Positioning the OER Business Model for Open Education

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Abstract

The enabling power of technology, especially information technology and social software, prompts a radical shift in economic and social interactions in societies around the globe. Existing traditional school based, formalized learning formats are unable to accommodate specific new learning needs. Hence, customized to the respective purposes of personal wellbeing, inclusion or requirements for professional performance, lifelong continuous learning is no longer a choice but a necessity. At the 2011 Davos World Economic Forum it was already stated that the lack of adequately educated people not only limits personal fulfilment but will also hinder prosperity and economic growth in the near future. Since the learning needs and learning possibilities today differ fundamentally from the 20th century the question is how to unlock the learning potential of people in a situation where mainstream education still heavily relies on traditional institutionalized closed formats.

Since more than a decade the Open Educational Resources (abbreviated as OER) movement provides new ideas on how to generate and share educational resources for educational use (within and outside formal institutional, open education) by large audiences for a variety of learning purposes. The vision of developing and sharing OER resources for Open Education (OpenED/OE) is interesting in this context for its great potential to substantially help solving existing educational problems. Open education based on sharing (OER) open resources for education enables people across continents and organizations to transform their talents into professional competences and grow by removing existing (economic) barriers and invent new strategies to open up education. To date though the OER/OpenED vision materializes primarily in activities organized as dedicated sponsored projects.

Crucial for a sustainable future of this appealing approach and the capability to bridge existing "education gaps" is our capacity to translate the OER/OpenED vision and existing commitment into appropriate, sustainable business models for OER/OpenED.

Sustainability is a key requirement for the OER business model. Education in the 21st century has the character of life long education, so the question is not so much whether a specific OER project can be funded adequately but whether we can create an underlying business model foundation able to serve as a flight deck from which necessary OER based learning activities can be launched, as part of completely open educational offerings or embedded in hybrid educational constellations, across organizations and countries.

After sketching the scene in the introduction we move to paragraph 2 where we describe how the application of the OER paradigm radically changes not only learning itself but from a business perspective also the interactions and relationships between learners, "teachers", creators and users of educational resources as well as relations between educational institutions, designers and service providers of both formal and non-formal learning offerings. In paragraph 3 we draw conclusions from these changing relationships, which leads to a new perspective on sustainable business models for, OER based, (open) education. Next in paragraph 4 we describe our ideas on the essential components of the proposed business model to become a viable sustainable living reality. Based on heuristics from research on learning networks, open innovation and collaboration we describe methods to frame OER/OpenED activities to lay the groundwork for sustainable learning ecologies. We end with concluding remarks and suggestions for future work.

Introduction

In the 21st century continuous education is of vital importance. Learning has become crucial to personal growth and wellbeing and imperative to developing the required professional capabilities needed in today's society. The focus of Obama's 2011 State of the Union to "out-innovate and out-educate and out-build" the rest of the world emphasized once again the crucial role of education. [1]. Almost at the same time at the Davos World Economic Forum [2] the urgency to care for appropriate education was stressed based on the observation that the current lack of adequately educated people hinders prosperity and will constrain economic growth in the near future.

The enabling power of technology, especially information technology and social software, prompts radical shifts in economic and social interactions in societies around the globe. New media use, social software, and collaborative learning in web-based communities offer new ways of networking learning and inventive problem solving (Bitter-Rijpkema & Verjans, 2010) [3] Traditional school based, formalized learning formats are not capable anymore to adequately accommodate the complete range of learning needs. Lifelong continuous learning is no longer a choice but a necessity to empower a person's wellbeing and inclusion in 21st century society and support individuals to meet the requirements for their professional performance.

Since more than a decade the Open Educational Resources (OER) movement provides new perspectives. The OER movement articulates new ideas on how to generate and share resources for learning by various audiences for a variety of educational purposes. The term OER, as defined by Hylén [4]. states that "OER are digestive materials offered freely and openly for educators, students and self-learners to use and re-use for teaching, learning and research". Open Education (abbreviated as OpenED or OE) [5] often expresses a wider ambition to open up education by using OER. In practice OER is often used as an umbrella term. Thus it is widely used not only to strictly refer to the open resource dimension of education but to the wider context of open up education. Since we concentrate on business models for OER based education we adhere in this paper to the existing, pragmatic use of OER. Hence we will only refer to OpenED when it is functional, specifically emphasizing ambitions of openness all across the educational value proposition.

Both OER and Open Education vision have a great potential to provide structural solutions to existing educational problems. In essence it does so by providing open access to educational resources (OER),and eventually across the whole chain of educational services (OpenEd), by removing existing economic and ownership barriers. In this way the open OER/OpenED strategies offer new ways to enable people across continents and organizations to get the education they needed in order to transform their talents into personal and professional competence.

The issue of the sustainability of OER becomes more important right now as more and more organizations make these resources available and the significance of open resources for the knowledge economy in developed and developing economies is recognized by several national and international organizations.

Crucial for success of this attractive approach to bridge the education gap is whether we will be able to combine existing OER/OpenED ideas and commitment of its participants with the realization of suitable and sustainable business formats for small scale projects i.e a dedicated textbook in for a specific course ar to large scale implementations like learning objects or video repositories To date its activities are still primarily organized as dedicated sponsored projects for fixed periods. The challenge is to use our creative capacities (Bitter-Rijpkema, et al., 2011) [6] to design new business models for the emergent learning needs of the post-industrial age.

The question to date is not so much whether a specific OER project can get funded but whether we can create an underlying "business model" format which offers a substrate able to serve as a "flight-deck" from which all kind of necessary OER/OpenED learning activities can be launched, within networks, organizations and across organizations and countries.

Business models in transition: rethinking requirements for OER based education

Already a lot has been written on business models for open educational resources, Downes, 2006, [7] Dholakia et al, 2006, [8] Koohang et al., 2007, [9] OECD 2007, [4] Guthrie et.al, 2008, [10] Lane, 2008, [11] de Langen, 2008 [12]. Most of these contributions build on Rappa [13] (2006)'s taxonomy of internet business. These models typically are revenue models, i.e. frameworks to generate revenues (Afuah, 2004) [14]. By focusing directly on the earning capacity of the open educational resources, these contributions ignore the complexity of the business model, which provide an integrated framework from inputs to the customer (Chesbrough, 2006, Osterwalder 2004) [15], [16]. A sustainable business model should take into account the interaction between the internal organization of the supplier of open educational resources (OER) and the financial flows in connection to the needs and wants of the users. This article is based on a literature review on the new approaches of business models as emerged since 2004 and the research on motives to provide and use of open educational resources, to analyze the possible contribution of this new approach to develop sustainable business models for OER and OpenED.

Delineating OER: defining the field of Open Educational Resources and Business Models

By answering the question which contribution the business model approach can have in increasing the sustainability of Open Educational Resources, it is important to define the variables in this equation. In this introduction, we will first articulate how we define open educational resources in this study before we continue with the definition of business models.

Open, in the sense of OER, is defined as free to access, use, reuse and improve. This includes systems

which require registration, but excludes systems where a monetary fee is asked for entry and participation. There is a grey area, because in some systems, a non-monetary contribution is asked in return for the usage of the existing open resources (for example, access to exam facilities is limited by the amount of questions contributed to the database).

Educational resources are defined as objects explicitly created for educational usage. This excludes objects which can be freely used in educational situations, but are not designed for this purpose. Yet, another grey area are items not constructed with the purpose of teaching, but useful for teaching (for example, the YouTube videos from INSEAD, providing short interviews on all aspects of strategy and likewise different Microsoft- series).

Note, however, that this analysis and lines of reasoning are under debate. For example David Wiley [17] (2010) states in his article on openness:

> I'm frequently asked: "What is the appropriate role of openness in education? I find the question to be deeply troubling and insidious. The question implies that openness might play any of several roles in the educational enterprise—a core or a peripheral role, a large or a small role. The question subtly distracts people from seeing that openness is the sole means by which education is effected. If a teacher is not sharing what he or she knows, there is no education happening".

Sustainability should be about supporting the openness of educational resources, not about pushing it into a peripheral role. Yet, ignoring the financing of OER/OpenED will seriously damage this movement in the long run.

A business model describes the rationale of how an organization creates, delivers, and captures value. Osterwalder, Pigneur and Tucci, [18] (2005, p. 17) define a business model as: "*a conceptual tool that contains a set of elements and their relationships and allows expressing the business logic of a specific firm. It is a description of the value a company offers to one or several segments of customers and of the architecture of the firm and its network of partners for creating*".

More specifically, a business model describes the transformation of inputs (money, goods and labour) into outputs (goods and services to be delivered to customers), via an activity system. It provides a holistic framework which can be used two-ways. Firstly, given the present production of goods and services, which resources, activities and partnerships are critical in the fulfilment of the needs of our present user (customer) and what can be organized better, more efficient or cheaper? Secondly, aimed at the needs of a potential user, the business model can be used to ask what resources, activities and partnerships are necessary to fulfil these needs and are we capable to provide these things?

To analyze present and future activities, most business models provide a set of categories, which can be used to decompose an organization in the essential components. A recent example is Osterwalder's Business Canvas (see Figure 1) [19], which distinguishes nine categories. However, central in all business model approaches are the needs and wants of user or customer. Without such an outlet, there is no valid description of a business model.

We will substituted the term '(end) user' for the more common used 'customer' for two reasons, (1) because the term customer often is used when the value for the end user can be translated in a monetary form (price) and usage is voluntary; (2) because in our opinion all organizations, profit or non-profit/private or governmental, are structures formed to transform inputs into outputs. However, in some cases the needs and wants are more complex so the direct relationship between outputs and users can be diffuse. In education, materials (computers, buildings, etc.) and labour (teaching, administration) are transformed into educated people and degrees, embodied in the students. Yet, there are more stakeholders in education as firms (requiring certain competences), the government (investing in the knowledge economy), and parents (investing in the future of their children) among others. The interaction of different needs and expectations thus result in a complex situation with respect to the value provided to these stakeholders.
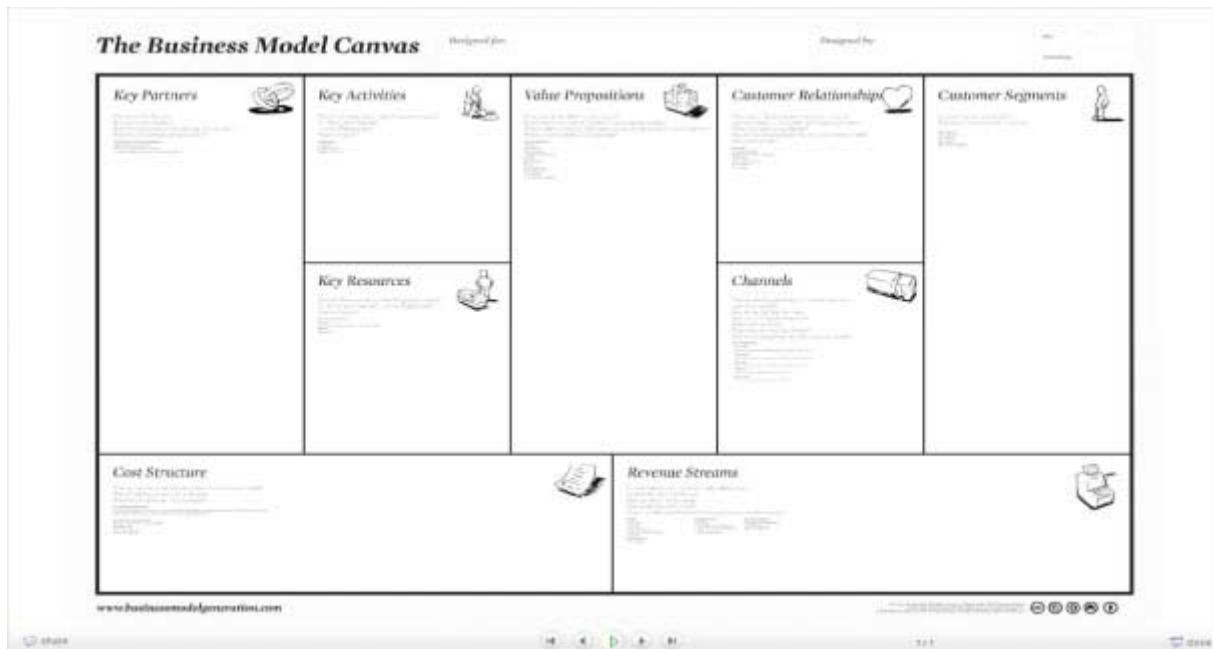
Figure 1. Osterwalder's Canvas
Source: http://www.slideshare.net/Alex.Osterwalder/business-model-canvas-poster

Furthermore, Osterwalder [16] (2004, p. 15/16) [18], Pennings, et al., [19] (2009) and Teece [21] (2010) do distinguish three kinds of business models. Firstly, business models to be used on an abstract level to model the different elements and their relationships. Secondly, as a model to analyze existing business models and lastly they can be used in a prescriptive way, modeling the world "as it should be".

Chesbrough and Roosenbloom [22] (2002) expanded the general definition, specifying six requirements that the business model concept should fulfill (see Figure 2). In this sense, the business model approach can support OER-systems by identifying its unique comparative advantages, its clients and defining the supporting processes to connect the clients with the unique OER-offering.

- Articulate the *value proposition* (the value created for users by the offering)
- Identify a *market segment* (the users to whom the offering and its purpose are useful)
- Define the structure of the *value chain* within the firm required to create and distribute the offering
- Estimate the *cost structure* and *profit potential* of producing the offering, given the value proposition and value chain structure chosen
- Describe the position of the firm within the *value network* linking suppliers and customers, including identification of potential complementors and competitors
- Formulate the *competitive strategy* by which the innovating firm will gain and hold advantage over rivals

Figure 2. The six requirements of Chesbrough and Rosenbloom (2002)

Lastly, we have to define our object of study. Open Educational Resources are offered in different constellations. Often the resources are part of the educational resources of an educational institution, and in this sense part of a larger business model. Educational institutions, universities or otherwise, have traditionally a large variations in their funding models. Expenditures are related to education, research and overhead costs. The incomes vary from government subsidies, payments of students, gifts from alumni or even income out of property, as buildings, art or estate. In figure 3, two examples of American universities are given. In one case (Michigan, total about $ 4 billion) more than 40 % of the budget is earned through hospital related activities; the second (Harvard, total $23 billion) shows a 31% income of endowment income. The examples are available at the website.[1]

Therefore, the perceived bold business model of educational institutions as transforming national funds into knowledge and degrees has to be adjusted as much of the research and education is funded through other activities as property management, fundraising or health care. Below, we will show that OER production within such an organization is possible, but there should be an explicit strategy (formulating

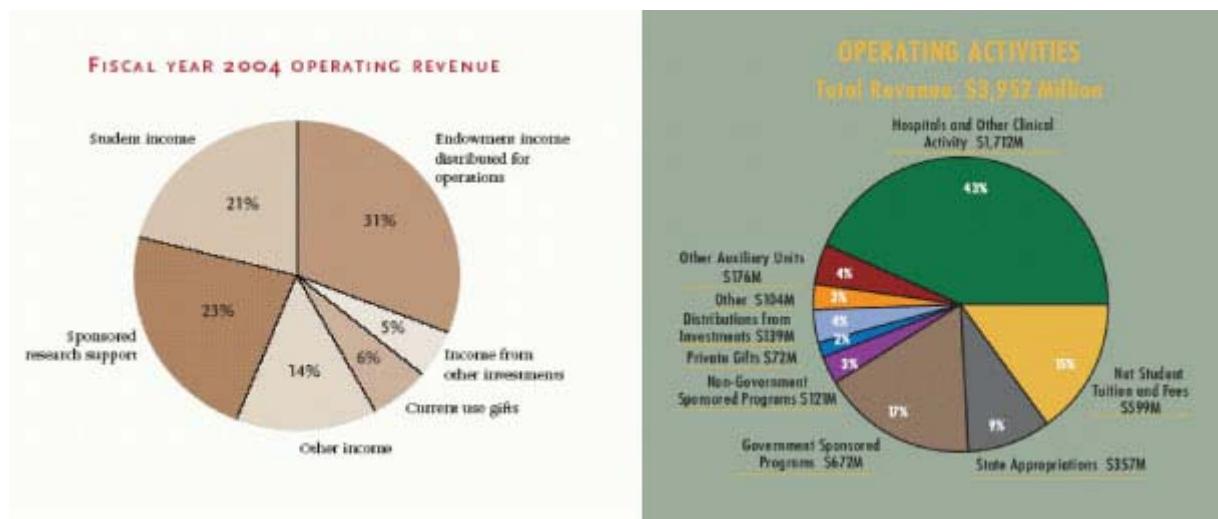targets) and some control on the costs of the realization of the strategic targets.

Figure 3. From: What are the sources of income for American universities?

Here, we define an OER-organization as either an independent organization or a part of an organization which is responsible for the balancing of costs and income, and can be treated as an independent organization. An OER-organization functions in a so-called 'OER-system', a set of participants in a network of OER producers and users (see Figure 4).
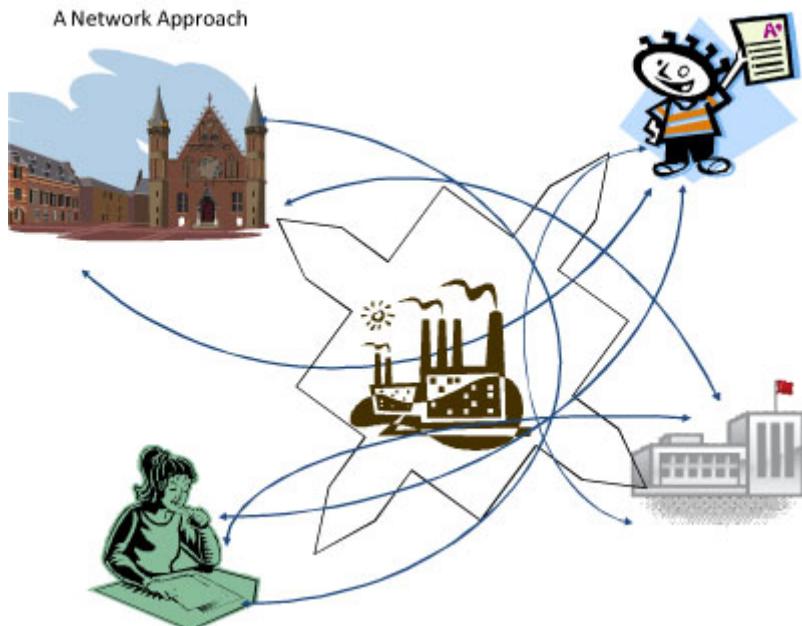

Figure 4. A network approach: the OER-system

Actual OER practices (Schuwer & Mulder, 2009, Petridis, 2008) [23], [24] show how difficult it is to find sustainable business formats to safeguard continuity in OER development and use. In an earlier paper (de Langen, 2011) [25] we argued that the only sustainable business model for an independent organization offering solely Open Educational Resources is one based on a continuous stream of subsidies and gifts. For the design of the business model it is essential to clearly define its target group, "the customer", and its goals. The benefactor of OER sometimes is the direct user of the offered resources. In that case it's easy to determine the needs and preferences of the target audience and align the OER offering to the user's needs. In other cases, as is often the case in government-financed educational systems, the financier is different from the direct user of OER. It those situations it is harder to provide evidence that the financier's goals are realized by the efforts made by the OER-providing organization.

As argued above, each organization has to take into account the requirements of the different stakeholders and users. To analyze the viability of an OER-business model, we will start from the motives of the participants in the OER-movement. Based on the analysis of existing OER learning communities and several case-studies (Petridis, 2008, Hylén, 2009 a/b), [24], [26], [27], we will argue that the sustainability of OER requires a shift in perspective from a payment model towards a mixed monetary- exchange model, in which the stakeholders are the customers of the products resulting of the business model. Secondly, we will argue that an appropriate business model for OER requires a new perspective, namely a networking view on OER as a learning approach and also as a business. In such a business perspective the view on the

organization is "opened" even wider than one usually finds in Open Business Model literature (Chesbrough, 2006) [15].

Starting from these two arguments we propose a third adjustment to the design of a sustainable business model for OER based education. Integrating the arguments of (1) and (2) it becomes apparent that in the envisaged OER business model, the difference between customer and producer disappears. Customers in the context of open networked education are seen as co-creators of results and concurrently as collaborators in the processes of providing of (OER) materials, fundraising and as providers of feedback. Hence they too have to be seen as customers.

In the following paragraph we will elaborate these new insights, starting from the motives of participants in the OER-movement, commenting on the subsidized OER-organizations and argue that the sustainability of OER demands a different perspective; a network approach to the business model

A new perspective: motives and the sustainability of an OER-organization

As stated above, business model definitions from the monetary perspective describes the process or transformation of inputs into products and services delivered to a customer, who is willing to pay for these products or services (the earning model). There are different definitions and the models differ in the amount of details as well as in distinguishing different stages and phases within the model. We can use the business model in the sense of Osterwalder (2004) [16] and Baden-Fuller and Morgan (2010) [28] to analyze the OER-production. Different groups of learners, students and teachers are provided with free materials (educational resources), so although there is a customer for the products, there is no earning model based on prices or sales. The organization derives its educational resources from individuals, either internally or externally, who make their materials available, providing some kind of system which transfers these resources to the users of OER. This involves costs, which are covered by financial resources, consisting of contributions of private or public institutions (socio-economic motives). Additional income can result as OER causes more regular (paying) students (marketing motive) or decreases the costs of regular teaching (efficiency motive). As Mackintosh (director of the Open Education Resource Foundation) stated, "*an OER university degree could be 10-15 per cent of the costs of a traditional degree*" (quoted in the Times Higher Education). A conclusion doubted by Tony Bates [29] in his column on the costs of online learning, when pointing to the costs of maintenance and asking for more research on this subject. It is, therefore, important to analyze what the different motives of participants in the OER process are. Based on an earlier analyses (de Langen, 2011), [25] using. Hylén, (2009a, 2009b)), [26] [27] we can distinguish various motives for the different stakeholders of OER as shown in Table 1 and 2. In Table 1 we present the relationship between organizations and individuals while table 2 presents the relationship of organizations versus governments.

Table 1: The individual and organizational motives combined (grey areas indicate potential conflicts in interest).

Individuals Organizations	Altruistic reasons	Non-monetary gain	Commercial reasons	Usefulness or costs
The 'public good' motive	Individuals will help the organization to realize their goal	There is an external motive necessary for individuals to align to the motives of the organization and it's individuals	The aim of the organization to supply the educational resources for free might conflict with the commercial motives of the individuals	The motives coincide. This will be accidentally, with the possibility that people protect their resources when they see that there is an unexpected demand.
The 'efficiency' motive	Individuals will be motivated to supply open educational resources, but there is a danger that they will resist that their altruistic motive are used for monetary gain of the organization	Individuals will be motivated to supply open educational resources, but there is a danger that they will resist that their materials are used for monetary gain, damaging their nonmonetary gains (reputation etc.).	Here the motives of the individual and the organization can move together, up to the point where the organizational efficiency interferes with individual commercial interests.	Common interest or rather an interest of the organization combined with a non-interest of the individual.
The 'marketing' motive			There can be a conflict depending on the amount of materials the individual wants to share and the division of future income.	

It is clear from Table 1 that there are several possible areas in which the interest of the individual might differ from the interest of the organization. These conflicting motives might be especially important when the organization acts as a portal through which external providers (individuals) offer their educational resources to others. It is evident that these conflicts may arise when the individuals hold the copyrights on the resources. However, there seems to be some evidence that these conflicts can also arise within (educational and professional) organizations when the copyrights belong to the organization, but the individuals see the materials as their intellectual property.

Table 2: The governmental and organizational motives combined (grey areas indicate potential conflicts of interest).

Governments Organizations	National motives	Sectoral motives
The 'public good' motive	The motives of the government and the organizations coincide. There is an external motive necessary for the individuals to align the motives of the organization and the individuals	
The 'efficiency' motive	These two motives can co-exist, especially as more efficient educational resources lead to more and qualitatively better resources.	The motives coincide and there will be no conflict of interest.
The 'marketing' motive	These motives can potentially conflict with each other when the "follow up" of the resources is costly. This conflict is avoided when the open educational resources are independent of paid resources.	

It is of importance to define the areas in which the motives of the government and the organizations may divergence, given the importance of government support for both private and public educational organizations. There are two areas in which the government and the organization might conflict. First in cases where the motives of the organization are partly commercial ('marketing' motive), this can conflict with the non-commercial motives of the government. Secondly, when the 'efficiency' motive causes the organization to be selective in the 'openness' of the educational resources (open in attracting resources, but closed with respect to external use of internally developed resources), this can increase the costs of education for the organization, but will decrease overall efficiency of the national economy. The same will apply if access is restricted to educational organizations, limiting open access for self-learners or private business. The possibility of a conflict of motives between governments and (educational) organizations becomes more important when the government is the major financial supporter of the supply of open educational resources, despite the public or private character of the organization.

Petrides (2008) [24] gives several examples of government financed OER-projects, showing the fragility of project funding for the long run (Petrides, 2008, p. 25 – 27) [24]. Another form of financing is found in the case of Stanford Encyclopedia of Philosophy. This open access reference work is a self-sustaining resource, financed through grants of other academic libraries. Of particular interest in this example is the fact that it had to redefine its revenue model as they (when wondering why some institutions did not financially participate) found that small libraries were not able to contribute a single payment, but were able to pay a regular small subscription fee (Petrides, 2008, p. 25). [24] This shows the importance of exactly knowing the needs and possibilities of all stakeholders.

To date we know relatively little about the users of open educational resources and there motives for use. Most research in business models and OER seems to assume that there are users waiting for these resources. Others, like Downes (2006) [7] reverse the question, and ask which customers fit the business models they are listing. Hylén (2009b) [27] observes that OER is primarily used by teaching staff to prepare their courses, although these often are developed with a much broader audience in mind. However, research on the use of MITOCW content (with over 150,000 learners, http://www.bb.ustc.edu.cn) and Tufts OCW (50% of 450.000 users in 2009, Newsletter Spring-Summer 2010) report a substantial amount of self-learners using the open educational resources. These users are characterized by a higher level of formal education (bachelors, master's degree). Gourley and Lane (2009) [30] report on the experiences with Open Learn, the open educational resources of the British Open University (http://openlearn.open.ac.uk/), offering independent study possibilities, learning tools and discussion groups. The website registered 2,000,000 visitors and 60,000 registered users in the first 1 ½ year of operation. These users would appreciate some formal recognition of their informal study (as characteristic for OER).

With respect to the motives for OER, there are several questions to be answered. For example:

- What are the efficiency benefits of OER? Does the supply of OER materials really decrease the costs of developing educational materials and if so, how much?
- What is the relationship between OER, the general knowledge level and general welfare?
- What is the macro-economic effect of education on general knowledge and welfare, and what is the

contribution of OER to this effect?
- What are the reasons for learners to use OER-materials and what are the results? Do self learners use OER-materials, for what purposes is the material used (short skill courses, full education, 'fun' education) and what is the contribution of OER-materials on these kinds of self learning?

These kind of quantitative data is necessary to sustain the perceived positive effects of OER on society, justifying the investments in the development and supply of OER-materials.

Given the problems of generating a sustainable business model and the characterization of stakeholders OER organizations should turn their attention towards the process of open education instead of focusing on the resource-side of the business model. Following the do's and don'ts in Petrides (2008), [24] attention should be given to developments in the network value added approach of business models. Summarizing the different approaches Meulenbroeks (2010, p. 21) [31] finds the following advice with respect to collaborative value creation in a value network:

- Description of the collaboration objective
- Description of the type of value to be exchanged
- Size and diversity of the value network (who adds value and why?)
- Collaborations within the value network (how are collaborations defined, managed and perceived?)
- Alignment of business models of collaborating parties
- Quality of the value network as such (how is the network as such valued? Does it generate maximum value?)

Some conclusions from Open Access are (Rieger, 2011) [32]:

1. Network of stakeholders; Integration in academic community and mandate/ governance system
2. Systematic development of content
3. Stability versus innovation
4. User-based strategies and feedback cycles: user central

Morgan et al (2010) [33] explain the success of open source software because of the following factors:

1. A high level of commitment
2. The volume and frequency of knowledge exchange and
3. The alignment of the goals of the network participants.

By applying these success factors to organizations involved in the production and distribution of OER, this stresses the importance of asking one self what the value added is for the stakeholders and how to provide it, as alignment of goals seems very important. Successful organizations do this already, if only partly. For example MITOCW and Tuft actively collect testimonials of students, which can be used as deliverables towards the funding organizations. We think, however, that there is a broader scope for co-creation and collaborative value creation in OER. One part, the student interaction, will be analyzed in the next paragraph. A more extensive study on the production side of value networks/the business model of OER and open education will be undertaken in the near future.

Towards OER based open learning networks

Our investigation into sustainable business models for open, OER-based education is set off by the growing awareness that OER can make it easier for people to realize their educational potential. To achieve this we have creatively to develop new ways first to organize the learning itself to match the specific learning needs of lifelong learners in various contexts and second to realize an economic basis for this new forms of learning by inventing sustainable business models.

To sustain the continuity of existing and new OER initiatives a viable business format is needed. (Downes, 2006; Wiley, 2007, Ilyoshi. and Kumar, 2008, Dholakia ,et al 2006) [7], [17], [34], [8]. Whilst the principle of openness of educational resources gains wider acclamation (Atkins, et al, 2007, Hilton & Wiley, 2010, Lane & McAndrew, 2010 Borgman et al., 2010, Conole ,2010), [35], [36], [37], [38], [39] assessments of ongoing practices (Petrides, 2008) [24] show peoples' willingness to contribute, share and collaborate like for example in the Merlot OER community. On the other hand we witness the fragility of those networks and communities. Initiating a virtual community might seem easy it proves to be quite difficult to keep it alive and flourishing. Petrides (2008) [24], evaluating OER practices, points to the urgency and necessity to attract structural commitment and funding for sustainability of new initiatives. A sound basis also needed to scale up existing initiatives and gain a critical mass of OER prosumers, which is vital to become a recognized player in the field of education.

Therefore we urgently need to put extra effort in the investigation of key requirements of new open, media enabled learning processes in OER-based learning communities. We do need to surface the success factors

that sustain learning in OER learning ecologies over time. Since the learning environment, the communities have to stay alive and "in business" as long as needed for the achievement of the communities' learning objectives. The facilitating educational and business conditions need to be in place at the appropriate scale and for the required length of time needed to achieve the envisaged learning results.

The question is which ideas and collaborative learning formats experienced in existing (learning) communities provide inspiration to take the development of OER business models, as described in the previous paragraphs, a step further. Earlier we proposed a new business model approach to OER based education to overcome the limitations of current project based funding and facilitate its growth and sustainability. In this paragraph, we will build upon research on networked collaborative learning processes to extend educational knowledge necessary to create the OER business model as a sound basis for learning in open learning ecologies.

Analysis of successful learning strategies in learning communities and communities of practice surfaces options to further specify the new networked, mixed monetary exchange approach of the OER business model. Our proposed business model builds economically on similar concepts of open exchange in network settings with actors acting from multiple roles: once producing once consuming (Benkler, 2006; Tapsott & Williams, 2006,) [40], [41] as networked learning does. Within the OER communities themselves, in learning networks and production oriented communities' prosumerism, collaborative distributed learning and peer production are already practiced. Insight into mechanism that work well is essential as input for further OER business model specification.

Therefore we now look for some exemplary experiences from learning networks which might be helpful to further specify the OER open business model framework proposed. Leading question is: are there interesting mechanisms, heuristics to enable continuous and viable "economic" value creation within OER based learning networks?

Within the context of this article we address the existence and practices of co-creation and peer production in professional learning networks. We first explore the relevance of research and experiences in this field for defining the business aspects of sustainability of OER based education. Next we zoom in on methods in use and ongoing research to present the potential of existing heuristics to stimulate success and sustainability of (professional and educational) learning communities for further work on business model design. A more thorough exploration however is needed to systematically surface applicable ideas for the definition of aforementioned OER business model.

Learning 2.0: emergent social production modes in learning networks

Various scientists (Bitter-Rijpkema & Verjans, 2010) [3] from the field of education and management sciences (Davenport, 2011; Duguid & Brown, 1991/2011) [42], [43] observe how professional learners use their networks. Their personal connections and organizational networks have become crucial for their work. The professionals' networks are important to acquire new information, develop new competencies, integrate knowledge for collective problem solving at work and connect to peers. (Bitter-Rijpkema & Verjans, 2010; Berlanga, et al, 2009; Bitter-Rijpkema et al, 2011). [3], [44], [6]. Concurrent to the professional's personal network, "learning networks" (Sloep, 2009; Mott, 2010) [45], [46] are going to play an important role, since they offer dedicated support for substantive learning ambitions.

Learning networks are defined by Sloep (2009) [45] as social networks centered around a particular topic or competence, offering learning support to effectively achieve a person's or collective's learning ambitions. Traditional learning management systems and communities often are well structured and directly managed by educational institutions. The educational format of these virtual learning communities directly relate to well-known face-2-face classroom and workgroup conventions. (like the virtual classroom format of Elluminate).[47]. Emergent (virtual) learning networks aimed at non-formal professional learning on the other hand are characterized by less structured formats, resembling more the social fabric encountered in social networks, shared interest groups, product design communities and communities of practice.

Especially learning practices in these ad hoc communities and learning networks are interesting for our purpose. (Bitter-Rijpkema, et al, 2011). [6] Their interactive nature, the value creation by community members in their different roles are interesting. Essential for our investigation is the fact that in these networks the relation between participants is not a linear one sided give and take between "teacher" and "learner" as "producer" and "consumer" of education. The perspective shifted from the consumer-earner paradigm, to learners as co-producers of knowledge. As Bereiter & Scardamalia (2006) [47] and Keursten (et al, 2003) [48] indicate collaborative knowledge building is essential for knowledge productivity, (i.e. "added value") of professionals. When professional learning should go beyond social (knowledge) reproduction and aim at enabling "learners to become productive knowledge builders" they consequently have to develop within the learning network their capacity to create solutions, "produce knowledge" in collaboration with peers! New pedagogical insights which coincide with other trends like initiatives of firms to collaborate with lead users for their branding and new product design. A shift towards peer production (Von Hippel, 2005), [49]. In a way this shift towards networked learning, with active roles of all peers

co-producing knowledge learning not only to knowledge productivity per se but also to wider societal (and economic) importance of this "productivity". The change towards peer production and openness "attacks" the "existing structure of the social division of labour" according (Von Hippel, 2005 [49], (pp 2-3)) requiring to adapt to the new situation and fundamentally change long held business models .

4.2. The potential of learning support heuristics for OER business model thinking.

The question to whether experiences in learning networks research, especially the design of peer productive participation in virtual learning communities provides relevant insights for further specification of OER business modelling requires further investigation of the transition from business models of conventional educational systems to open (OER) based learning networks. Our attention focuses in this paragraph on surfacing strategies to support productive learning interactions generating value, i.e. positive results (solved problems/new knowledge) As one of the core components in the new educational value networks.

Investigation of practices in self-organized and non-formal learning communities point to specific risks endangering both the continuity and likelihood of positive outcomes of peer collaboration. One observation is that communities need explicitly shared goals as a binding factor and focus point. The goal proves to be helpful to delineate the boundaries of the collective: who and what belongs to the shared endeavour. Also crucial to a learning community her dynamics over time. A assured basic interactivity and flow of information is decisive. New information, active discussions motivate others to (re)act. While breakdowns in this flow may lead to flaws and inactivity, and consequently loss of interest and activity. Yet another issue is that more than the number of participants in a community it matters whether peers find the right partners for collaborating on shared ambitions and interests. (Berlanga ,et al, 2009) [44]. Knowing that one can expect to encounter these problems recommended solutions are developed. Based on scientific insights into what makes communities of learners successful, educational scientists develop interventions. Pattern based recommendations for actions to stimulate a continuous discussion flow, prevent of participation breakdown, handle expectation management create a facilitating environment for learning interactions and care for balancing the two dimensions of prosumerism. (Bitter-Rijpkema, et al., 2011) [6].

Insight into the mechanisms of peer production, collaboration and learning in open learning communities and invention of new ways to facilitate learning in these contexts. It surfaces evidence and ideas on how learning takes place in settings open learning networks and thus provides functional input for modelling the business value network.

Further methodical elaboration of these concepts of educational and business value networks and actors acting in a variety of roles in open learning communities will be described in another publication.

Conclusions and future work

The observation that lack of adequately educated people for today's society will negatively effect our economic prosperity and potential triggered the investigate of how the OER approach of open education by stimulating effectively sharing learning resources at almost no costs might help us to inventively find new ways to realize the urgently needed new learning formats and support methods for the future.

We argue that for the realization of effective open and non-formal learning, accommodating today's professional learning requirements, we need more then the common investigation and application of existing learning design principles. We need concurrent development of sustainable business models for the emergent open education. That's why we focused in this article on the development of a sustainable business model for OER, so fundamental to the implementation of necessary new learning formats.

With the acceptance of the open philosophy underlying OER for education it is in our view necessary to change our educational and business perspective: It invites us to use our creativity to shift from prescriptive educational methods towards open learning formats and from monetary earning models towards a value network business model approach.

As De Langen, (2011) [25] argued the OER-movement will with continuation of the current approach stay dependent on subsidies and gifts. In the new approach of a sustainable business model for OER we propose more attention to the exchange of value compared to the focus on monetary gain in more traditional views. Since the main question for OER-organizations then becomes "what value do we offer to all our stakeholders?" a deeper understanding of the motives of stakeholders to participate in OER is required.

For business model development central questions to analyze are into the efficiency benefits of OER, the relationship between OER, the general knowledge level and welfare, the reasons for learners to use OER materials, the results of OER based study. Investigations providing a sound basis to the kind of resources, activities and partnerships necessary for the formulation of a sustainable business model.

We discussed the role of value networks. Based on a value network based approach, we expect that

OER-organizations can become intermediaries between the different stakeholders, providing learners and teachers with materials realized funding for the organization, and provide suppliers with credits and acknowledgement. An aspects also requiring further, extensive analysis, both regarding existing organizations and with respect to the underlying model. Consequently we need to shift our attention from Open Education resources towards open education processes. In this paper we made a start to articulate how analyzing success factors in learning communities and research therein, relates to the business model of OER i.e. Open education business processes.

To develop this approach in its fullness, it is necessary to augment the model sketched above. This augmented model can then be used to analyze existing successful organizations, to find the relevant critical factors. Using the method as suggested by D'Antoni & Savage (2009), [50] one can use the outcomes to create viable scenarios for inventing, organizing and implementing OER, taking into account the requirements and constraints for economic sustainability. Several steps are already prepared. Our colleagues in the OERNED-project have analyzed several of the major OER-projects and will publish the results of their interviews soon. This will augment the known arguments for OER. The results of several research into networks in different settings stress the importance of coordination of the goals of the participants in the network and leadership in this coordination and the correction of eventual redistributional effects. An augmented model should take these factors in account.

Inside the organization, there should be a discussion on internal leadership. Project management, marketing skills and communication design are perhaps more important skills than academic qualifications for the success of the OER-organization (see for example the research of Schuwer & Mulder, (2009) [23] and Petridis (2008) [24]). However, the success of the OER-materials is probably depending on the educational and academic quality of the materials. So we would expect a certain mix of academic and communication skills in successful OER-organizations. Developing a full model for an OER-organization is beyond the perspective of this article, but a successful business model will probably combine such an internal mix of management and education with the external balancing of the goals of different participants.

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