt an OER policy for all material produced by faculty but it cannot force students to do the same. The adoption of open course platforms such as public wikis or blogs may not appeal to all students and many may be concerned about publishing their ideas openly. Today's VLEs keep all student work behind faculty walls but as we evolve on to more open approaches, as seen

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[9] http://epprobate.com/
[10] http://www.concede.cc/

for example in MOOCs and Peer 2 Peer University, it cannot be taken for granted that all students will accept openness as default.

OER demands and prerequisites a culture of sharing which will be discussed in the following subchapter.

3. Culture of sharing

The development of open learning will make radical demands on teachers, students, leaders of educational organizations and policy makers [6]. A major reason behind the general reluctance to adopt OER is insecurity. OER calls into question many of the most central concepts in education: the role of the teacher, the role of the university, the classroom, course literature and examination. A culture of sharing course material will demand new structures of course design, course delivery and assessments as well as an increased focus on pedagogy and development of teaching and learning. Adoption of OER forces a radical review of how universities deal with these issues. Fully adopting OER and moving towards OEP and OEC will require teachers to relearn teaching and students to relearn learning. A culture of sharing and collaborative learning will thus become the new educational and learning paradigm [5].

The changes do not simply concern technological innovations or a technological revolution but more ongoing cultural educational and organizational innovation in new learning environments [25]. Kroksmark [10] and Kjällander [11] refer to the new learning paradigm calling more for extended learning environments. Kroksmark [10] even argues for stretched learning and stretched learning environments. The changing paradigm is expressed as more of a revolution than just a paradigm shift [26-30]. Wheeler [31] more powerfully expresses it as *Doing Battle*. The battle referred to means first that there is a need to examine what education actually means, the word comes from latin *educere* and means draw out from or to tap in some one's potential, not to control. Secondly new and emerging technology can liberate learners by extending, enriching and enhance learning opportunities, which also was articulated by Kroksmark [10]. Thirdly, stop managing learning and hand it over to the learners as with the P2PU, MOCC and the DoItYourself [24] initiatives. *Doing battle* will radically change the teachers and the educational organizations and thus the educational and learning culture. Thomas & Seely Brown [30] introduces the provocative and tremendously important new conceptual paradigm as *a new culture of learning*. At first glance it seems to be simple, subtle, and sophisticated, but they highlight how digital technology will profoundly change the future and the competitive edge. They also draw attention to the fact that the needs for a new culture of learning raise serious consequences; the only constant is that we are living in a world of constant change and we have to face the challenges. Success factors for collaborative learning are often highlighted as critical friends, communication, equality, ownership and intelligence gathering [3]. Read underlines the OER movement as cultural and organizational drivers or as change agents [31:140]. The same scenarios are pointed out by Lane and McAndrew [33] who discuss if OER are systematic or systemic change agents. Ossiannilsson [3,4,5] and Ossiannilsson & Creelman [5] argue towards the same direction that the challenges facing higher education today mean that many of today's fundamental educational concepts must be questioned and some phased out as we move towards a greater emphasis on collaborative net-based learning and within cultural change and cultivating imagination for a World of constant change [30]. Thus quality has to be considered and discussed within new lights and dimensions as will be in the next subchapter.

4. Quality

Already in 1998 it was emphasized that in a networked world there are requirements for new roles and responsibilities within learning and education and thus also how quality has to be considered in this new environment [34]. Castell [35] in his book on the Internet Galaxy claims that a global change was foreseeable in education and society due to Internet and quality dimensions were directed to other dimensions. Den Hollander [cited in 3] argues that there is a new paradigm for quality; quality as performance which is based on excellence and people. Quality can be assured through effective staff engagement and begins with narratives through people and to link *why*, *how* and *what* questions to the institutions. The most essential aspect is to invest in quality and build quality into the culture of any organization. In a study by Ossiannilsson [2-4] on benchmarking e-learning in higher education it was emphasized that benchmarking is a valuable tool for quality assurance and enhancement and to be integrated in ordinary quality assurance work. Thus, looking into your own organization and learning from best practice demonstrate quality performance.

The findings further indicated that quality has to be developed and evaluated from the learners' dimensions and perspectives. The management dimension is also of utmost importance as is the management's vision and support, not least concerning infrastructure, costs, innovation and pro-activeness. Ossiannilsson also referred to a comprehensive review of paradigms for evaluating quality of online education programs made by Shelton [39] where 13 paradigms were identified in the study (2000-2009). The institutional commitment, support, and leadership theme was the most cited when determining standards for online education programs. Ten of the paradigms examined pointed toward the institutional commitment, support, and leadership theme as being primary indicators of quality. Teaching and learning were the second most cited indicating quality. Faculty support, student support, and the course development themes were the third most cited in the analyses**.**

E-learning and online learning goes beyond ordinary university framework and demand changes within the entire culture and organizational structure, thus there is a need to re-think the entire quality concept within quality in higher education. Quality has many dimensions. Quality refers to why we strive for quality, what quality is and quality for whom, but also the time dimension of when to measure quality and how to measure quality. In consequence there are many quality strategies. There are also increased demands on quality literacy, which means awareness on different levels and dimensions on quality and thus a variety to embed quality on daily base in activities. Additionally underlined by Holmes [8] the scope is wide and there are many dimensions within e-learning. Quality improvements and standards will be of the utmost importance. Internationally there are wide quality initiatives, but far too isolated and consequently there is a great need to build bridges globally. There is a move in education from transfer to acquisition and construction of knowledge through active dialogues with learners, content and teachers. In this scenario there is a need for teachers to take another role i.e. to be facilitator, mentor; guiding, inspiring and motivating the individual to follow their own path of learning. Holmes [8] argues that the learner-centered approach is more dynamic, more flexible to the individual's needs, but moreover a greater challenge to traditional educational institutions. He stresses that this new paradigm leads to a perceived loss of control and this shift in power is painful and may pose some problems for teacher and for institutions.

In addition trends in e-learning seem to be logical connectivity, smart and communicative devices, convergence, and personalized on-demand and reliable services. E-learning is not a homogenous concept. The concept e-learning is changing from a primary distributive mode to a more collaborative mode [40]. JISC present a model where one aspect is the nature of issues i.e. the rationale for e-learning, from resource use to student engagement and the other aspect is the e-approach i.e. through increased value in education to ultimately seeking to transform the entire learning process [41]. Hence, it is argued that there is no longer a need for definitions, as e-learning has implications in a vast number of fields in daily life [29,41,42]. Paralleled quality indicators can be foreseen with the use of OER, which is why the two following subchapters first discuss benchmarking, as a tool for quality enhancement and best practice and that the entire chapter argues for quality indicators within the use of OER in higher education. Secondly in the next subheading there is a discussion on re-thinking international university education and beyond.

5. Benchmarking

Benchmarking has become a useful tool for quality assurance even now in higher education, although the concept originates from the business sector. Benchmarking has developed into an essential tool for organizations, and is regarded as an internationally respected vital component of good management practice. Moriarty and Smallman, [43: p. 484] stated that "*the 'locus' of benchmarking lies between the current and desirable states of affairs and contributes to the transformation processes that realise these improvements.*" Moriarty [44] stressed that benchmarking is intended to be a means towards the end of achieving a more desirable organizational state of affairs. Benchmarking may identify the changes which are necessary to achieve that end. The concept of change seems to be inherent in benchmarking. Benchmarking is, however, not just about change, but about improvement, or as Harrington [1995] put it, "*all improvements is* [sic] *change, but not all change is improvement*" [cited 44: 29]. Moriarty continued by stating that benchmarking is not just about making changes, as it is more about identification and successful implementation. The European Centre for Strategic Management of Universities (ESMU) has initiated and worked on several European benchmarking initiatives, and as late as in 2009 they conducted the e-learning benchmarking exercise [1,3]. The ESMU definition is as follows;

> *Benchmarking is an internal organizational* [sic] *process which aims to improve the organization's performance by learning about possible improvements of its primary and/or support processes by looking at these processes in other, better-performing organizations* [45: 16].

As shown in the definitions above, benchmarking is very much a process designed to enhance quality, to identify gaps and to bring about the implementation of changes.

5.1 Benchmarking on e-learning

Benchmarking with regard to e-learning has been used since the mid 90´s [3,45-48]. Quality e-learning has however been considered separately from so called traditional education, and quality indicators, benchmarks and critical success factors for e-learning have not been taken seriously nor considered and have been managed in a very disconnected manner, not embedded in learning and quality contexts [49,50]. Ossiannilsson also showed in earlier studies [2-4] that there is a lack of experience of the value and impact of benchmarking in higher education. Through international benchmarking on e-learning several insights have been gained [3,39,50] and benchmarks and indicators are well known and documented through comprehensive research. There are three main areas to consider, however expressed within varieties in terminology. These three areas concern *management* i.e. strategic management and visions, *products* i.e. curriculum and course design and course delivery and *support* i.e. student and staff support [3,47]. Lessons and

experiences from the mentioned benchmarking initiatives might have messages to consider for benchmarking of OER and finding good examples and success issues.

5.2 Benchmarking of OER

From the benchmarking initiatives on e-learning lessons can be learnt on how to conduct benchmarking on the use of OER in higher education and how to work on good practice and within success factors on OER. Although, it may be too early to implement in countries and universities where OER is still a relatively new concept there are some countries and institutions who have reached a mature level of OER use. On the other hand quality indicators on e-learning may also apply to OER. Areas of interest to consider on benchmarking on OER/OEP/OEC may focus on:
to identify success factors for the use and reuse of OER
> how social aspects really work and how they contribute to the success of OER activity generally.
> identify communities of practice
> identify stakeholders
> identify approaches in the use of OER
> develop best practice and cultivate cultures in the use of OER
> identify the process towards OEP and OEC

6. Rethinking international university education and beyond

Embracing the full potential of OER and OEP forces universities to radically rethink their policies and strategies. OER/OEP are indeed disruptive forces in that they challenge fundamental academic traditions such as the lecture, the classroom, scientific publication and traditional paths to academic status. Faced with such a radical rethink it is not surprising that many institutions disregard innovative ideas and become entrenched in defending the status quo. Advocates of open education have believed in spreading innovation by the organic sharing of good practice and that this will then spread to national authorities. However, although much progress has been made in some countries, the spread of open education and a culture of sharing have met stiff resistance, described by Aceto, Dondi, Nascimbeni [51] as:

Underestimation of institutional and structural inertia and its self-organization and stabiliz[sic]*ation potential.*

The academic sector is fiercely independent with rivalries and competition between institutions, often encouraged by governments' desire to create a competitive market in higher education, making the idea of freely sharing resources distinctly unappealing for most. Advocates of openness have also underestimated the time required to effect such major shifts in education and the amount of support and patience that will be required to change deep-rooted beliefs and attitudes. The ability of the education sector to embrace innovation has been called into question [19,51] and in most countries OER is still in the domain of the early adopters. The expected mainstream uptake has not yet taken place and there are a number of key factors that could lead to widespread implementation. These include a focus on quality assurance of OER, top-down initiatives from international bodies such as UNESCO and at EU or national level. The examples of Open Access and the Bologna process[11] show what can be achieved if there is a concerted effort at international and national level. The recent Brazilian example of legislation being introduced requiring government funded educational resources to be made freely available to the public under open licenses such as Creative Commons will hopefully inspire other countries to follow.[12]

A lack of clarity in copyright issues is one factor behind universities' reluctance to adopt the principles behind OER. In many countries it is unclear whether the university or the individual teacher owns the rights to resources produced during working hours. If the university wants to make a teacher's resources available on the net it may be necessary to provide remuneration. Any institution wishing to adopt OER as default must first clarify copyright issues and this can be a thorny issue. As a result many choose not to open such a hornets' nest.

There are many stakeholders in the adoption and implementation of OER, where all play a crucial role *per se,* but there are demands for co-operation and integration for successful implementation. According to COL-UNESCO there are at least five stakeholders as below and also illustrated as Figure 3 shows, and for each of them urgent guidelines are proposed aligned with embedded quality issues. The stakeholders are:

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[11] http://portal.bolognaexperts.net/files/Leuven_Louvain-la Neuve_Communique, April_2009.pdf
[12] https://creativecommons.org/weblog/entry/27698

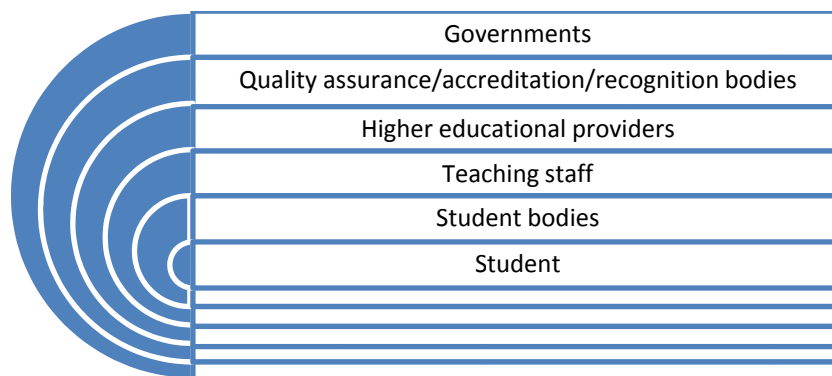| Governments |
| Quality assurance/accreditation/recognition bodies |
| Higher educational providers |
| Teaching staff |
| Student bodies |
| Student |

Fig. 3 Stakeholders involved in the adaptation and implementation of OER.

7. Discussion and Conclusions

In the twenty-first century where learners live in a digital world, the e-phenomenon has to be embedded in all learning and educational activities in order to push the boundaries are expressed by several scholars [27-29]. Acceptance of a new paradigm is essential. The traditional academic paradigm of peer review, academic journals and credibility via academic merits has great difficulty understanding and accepting new models such as crowd sourcing, reuse, mash-ups and social networking. According to Laurillard [58] there is an urgent need to re-think university teaching and learning, not least to consider affordance to a higher extent and to focus on pedagogy rather than technology. Concepts and success factors related to e-learning in the twenty-first century will surely change the learning scenarios and cultures and may have an impact on how benchmarking e-learning in higher education will be conducted in the future and the kinds of quality-related issues which matter [1,3]. According to Laurillard [42] there is an urgent need to re-think university teaching and learning, not least to consider affordance to a higher extent and to focus on pedagogy rather than technology.

Clear parallels can be seen between OER and the Open Access movement and also the Bologna process. Bologna and Open Access would not have been possible without clear directives from EU level. With a clear European strategy in place national authorities and universities could then act within that framework. We believe that it will be extremely difficult if not impossible to achieve coherent and sustainable use of open educational resources without clear support and acceptance from above. The success of the Open Access movement for open academic publication can be seen as a role model for the implementation of OER/OEP. The key factor leading to the widespread acceptance of OpenAccess was the Berlin Declaration[13] recommending Open Access principles for all European research. This in turn recommended member states to implement the principles nationally and today most research funding in Europe is dependent on the open publication of results. Although support amongst researchers was essential Open Access would not have gained mainstream acceptance without clear incentives from influential authorities.

A similar scenario is essential for OER/OEP/OEC to gain widespread acceptance and although there are many examples of universities adopting OER as a key factor in their academic strategy there is little coordinated support from government level.

OER is just one aspect of a major paradigm shift in education and cannot be seen in isolation. It is intimately linked to concepts like connectivism, collaborative learning, digital literacy, open access and lifelong learning and as a result it is impossible to deal with the one without involving all the others. The educational paradigm in the use of OERs emphasizes education for all, internationalization, virtual mobility and sustainable development among other issues [5].

As stated above, the challenges facing higher education today to provide education in line with the demands of tomorrow's global digital economy are enormous. Many of today's fundamental educational concepts must be questioned and some phased out as we move towards a greater emphasis on collaborative net-based learning and a marked increase in part-time lifelong learning. Higher education will be more integrated into working life and with more learning on demand and/or tailor made learning and education, with high demands of flexibility and accessibility. This type of radical change cannot be achieved just through grass-roots agitation; it must be part of an international development. Several questions have to be considered within the emerging twenty-first century's educational paradigm on cultural changes towards openness and sharing resources in higher education: in short we must open Pandora's box as in Figure 4.

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[13] http://www.zim.mpg.de/openaccess-berlin/berlin_declaration.pdf

Fig. 4   Pandoras box. Some rights reserved by Christiaan Botha

Acceptance of OER opens up Pandora's box in that it demands that a host of other issues be resolved: teacher's role, student's role, university's role, review of intellectual properties, practices, administrative routines, teacher and student support. It raises questions about how universities will react to students taking charge of their learning in ways outlined by the OER University [22] and DoItYourself [24]. The increasing interest in certifying informal, OER-based learning seen in projects such as Mozilla's Open Badges initiative will also change the way we view assessment and validation and the question is how the formal education system will be able to accommodate such innovation [53]. Will they entrench themselves further in their traditional role or will battle really commence?

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