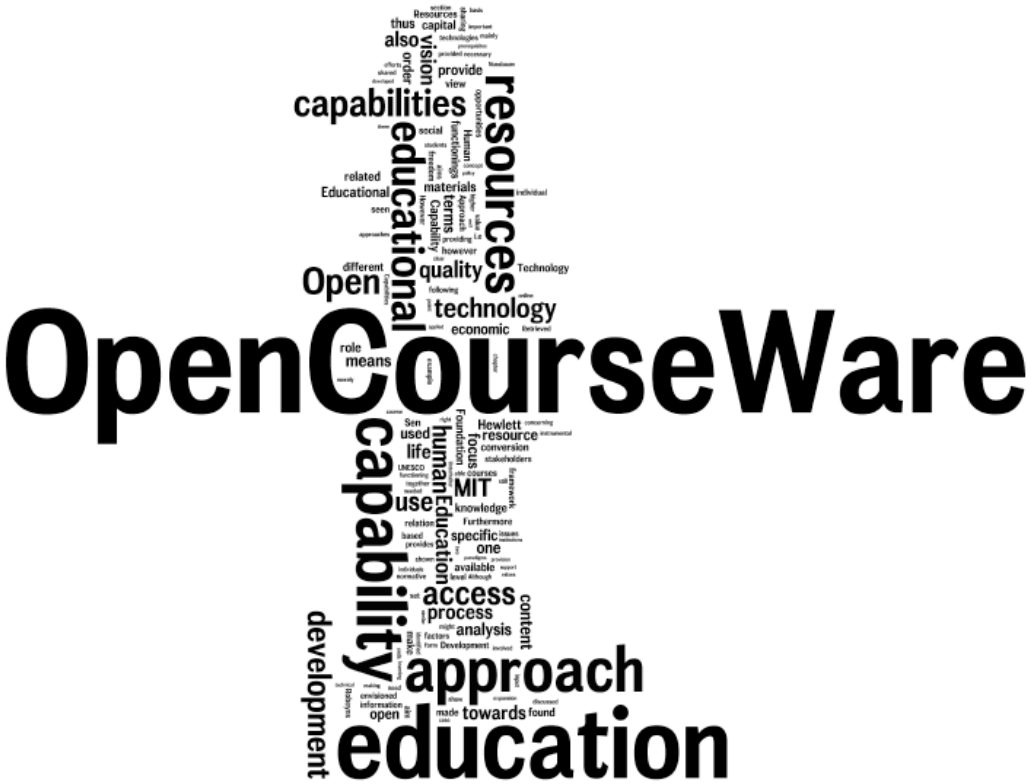
OpenCourseWare and the Capability Approach

Technology, Education for Development and Quality of Life



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Abstract

Globally we are facing a growing demand for education, an issue that is especially prevalent in lesser developed nations. A lack of resources for education is one of the main limitations in provision of education. The occurence of Information and Communication Technology now provide us the means to share digital educational resources openly. The scarcity formerly found in terms of educational content has now turned into abundance. These educational resources have been attributed a number of different roles, ranging from providing input for the development of curricula, to providing an education in itself and thereby accelerating development and improving quality of life. The main challenge related to this is: how to make meaningful use of this resource?

In this thesis I aim to provide a normative framework in which it is possible to accurately evaluate digital educational resources and their use and (possible) impact. The framework for this will be provided by the capability approach and applied to a specific case study on digital educational resources. The capability approach provides a framework for evaluating quality of life on the basis of the notion of development as specified in the capability approach. Development in the capability approach is seen as an expansion of freedoms by creating or expanding capabilities and provides an alternative to the dominant paradigms in which development is measured by availability of resources or utility.

Both education and technology are seen as important means for expanding capabilities, and the capability approach will be expanded in such a way that it can be applied to evaluations of education and technology. Using the means-ends distinction found in the capability approach, together with the conversion process from resources to capabilities, an analysis of the use of technology will be made and contrasted to the visions held towards the use of that technology.

The case study of this thesis is OpenCourseWare, an initiative by the Masschussets Institute of Technology, in which they are now sharing all the courses that are taught at their campus in an openly accessible online repository. In order to analyse this case study by means of the capability approach, I will start with a descriptive analysis of OpenCourseWare and the stakeholders involved in it. Presenting the capability approach, and its links to both education and technology will follow this. Finally, the visions that the stakeholders hold towards the use and application of OpenCourseware will be presented. Based on those three elements, OpenCourseWare will be analysed by means of the capability approach.

Based on the analysis by the capability approach I will draw conclusions on the impact and value of OpenCourseWare in the context of education for development, and how this might result in improved quality of life. Following that I will show the merits of the capability approach as compared to a resource based paradigm, and argue that OpenCourseWare could have benefitted from taking the capability approach as the framework in which to develop OpenCourseWare.

Finally I will make some recommendations towards possible improvements of OpenCourseWare by including 'Value Sensitive Design' and the notion that pedagogy has to prevail over technology in the process of education. Both the recommendation for using the capability approach as a framework in which to evaluate and develop OpenCourseWare and the inclusion of additional theories for design and education, are aimed at maximising the impact OpenCourseWare in education for development, thereby truly realising the potential of its contribution to an improvement in quality of life.

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Introduction

Background

Currently in many parts of the world people are still deprived of access to education, while demand for education is continuously growing. This issue is present in many nations but especially in what are being called lesser developed nations. Efforts are being made towards addressing this issue, for example by the United Nations 'Education For All' program, the Millennium Development Goals and by including the right to education in the universal declaration of human rights. Besides being declared a human right, education is strongly linked to efforts for enabling the development of lesser developed nations. Access to education however is highly dependent on the allocation of resources. Governments the world over have to balance education to other necessary expenditures, while education in itself is balancing its resources between the different levels of education that form the education system. Scarcity of resources thus remains a pressing issue in providing education. While there are different types of resources involved, the focus in the following will be on educational resources such as course materials that are available online.

Information and Communication Technology (ICT) plays an important role in addressing the scarcity of educational resources. The Massachusetts Institute of Technology (MIT) in 2001 decided to aid in addressing the issue of scarcity of educational materials by publishing the graduate and undergraduate courses taught at MIT in an openly accessible online repository. MIT christened this initiative OpenCourseWare and has currently published over two thousand courses. OpenCourseWare does not warrant educational credits and is therefore not intended as a distance education program. Instead OpenCourseWare is shared out of the belief that knowledge is a public good and is therefore to be shared openly. Although not the only motivation, the moral stance -that knowledge is to be openly shared- MIT takes through OpenCourseWare is an important one in addressing the scarcity in educational resources. MIT's OpenCourseWare will be the case study in this thesis.

OpenCourseWare relies on a variety of ICTs for dissemination and ensuring open availability. ICTs are highly influential to modern society and internet has been recognised as one of the most influential technologies in this, such that it has been linked to causing a digital revolution that has led us into 'the communication age' and subsequently into the current 'information age'. Using internet to disseminate

educational resources seem to be a fitting homage paid to the original goal of using it as a network for scholars to share information. Where there were formerly practical issues that constrained the open sharing of education materials, ICTs now provide a solution to this distribution problem. Through ICTs, the scarcity that formerly existed in freely accessible education materials has now turned into abundance. One of the challenges facing education at the moment is how to turn this abundance of resources into meaningful use.

As often happens when a new technology is introduced, a revolution is announced by experts in their respective fields. This has been the case for the use of technology in higher education in general as well as for the envisioned opportunities the availability and use of OpenCourseWare hold. The envisioned opportunities provided by OpenCourseWare for lesser developed countries range from it being used as high-quality input for the development of own courses, to enhancing education quality worldwide, providing a bridge to education in lesser developed nations and the building of knowledge societies and human capital to advance economic development and improving quality of life. These technologies are however regularly found to bring less of a revolutionary result as announced on introduction, as is the case with technology in higher education and OpenCourseWare.

Now that a decade of OpenCourseWare has been celebrated in the beginning of 2011, education is a human right and denying access to internet has become a human rights violation this seems to be a suitable time to review some of the envisioned results of OpenCourseWare. Furthermore, new technologies such as OpenCourseWare often demand ethical reflection, especially in the case of OpenCourseWare because of its links to visions of quality of education, quality of life and development which all posses (implicit) judgement of value. Since education is recognised as not only the transfer of information but also as a transfer of values, this provides another imperative for ethical reflection (Brey, 2006). This transfer of values is not limited to the process of education, educational materials shared through ICT can also be ingrained with (implicit) values (Brey, 2007). Education and technology thus are not neutral and neither are the visions attached to its role and use. Moreover, since various claims towards quality are made in the vision towards OpenCourseWare this calls for a normative and evaluative framework in order to assess these claims together with the (envisioned) use of OpenCourseWare.

This framework will be taken from the Capability Approach, an approach that originated in the dissatisfaction of Amartya Sen with the dominant development paradigms that focus on the possession of resources or on utility. Instead the capability approach focuses on what individuals are actually able to do and be in real life, where it distinguishes between capabilities and functionings. Capabilities are the options an individual can choose from in order to achieve functionings. Functionings are thus the actual achievements where capabilities are the possibilities to choose from in order to achieve functionings.

Next to Sen, Martha Nussbaum has contributed considerably to further development of the capability approach. Although the approach originated in economics it has been subsequently applied in a number of other fields in relation to social justice, development ethics and policy paradigms. Recently there has been growing attention for the capability approach's relation to both education and technology, as an evaluative tool as well as a framework from which policy advices can be drawn. Moreover both education and technology have the innate capacity to expand capabilities and are therefore logical and interesting topics of research for the capability approach.

By means of the capability approach an analysis will be made of OpenCourseware and the visions held towards it in terms of contribution to education, development and quality of life.

Research Purpose

In this thesis I will explore and attempt to answer how sharing of courses taught in tertiary education by means of OpenCourseWare can possibly contribute to Education for Development. The aims of development will be those defined in the capability approach's view on quality of life. The Capability Approach will provide the normative framework for evaluating OpenCourseware.

OpenCourseWare is an initiative by the Massachusetts Institute of Technology. In 2002 they started openly sharing course information on a dedicated website. An OpenCourseWare course contains at least a syllabus, course description and outline but can be expanded with various other media, such as videos of lectures, reading materials and lecture notes. OpenCourseWare is not credit granting nor providing support for its users, but aspires to be a resource for tertiary education. The OpenCourseWare concept is not only educational content but includes the Information and Communication Technology (ICT) that enables open access and use. The term 'OpenCourseWare' will

from here on signify the educational resource for the tertiary level, inclusive of the technology that enables sharing, access and use of it.

A vision analysis of OpenCourseWare will be undertaken to provide the analysis with which the evaluation in terms of the Capability Approach can be made. The vision analysis will identify OpenCourseWare stakeholders and show for whom OpenCourseWare has value and why. The research will review OpenCourseWare and mainly limit itself to two related stakeholders; MIT, and the OpenCourseWare Consortium it has initiated, as 'OpenCourseWare producer', and the United Nations Educational, Scientific and Cultural Organization (UNESCO) and the Hewlett Foundation as the leading organisations that fund and support OpenCourseWare initiatives as 'OpenCourseWare proponents'. Both MIT, the Hewlett Foundation and UNESCO have been involved in OpenCourseWare from its conception.

The vision analysis will include the perspectives held by different stakeholders on OpenCourseWare in order to make explicit their expectations and underlying assumptions. Through the vision analysis I expect to find a shared vision between various stakeholders in proponents of OpenCourseWare, in which OpenCourseWare is seen as a means (education) towards an ends (development), with education as a driving factor for development. One can however question this vision and wonder if OpenCourseWare are the appropriate means -an education resource-, to the envisioned end; education leading to development. The vision analysis will discuss the OpenCourseWare vision in relation to education and development. The 'vision' will be seen as a set of beliefs in and possibilities of OpenCourseWare and its applications and uses. It will aim to identify the vision that is shared among OpenCourseWare proponents in relation to the uses and effects of OpenCourseWare. These will be contrasted to the vision of OpenCourseWare producers. On the basis of the vision analysis I will examine whether the OpenCourseWare technology is consistent with the vision. This will be done both in terms of having an appropriate means-ends relation as well as the underlying values in the vision and the technology.

For the sake of clarity in the OpenCourseWare analysis and to prevent mixing up the different components of OpenCourseWare, a division between actual OpenCourseWare content and OpenCourseWare technology for production and access will be made in chapter one. Hylen (2006) conceptualised education resources such as OpenCourseWare as consisting of ''*tools*''; technology needed for production and dissemination, ''*content*''; the actual course materials that are published and

‘’*implementation resources*’’; property right licences such as Creative Commons and guidelines for uniformity in design of OpenCourseWare. Focus will be on the technology components of OpenCourseWare. However, in analysing the technology used in OpenCourseWare I expect to find an interplay between different OpenCourseWare components in which content already influences technology design and vice versa. Although a clear division between components will be made for the sake of clarity in the analysis, interplay between the OpenCourseWare components is expected to be found.

Sen and Nussbaum’s Capability Approach will be presented in chapter two and used in chapter three to assess OpenCourseWare visions and possible uses of OpenCourseWare, and the role of technology in the process. The capability approach started off as an approach to welfare economics developed by Amartya Sen does not focus merely on the provision of resources, but aims to show how specific resources (or ‘commodities’) can be used to create capabilities. It understands poverty in terms of a lack of capabilities, instead of a lack of resources. Sen collaborated with Nussbaum to expand his approach and apply it to human development and Nussbaum’s Aristotelian view on ‘human flourishing’ (Nussbaum, 1993). Furthermore, Nussbaum has proposed a list of ten ‘central human capabilities’, by which the capability approach can be applied as a normative framework.

The capability approach paradigm has been extended and applied to education (Unterhalter, 2009; Saito, 2003, Robeyns, 2006a; Walker, 2005), and more specifically to how Education can lead to an expansion of capabilities, thereby improving quality of life. Furthermore there is also a growing body of literature exploring the relation between the capability approach and technology (Oosterlaken, 2009; Zheng, 2007; Johnstone, 2007) in a way largely similar to that in which education is connected to the capability approach. Since OpenCourseWare combines education and technology, and the capability approach can be applied to both of those, OpenCourseWare will be framed as a ‘educational technology’ and will be analysed and discussed as such.

In chapter three, the values in OpenCourseWare, such as underlying assumptions, interests and bias will be made explicit in order to evaluate their relation to the envisioned impacts of OpenCourseWare, both as the appropriate means towards the ends and to identify issues that might arise in the use of OpenCourseWare. The vision analysis of both OpenCourseWare producers and of OpenCourseWare proponents will be used to analyse the envisioned and/or possible impact of OpenCourseWare in terms

of creation of capabilities. This expansion of valued capabilities is what the Capability Approach defines as development.

The analysis of OCW will question whether OpenCourseWare as it is can make the impact 'envisioned' (in terms of capabilities) by its producers and proponents. More specifically; is the 'resource' OpenCourseWare sufficient, or does the concept need expanding and/or additions to make the envisioned impact? If from the analysis follows that the OpenCourseWare concept is incomplete, I will aim to identify and elaborate on issues that need to be addressed in order to maximise the impact of OpenCourseWare. Furthermore the analysis aims to create awareness of underlying aspects, assumptions and values in the vision towards education and technology concerning OpenCourseWare.

The research in this thesis will serve a twofold purpose: it will combine education and technology in the framework of the capability approach and based on that an analysis of the OpenCourseWare case study will be made. The inclusion of education and technology in the capability approach aims to show the merits of the capability approach when compared to resources and utility focussed paradigms. The application of the framework will show how the capability approach provides a more comprehensive framework in contrast to the limitations of the other paradigms that seem to currently prevail in the visions towards OpenCourseWare. Analysing OpenCourseWare by means of the capability approach will show the limitations of OpenCourseWare. Following from the findings of this analysis several recommendations towards the use of and vision towards OpenCourseWare will be made. Thereby showing the limitations of OpenCourseWare and the attached vision, the merits of the capability approach as a framework for evaluation which will culminate in advice towards the use of OpenCourseWare based on the capability approach.

Thesis Outline

Research Questions

The main research question, which will eventually be addressed in the final part of chapter three, is: How can the technology OpenCourseWare contribute to expanding capabilities and improvements in quality of life, in the context of education and development? This question will be answered by first analysing OpenCourseWare and the related vision by means of the capability approach, followed by recommendations

towards maximising the opportunities offered by OpenCourseWare in terms of the capability approach.

In order to do so the first chapter of this thesis will address the question: What is OpenCourseWare in terms of content, features and technology, and who are the main stakeholders involved in OpenCourseware? The second chapter will present the capability approach as a normative framework by which to analyse education and technology and its relation towards development and quality of life. This will be done by answering the question: What is the capability approach and how does it compare to other paradigms concerning quality of life and development? Together with: How does the capability approach relate to education and technology, and how can it be used to analyse OpenCourseWare? The analysis that is to take place in chapter three will start by answering how OpenCourseware does, and possibly can, contribute towards the assessment of capabilities. Based on this the main research question will be answered and conclusions and recommendations will follow that.

Concepts

The first chapter of this thesis will be a conceptual analysis that will deal with the concept of OpenCourseWare. How do we define OpenCourseWare itself and what are its distinguishing features. It will be located in the frame of Open Educational Resources, a broader category of online education resources not limited by the specific OpenCourseWare characteristics, of which it is part. The relevance of the Open educational resources concept will be shown when the use of OpenCourseWare will be contrasted to the vision in terms of the capability approach: is OpenCourseWare just an educational resource or is it more and what can be expected of it?

Normative framework

The capability approach by Sen and Nussbaum, and subsequent expansions of the capability approach in the fields of education and technology, will be used to identify how the vision of OpenCourseWare relates to the development of capabilities through the use of OpenCourseWare. Furthermore, the capability approach will provide the framework for a normative evaluation of OpenCourseWare.

The capability approach is an approach for the assessment of quality of life in terms of capabilities instead of resources. Development aid usually focuses mainly on the provision of resources (Chabott & Ramirez, 2006), for example the provision of a

technology that is to assist in education. In this education is often subsequently assumed to lead to development. The capability approach looks beyond provision of resources and investigates in what way available resources actually lead to increased capabilities.

In this, Education is seen as a 'driving force of change' (Unterhalter, 2009). This change can be described as ''(i) the enhancement of capacities and opportunities and (ii) the development of judgement in relation to the appropriate exercise of capacities'' (Saito, 2003). According to Nussbaum (Unterhalter, 2009) education thus has the opportunity to create and expand capabilities to improve 'quality of life' judged from Nussbaum's Aristotelian perspective. The capability approach is presented as a useful and maybe even necessary addition to other approaches to education such as 'Human Capital' or rights-based paradigms (Robeyns, 2006).

Similar linkages as in the capability approach and education are investigated in terms of the capability approach and technology. More specifically, inquiries are being made into the question if and how technology can play a role similar to that of education in terms of the capability approach? And how the capability approach might also add to current approaches in technology and technology design (Oosterlaken, 2009).

To relate this to OpenCourseWare; OpenCourseWare is an educational resource. Moreover, in terms of the capability approach framework OpenCourseWare will be treated as being an 'educational technology'; in this case a technology that makes available a resource that can be used for educational purposes. In terms of traditional resource focused paradigms, provision of OpenCourseWare would be an achievement in itself. In terms of the capability approach however, the question to what extent will OpenCourseWare open up new capabilities will be addressed. This will show that merely a resource does not (necessarily) lead to capabilities, although these outcomes (capabilities) are envisioned by OpenCourseWare proponents

Analysis

The vision analysis in chapter three will be used to identify and describe the 'visions' held on OpenCourseWare, followed by an analysis of OpenCourseWare by means of the capability approach. Production of and support for OpenCourseWare obviously involves a vision as to why it should be produced and/or supported. The vision analysis aims to identify for whom the technology has value, the reasons for this value, and how much value is (or should be) attached to it. Stakeholders and their

interest will be identified in order to do so and the prerequisites for the realization of the vision will be identified. The key steps in this process are to make a collection of visions on OpenCourseWare and to analyse their content and embedded normative implications.

The outcomes envisioned are the ends to which the means -OpenCourseWare- are produced. When the vision held by an OpenCourseWare producer/proponent has been identified and described, a start can be made towards analyzing this vision and underlying assumptions embodied in both vision and technology. Furthermore the vision will be used for further assessment in a means-ends analysis; is the technology able to live up to the vision or does either the vision or the technology needs to be amended in order for them to be consistent?

The abovementioned methods will be combined to form the basis on which OpenCourseWare will be evaluated through the normative framework the capability approach provide. This will lead to some recommendations on ways to improve OpenCourseWare as a whole; whether the vision needs to adapted or expanded to match the technology and vice versa; whether the technology fits the envisioned use of OpenCourseWare or if the technology is in need of adjustment.

The normative framework provided by the Capability Approach will be used to come to a normative analysis of the technology OpenCourseWare. Technology is here to make our lives better, let us therefore investigate: what does this technology (OpenCourseWare) actually contributes towards that end? The normative framework to link together and apply the aforementioned methods to will be that of the capability approach, and its relation to both the educational technology at stake as well as providing a normative stance on quality of life and development. The investigation concerning the contribution of OpenCourseWare towards 'quality of life' in terms of the capability approach connects with the domain of Development studies and the role of education in development. Education here is not seen solely as having an intrinsic value. In terms of welfare economics it is also seen as an instrument with which one can expand valued capabilities. The capability approach sees this expansion as development that improves quality of life and enlarges freedom.

The eventual aim of development is to create opportunities for improvements in quality of life, and in this specific case education and educational technology is (one of) the (envisioned) means towards this end. This will combine the normative aspect of the end; improvement in quality of life, to the moral scrutiny of the means; an educational

technology. The capability approach will make clear how OpenCourseWare contributes to functional capabilities, adding to other good life paradigms such as utility or access to resources. The capability approach provides an addition to other good life paradigms and/or an alternative framework and view in which to conceptualise, evaluate and develop a resource. Furthermore, the philosophy behind the development aims and more importantly the educational aspects will be addressed.

The vision analysis may show good intentions of those involved in OpenCourseWare, however underlying assumptions in their approach should be made explicit; well intentioned efforts do not necessarily lead to a good and/or the envisioned result. I expect to find a resource focused paradigm to be dominant in OpenCourseWare proponents, which the capability approach can show to be incomplete (as a paradigm) and in need of addition(s). Furthermore, if the vision analysis shows for example the assumption that education necessarily leads to development, and assumes that OpenCourseWare provides education, this can be seen as a biased mode of thinking. An ethical aspect of the technology and the content distributed that is informed by a specific bias will come to the fore in this.

OpenCourseWare is made possible through a set of technologies. Technology in terms of OpenCourseWare can be seen as a solution to a distribution problem concerning dissemination of knowledge. The scarcity that formerly existed in that domain has now turned into abundance, the challenge now is to turn that abundance into meaningful use.

Conclusions and recommendations

In drawing conclusions at the end of chapter three I aim to show how OpenCourseWare can be seen in terms of the capability approach and how this approach can usefully add to other welfare approaches when evaluated in terms of improvements in quality of Life defined by the capability approach. Furthermore the implicit and explicit assumptions in OpenCourseWare design, production and technology will be shown. The vision analysis will aim to identify (possible) issues involved in the development and dissemination of OpenCourseWare. The vision analysis and an evaluation of it will be brought together here to make suggestions for vision management. From the embedded assumptions points will be brought forward in need of further research or more attention in the domain of OpenCourseWare.

Following this, the broader views and assumptions on both development and education will be identified.

Once the assumptions which influence the OpenCourseWare domain and the relevance of a focus on capabilities have been made clear, they will form the basis for recommendations for improvements for OpenCourseWare. The vision analysis will be the basis for the normative judgement based on the capability approach framework. The analysis will be in terms of use, production and dissemination, and of the means toward which OpenCourseWare are the ends concluding with necessary conditions / prerequisites for efficient OpenCourseWare uptake. These recommendations will be aimed at expanding capabilities through education and the use of technology, to come to improvements in quality of life, and the role OpenCourseWare might play in this.

Conclusion

The conclusion will provide a summary of the thesis, together with the most important findings and recommendations from the OpenCourseWare analysis in chapter three.

OpenCourseWare; Concept, Definition and Stakeholders

Introduction

The main aim of this chapter is to clarify what OpenCourseWare is, who is involved in it, how OpenCourseWare relates to other educational resources and what technologies are used for providing access to OpenCourseWare. This will be done descriptively and will start by clarifying the concept of OpenCourseWare, together with its defining features and characteristics.

OpenCourseWare refers to the open sharing of course in an online repository as started by the Massachusetts Institute of Technology (MIT). The OpenCourseWare is located in the framework of Open Educational Resources, a broader category of online education resources inclusive of OpenCourseWare, but not limited by the specific OpenCourseWare characteristics. The relevance of the Open Educational Resources concept and its relation with OpenCourseWare will be clarified by comparing where the two concepts overlap and how they differ. I will conclude by illustrating how OpenCourseWare are a specific sub-set of Open Educational Resources.

Introducing several concepts and terminologies taken from the Open educational resources field and applying them to OpenCourseWare will allow a clear separation of the different fields and technologies involved in OpenCourseWare production, sharing and accessibility. In doing so, the concept of 'Openness' of resources will be addressed to show how it is subject to different interpretations and how these relate to choices that concern both the content and technology of educational resources. Furthermore the 'history' and origin of OpenCourseWare will be discussed to make clear what the motivation and reasoning behind MIT's decision to start openly sharing their courses was. In this the main stakeholders in the OpenCourseWare field will also be introduced; MIT and it's OpenCourseWare -Consortium as initiator and producer(s) and UNESCO and the Hewlett Foundation as organisations supportive of OpenCourseWare. In conclusion, the rationale of the organisations providing support to OpenCourseWare will be touched upon, together with how the 'user' is perceived by both producers and proponents. This chapter aims to provide an overview of the OpenCourseWare field and its connections to other resources and technologies. This, together with the normative framework provided by the Capability Approach, will form the basis for the analysis of OpenCourseWare that is to take place in the third chapter of this thesis.

OpenCourseWare: Concept

In the following section the concept of OpenCourseWare as shared by MIT will be introduced, together with its defining features and characteristics. OpenCourseWare as shared by MIT are digital publications of course materials that are freely accessible for use (and reuse), within the limits of the Creative Commons license under which the OpenCourseWare are published. During a UNESCO forum, inspired by the emergence of OpenCourseWare, the participants, among whom Ms Anne Margulies the executive director of the MIT OpenCourseWare initiative was present, described OpenCourseWare as a concept that;

> 1. Provides educational resources for college and university faculties to adapt in accordance with their curricular and pedagogical requirements.
> 2. Includes the technology to support open, meaningful access and use of the courseware.
> 3. Includes at a minimum the course description, syllabus, calendar, and at least one of the following: lecture notes, demonstrations, simulations, illustrations, learning objects, reading materials, assessments, projects.
> 4. Does not normally provide direct open learning support for students. (Witherspoon, as quoted in: UNESCO, 2002)

To summarise this conceptualisation, OpenCourseWare: is primarily aimed at Higher Education faculty (and to a lesser extent their students); incorporates technology which does not limit access or meaningful use; includes relevant and complete course content but is purely a resource, i.e. not credit-granting. Concerns about giving away an MIT education for 'free' were countered by stressing explicitly that it must not be seen as a distance education programme or an attempt to provide or replace formal education. Users of OpenCourseWare are not entitled to receive university credits or other forms of certification from the providing university, nor are there direct forms of access to faculty for feedback or support (MIT, 2011e) . What OpenCourseWare does provide is an openly accessible resource of education materials grouped in courses, of a quality that reflects the standard of education at MIT.

OpenCourseWare are shared under a Creative Commons license, a copyright license under which the rights that remain reserved and the rights that are foregone can be specified, unlike the traditional copyright licenses that do not allow for flexibility of use. MIT has chosen a Creative Commons license (CC BY-NC-SA) that allows sharing, copying and redistribution, and even derivative works based on OpenCourseWare

(MIT, 2011g). The conditions under which all of this is allowed specify that OpenCourseWare (or its derivatives) will be "shared alike". This means that the (re-) distribution is to take place under the same (or a similar) license. Furthermore, the materials must be attributed to the original author in the manner specified by MIT and may not be used for commercial purposes. MIT, however, makes clear that use of OpenCourseWare for educational purposes or by not-for-profit organisations is allowed under the terms of the Creative Commons agreement BY-NC-SA.

Next to OpenCourseWare, there are a number of other initiatives with similar aims that, just as OpenCourseWare, can be placed under a broader concept which will be referred to as 'Open Educational Resources'. The next section will explore the differences and similarities between OpenCourseWare in specific and Open Educational Resources in general.

Open Educational Resources: The Bigger picture

OpenCourseWare falls into a broader category of educational materials called Open Educational Resources. Although OpenCourseWare is an Open Educational Resource, not all Open Educational Resources are coursewares; OpenCourseWare is a specific subset of Open Educational Resources. This observation already takes us to one of the principal differences between OpenCourseWare and Open Educational Resources; OpenCourseWare is an educational resource which is offered in pre-packaged course modules, while Open Educational Resources are not necessarily predefined course packages or of a modular nature. Moreover, in Open educational resources the audience the material is aimed at and the quality and relevance of the material can remain ambiguous, while in OpenCourseWare the audience is pre-defined as the materials are found in (under-) graduate courses, implying that the envisioned user is either teaching or studying at university, or is a university graduate.

Quality and relevance in OpenCourseWare are assured by means of the accreditation of the higher education institutions that participate in the OpenCourseWare-Consortium. The terms for use concerning OpenCourseWare are also uniformly determined. This is because all OpenCourseWare make use of the same Creative Commons licence and allow re-use of the materials under the conditions that it is not used for commercial purposes and that the original author is attributed. Among Open Educational Resources there is a great variation of options for use and re-use,

which is mainly dependent on which rights the author decides to forfeit (although the author is not always known).

OpenCourseWare is thus a fairly strict concept; it limits itself to accredited higher education institutions who need to publish at least 10 courses in OpenCourseWare format in order to become a member of the OpenCourseWare-Consortium. So far, we can see that OpenCourseWare, with its modular structure, Creative Commons license, quality control and clear aim at a specific audience, is a fairly rigid resource. This rigidity is not, however, necessarily found in other Open Educational Resources (but at the same instance is not ruled out either).

Where OpenCourseWare and Open Educational Resources do overlap is in its principal intention; making educational resources openly available through ICTs. Arguably one could call 'openly' accessible informative or specifically educational materials Open educational resources. Among those can be personal websites and blogs or institutionalised resources such as Wikipedia, E-books etc. With this there are some issues related to the use and application of these materials: the source/author is not always clear and neither are the terms of use concerning redistribution and reuse. Moreover, there is not necessarily an educational aim involved and therefore such initiatives might be better grouped under 'Open Content' (D. E. Atkins, J. S. Brown, & A. L. Hammond, 2007). The previously given original OpenCourseWare definition (UNESCO, 2002) is still useful but it should be noted that OpenCourseWare is exclusively applied to the efforts of MIT or members of the OpenCourseWare - Consortium. Open Educational Resources currently encompass a broader category of educational resources than just coursewares published by higher education institutions (EDUCAUSE, 2010); however, as will be discussed now, the exact definition of Open educational resources remains both broad and vague.

At the time of the UNESCO forum on the impact of OpenCourseWare the participants concluded by suggesting Open educational resources to be described as: ‘’ The open provision of educational resources, enabled by information and communication technologies, for consultation, use and adaptation by a community of users for non-commercial purposes.’’ (UNESCO, 2002). This was largely based on what they, at the time, had learned from one of the first large scale and institutionalised Open Educational Resource initiatives; OpenCourseWare. In the mean time the field has however moved and expanded in the ten years that have gone by since the announcement of OpenCourseWare. Non-course resources such as textbooks, articles

and other learning objects have become more widely available as a result (Wiley, 2006). Hylen (2006) states that the most often used description of Open educational resources has become: “Open Educational Resources are digitised materials offered freely and openly for educators, students and self-learners to use and re-use for teaching, learning and research."

The following definition can be found in Atkins et al. (2007): "Open educational resources 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. Open educational resources include full courses, course materials, modules, textbooks, streaming videos, tests, software, and any other tools, materials, or techniques used to support access to knowledge." More generally speaking, the Hewlett Foundation describes Open Educational Resources as: "High-quality digitized educational materials offered freely and openly for anyone with access to the internet. These materials are available for use as is, or for re-use as appropriate." (Hewlett Foundation, 2005).

Despite the differentiation in definitions, what stands out clearly are the similarities in terms of access, aim and use. Open educational resources are openly shared and browser-accessed, meaning that anyone with a means of accessing the internet can view (and often download) them, without registering or enrolling first. This open access also means that no form of (university) credits are to be gained from Open educational resources; it is primarily meant as a resource. Furthermore, the technology for open access is also included in Open educational resources; browser based access combined with other free-of-charge software(s) to ensure 'universal' access without having to buy licensed software to do so.

The general aim of Open educational resources is to supply teachers and learners with a resource that they can use for information and self-study, or re-use in courses of their own. This possibility is ensured by (various) content licenses that allow (re-) use, of which the most prominent is the Creative Commons license. Concerning the domain of Open educational resources, for the purposes of this paper, it will be restricted to content produced and shared by Higher Education Institutions. The focus will thus be limited to tertiary academic education, much in line with OpenCourseWare.

The Open educational resources definitions above include roughly three categories; Content, Tools and Implementation Resources (Hylén, 2006). Together these three form the components of OpenCourseWare which will be elaborated on in the

next section. The focus in this section is on making clear how OpenCourseWare fits into the Open educational resources field. Following from Atkins et al., there are clear similarities which show that OpenCourseWare is to be grouped under Open educational resources; both concern digital openly shared materials to be used for educational purposes. In addition, both are most often found grouped in collections or repositories and shared under specified licenses that support openness of use, such as Creative Commons. Furthermore, the shared materials are not credit granting (i.e. they are purely a resource) and enable user-flexibility because of the modular nature which allows mixing and matching of different materials from different sources (although OpenCourseWare remains a Read Only resource) for the user's non-commercial re-use.

Components of OpenCourseWare

In the previous sections both OpenCourseWare and Open educational resources were discussed along with their similarities and differences. This section will build on both the OpenCourseWare and Open educational resources descriptions but will also provide more details on the technologies used and their relation with OpenCourseWare content.
OpenCourseWare is made possible through a set of technologies; ICTs. Technology in the case of OpenCourseWare can be seen as a solution to a distribution problem concerning dissemination of courseware(s). The scarcity of educational resources that formerly existed has now turned into abundance. The challenge following from that is to turn the resources available into meaningful use (Liyoshi & Vijay Kumar, 2008, p. 3). Openness of courseware and resources is paramount in the OpenCourseWare movement. The same importance given to the openness discussed in the foregoing section applies to the technologies used in OpenCourseWare. In the following section I will explore the technologies used for OpenCourseWare and subsequently elaborate on the different interpretations given to ‘openness’.

OpenCourseWare Technologies

As far as the technologies themselves are concerned three basic categories can be identified; Hardware, Software and Connectivity. Connectivity and Hardware are generally not directly OpenCourseWare related, nor (necessarily) designed with OpenCourseWare in mind. In this case they are part of the necessary prerequisites for access to OpenCourseWare.

In contrast, software is strongly interrelated with the sharing of open content that is facilitated by ICTs. The software can be thought of as the tools that enable production and dissemination of OpenCourseWare (presupposing that the Hardware and Connectivity prerequisites are fulfilled), and also largely determine how 'open' the resource is. Consequently, the current section on technology, as well as the following section on 'Openness', will focus on the (types of) software used in OpenCourseWare and Open educational resources. Different types of tools are needed for both making available and producing OpenCourseWare; tools for development of OpenCourseWare, and open source software in order to access the shared materials (Hylen, p.10, 2006). Although hard to separate content from technology (as will be elaborated on in the following paragraph), in my analysis OpenCourseWare will mainly be addressed in terms of the enabling 'open technologies' together with the implementation resources.

Division between OpenCourseWare components

For the sake of clarity in the OpenCourseWare analysis a division between three important components of OpenCourseWare will be made here; content, technology, and implementation resources. Hylen (p. 30-31, 2006) divides Open educational resources such as OpenCourseWare as consisting of: ''tools'', which is the technology needed for access, use, production and dissemination; ''content'', which refers to the actual course materials that are published and; ''implementation resources'' which refers to the property right licences such as Creative Commons, guidelines and standards for uniformity in design of OpenCourseWare.

These three components are interrelated. For example, the content will influence the tools needed and the specific design for a given OpenCourseWare. In other words, if the content is a video lecture, the tools needed are a freely useable video player on a computer that has appropriate processing capacity linked to an internet connection with sufficient bandwidth. The options and limitations of that setup will also influence the type of standard that is required for compressing the video. All three of the categories of which Open educational resources are made up of influence each other in terms of enabling and limiting. With respect to the 'tools' as described by Hylen, I would like to add a distinction between technology needed for access and use, and technology for production and dissemination. Taken from the user's point of view, the main interest will be the ability to access and make use of OpenCourseWare and not necessarily in being able to produce and disseminate OpenCourseWare. Even when the user wishes to

produce or modify OpenCourseWare for further dissemination, access and the ability to make use of OpenCourseWare remain prerequisites for that. One can also divide the tools further into those needed for consumption and those for production or modification of OpenCourseWare.

As has been discussed previously, freedom of access is paramount in the field of Open educational resources. The tools, content and implementation resources together determine the level of freedom given to the user. However, the term 'open' can take on different meanings and interpretations on what actually constitutes an 'open' resource. The following section will focus on different interpretations of 'open' concerning educational resources, together with the constraints that influence the degree of freedom the resources provide its users with. Subsequently, there will be a section in which three Open educational resources initiatives and the degrees of freedom they provide are compared, in order to illustrate the interrelation between the different components of OpenCourseWare.

Openness of CourseWares and Educational Resources

The provided resources being "Open", is a defining characteristic of both OpenCourseWare in specific and Open educational resources in general. It can, however, take on different meanings, when applied to open educational resources or specific areas and aspects thereof. Tuomi (2006) describes three areas in which openness plays a role; "One has to do with technical characteristics, one with social characteristics, and the third with the nature of the resource itself."

In Open educational resources when discussing openness, the focus is on the interplay between constraints and freedoms. Technical constraints can be a lack of accessibility and technical interoperability, i.e. how openly accessible are the Open educational resources and how do they fit into existing systems and structures? Social constraints concern the (expected) social means to which one makes the resource available. In this case, making knowledge openly accessible through Open educational resources. Although openness might be guaranteed in the technical area, a social constraint such as copyright or a limiting ethical standard can then still affect accessibility. The "nature of the resource" refers to the way in which the resource is perceived. For example, if educational resources are seen as 'global public goods'[1]. This

[1] Public goods are goods that are 'non-excludable' (i.e. access to the specific good cannot be excluded) and 'nonrival': when the specific good is used it does not leave any less for others to consume (Kaul, Grunberg, & Stern, 1999, p. 2)

provides a justification for sharing, but if not, it might justify limitation of access. Both the technical, in which the focus will be primarily on the software(s), where the social constraints will be returned to later on to see how institutions deal with these in the practice of open educational resources. First the meaning of 'open' in relation to Open educational resources will be addressed.

Bissel & Boyle (2007) identify 'open access' as a primary requirement of Open educational resources. Open access, in this case, meaning free of charge, without requiring registration, to anyone with a means of accessing the public webpage the Open educational resources are published on. This, as they emphasize, does not go much further than most 'ordinary' websites, given that they are publicly accessible. A further analysis is undertaken in which several "levels of freedom" are specified, where each level is assigned a number. The first level, being the aforementioned 'open access', is sublevel -1 because it is the bare minimum required in order to get the label ‘open’. The next level up, "level 0", allows not just access but also copies and redistribution of the accessed content. Being allowed "derivative works"; re-distribution after modification of content by addition, subtraction or otherwise, is "level 1". This level brings with it the limitation that derivative works cannot be used commercially. A 'level 1+' would be possible by allowing commercial exploitation.

'Open' thus generally means access 'free of charge' and not 'free to use and modify at will'. It is therefore not a synonym for "without conditions" (Hylen, 2007). Currently Creative Commons are the most commonly used licenses in the field of Open educational resources. The most restrictive Creative Commons license, abbreviated ‘BY-NC-ND’, still allows sharing, copying, distribution and transmission of the work, under the condition that it is not used for commercial purposes, no derivative works are made and that the original work is attributed as specified (Creative Commons, 2011). Even the most restrictive Creative Commons license thus still satisfies the ‘openness’ requirement related to 'level 0' of freedom as specified by Bissel and Boyle.

So far the term 'open' and its subsequent analysis in levels of 'openness' has focussed mainly on the content shared, and the freedom(s) it allows to users. As shown in the previous sections, a division between content and technology can be made. Open technology therefore will also be discussed. The technologies needed for accessing the content influence the 'openness' of access. What is most prominent concerning technology is similar to the content; a guarantee that access is free of charge, to ensure

that at least the freedom of 'level 0' of openness is present; guaranteeing open access and the possibility to copy and redistribute.

Open educational resources, being browser based, gives the user a number of free-of-charge software options to choose from for primary access, from across different (PC) operating platforms. Further access to the materials is ensured by primarily making use of PDF file formats and, for media other than text (e.g. video, images), file formats that supply the user again with several free-of-charge options for access. In doing so, 'sublevel -1' is generally guaranteed, although some Open educational resources still partly need specific licensed software. This means that the providing institution needs to find a balance between openness of access and richness of content. Furthermore, the aforementioned technical and social constraints can affect the 'openness', as well as the mode of sharing chosen by the Open educational resources provider.

Open Educational Resources initiatives

In the following section, three Open educational resources initiatives will be described; OpenCourseWare by MIT, Connexions by Rice University and, MERLOT by California State University. Each of these will subsequently be reviewed to illustrate how the choices they made were related to their mode of sharing (and thus influenced their 'openness') and if/how technical and social constraints played a role in this. The aforementioned institutions are the initiators of the specific Open educational resources initiative. They all work together with other institutions and associations, the details of which will not be elaborated here.

MIT has set itself a goal to publish all of their courses in the OpenCourseWare format, and aims to make its content available to "as many people around the world as possible" (MIT, 2011a). This aim has clear implications for the technology used; to ensure high accessibility most of the material found in OpenCourseWare is in PDF format because it ensures free means of access from across different platforms. PDF, however, also brings with it a technical constraint - they are usually not open for editing. An oft found social constraint is copyright, meaning that OpenCourseWare (and a number of other Open educational resources) frequently are not able to provide more than a literature list, without providing means of access to the literature. The Creative Commons license OpenCourseWare are published under is ‘BY-NC-SA’ which allows sharing and remixing (or adapting) of the original work, under the condition that

derivatives are non-commercial, attributed and shared again under a similar license; the 'share alike' license. (Creative Commons 2011).

The 'openness' of OpenCourseWare, and Open educational resources in general, is thus both ensured and limited by technical and social issues that are encountered in the process of making OpenCourseWare openly available. Furthermore, the choices made by MIT make OpenCourseWare static and highly rigid; it is offered in a non-editable format, in pre-structured courses without means of direct feedback or user contribution. Moreover, it is institutionalised through, and managed by, MIT staff. In doing so, OpenCourseWare remain largely Read Only materials of which the contents are under (quality) control of MIT.

Rice University has set itself a somewhat different goal; "the collaborative development of educational modules and courses" (Wiley & Gurrel, 2009). Unlike OpenCourseWare the content is not necessarily found in pre-structured courses but can also be arranged in modules that can be combined into a custom-made course, or open textbooks that can be integrated into other courses or modules. Moreover, Connexions allows 'external' authors (i.e. those other than Rice University staff) to contribute content. This decentralised approach allows a higher level of freedom, since users can now contribute materials of their own, and structure separate modules into a course. This is also reflected in the Creative Commons license used which is simply BY (Connexions 2011). Meaning that users are allowed sharing and remixing if only the derivatives are properly attributed (commercial). Re-use thus remains open and there is no obligation to 'share alike' (Creative Commons 2011). The inclusive policy towards user contribution brings with it a different form of quality control, not done by centralised staff, but by registered contributors to Connexions. Technical constraints are less prominent due to the inclusive nature of Connexions; besides PDF formats, users can also download XML formats that ensure interoperability between platforms and the ability to edit. In the same way social constraints are less prominent because contributors try to use 'open' content in their contributions, meaning there are less copyright issues to deal with.

While both OpenCourseWare and Connexion are repositories for content, MERLOT is a "referatory" (Hylen, 2007), and includes OpenCourseWare and Connexions in their database search (MERLOT 2011). Meaning that instead of producing content and making it available, it simply links to content that is available elsewhere. It does, however, also provide software tools to allow users to build content

of their own, which can then be included in the MERLOT search database. In the meantime a form of quality control remains in place; MERLOT has editorial boards for each academic discipline that peer-review the content before it is added to the database. The Creative Commons license used for MERLOT's open content is either BY-NC-SA (similar to OpenCourseWare) or BY-NC-ND (Creative Commons 2011), which is similar except that it does not allow derivative works. There is, however, content found of which it remains unclear what the limitations for use are, and whether content is open for editing. On top of that, certain content needs explicit permission for use from MERLOT, which also charges institutional users a fee for some of the services they provide. This ambiguity seems to be found throughout MERLOT, whether it is free of charge, how 'open' the content is etc. The approach they have chosen is less structured and uniform compared to the other two Open educational resources initiatives discussed here. Moreover, because it is a 'referatory' it is more difficult to review which technical and social constraints are generally of influence.

As has been discussed in the preceding sections, being ‘open’ is a prominent feature of Open educational resources. The individual providing institutions also apply different meanings of ‘open’ to their Open educational resources. Openness is influenced by a number of areas, such as technical and social constraints and the aim to which institutions are providing Open educational resources, which results in differing levels of freedom. The minimum level of freedom is access free of charge, which mostly still comes with certain conditions of use. The most restrictive Creative Commons license ensures a minimum level of freedom (‘level 0’) and from thereon Open educational resources can become more open, with Creative Commons licenses to support those greater degrees of freedom. Furthermore, content and technology have been shown to be interconnected with regards to the level of freedom of Open educational resources. While some opt for a ‘static’ centrally controlled resource (e.g. OpenCourseWare), others are less centralised (e.g. Connexions, MERLOT) and encourage user contributions, though the possibilities for user contributions also differ. In every open educational resource, independent of the level of freedom, technology is a facilitator for access. Depending on the desired level of openness, with the given constraints in mind, choices for specific technologies are made.

OpenCourseWare History and Stakeholders

In the fall of 2002 MIT launched a dedicated OpenCourseWare website as a pilot project (MIT, 2011c). The pilot website contained fifty courses that had been previously taught at MIT or were taught at the time. The website provided access to a variety of course materials such as syllabi, literature lists and course notes.

The idea to start OpenCourseWare was the result of a special committee of MIT's Council on Educational Technology that investigated options for MIT to step into the field of online education (Lerman & Miyagawa, 2002), a field which was rapidly expanding at the time (Werry, 2002). When participation in online education was deemed not viable as a for-profit venture, the idea for the OpenCourseWare pilot project was launched. OpenCourseWare would provide MIT with a way to contribute to online learning that reflected MIT's values and ideals concerning education (Lerman & Miyagawa, 2002). Since the start of the OpenCourseWare pilot project MIT has vastly expanded the available courses. In 2003 (MIT, 2011c) an official OpenCourseWare site was launched, at that point containing 500 courses. MIT's ongoing efforts in the following years led to virtually all of MIT's courses, numbering 1800 in total, being available as OpenCourseWare in 2007. MIT's expansion of OpenCourseWare has resulted in the current availability of more than 2000 courses on MIT.OpenCourseWare.edu.

OpenCourseWare, as shared by MIT, are digital publications of course materials that are freely and openly accessible, there is no registration or enrolment required for access to OpenCourseWare. It is stressed though that OpenCourseWare does not grant credits nor degrees or certificates. What OpenCourseWare does provide is open access to a variety of MIT education materials organised in courses, to be used as a resource for educators and learners (Vest, 2004). The materials shared through OpenCourseWare can range from lecture notes and literature lists to videos of entire lectures and exams, all bundled in courses (due to various external restrictions the OpenCourseWare do not always contain the entire content of the course). The materials of a course can be downloaded as a package for offline use. All of the OpenCourseWare have been, or are currently taught at MIT, ensuring that all OpenCourseWare have a certain quality assurance - they reflect the standards and values of MIT as represented in their education system.

OpenCourseWare-Consortium

Next to sharing their own courses, MIT also started an OpenCourseWare-Consortium in which over 250 universities currently participate. The OpenCourseWare-Consortium members have followed MIT's lead in sharing (part of) their courses online in the specified OpenCourseWare format. The number of courses available under the OpenCourseWare-Consortium (MIT, 2011b) is already exceeding 13.000 and the OpenCourseWare-Consortium incorporates (translated) courses in 20 different languages. MIT has set itself the goal to advance 'Education around the world' (Hockfield, 2011) by acting on the belief that knowledge is "a public good for the benefit of all", resulting in the open sharing of their courses through OpenCourseWare. The universities that chose to become members of the OpenCourseWare-Consortium follow MIT in this effort.

OpenCourseWare proponents

Aside from like-minded universities joining the Consortium, the OpenCourseWare initiative has also attracted the attention of organisations that wanted to make the most of the potential they saw in the OpenCourseWare initiative and to align the OpenCourseWare efforts with their own broader goals. The UNESCO International Institute for Educational Planning (IIEP) and the Education program of the Hewlett Foundation have shown an interest in OpenCourseWare from the very beginning of the MIT initiative.

UNESCO and the Hewlett Foundation started their contribution to OpenCourseWare in 2001 by organising a "Forum on the Impact of Open Courseware for Higher Education in Developing Countries" (Johnstone, as quoted in: UNESCO, 2002) which took place before the launch of the public OpenCourseWare pilot website.

The aim of the forum organised by UNESCO and the Hewlett Foundation was to explore the areas in which OpenCourseWare has the potential to be meaningfully used in higher education, with a specific concern for the needs of developing countries. Furthermore, the prerequisites to be able to make meaningful use of OpenCourseWare in technical, legal and social terms were explored during the forum meeting. In conclusion, the forum participants expressed their desire to support ongoing efforts towards expanding educational resources such as OpenCourseWare in a final declaration. This declaration included a definition of the sort of resources to support, and a 'vision' towards its possibilities for use. In order to further specify their future

efforts they agreed on a broader concept, under which to group initiatives they would support, which will be elaborated on in the next section.

In the meantime the United Nations University also got involved in the OpenCourseWare movement, by sharing a part of their own courses through OpenCourseWare on a dedicated website (United Nations University, 2011).

Although it is explicitly stated that, concerning OpenCourseWare, ‘’Users themselves will decide how to profit from the electronic materials we post’’ (Lerman & Miyagawa, 2002), MIT does aim at a specific audience. Since OpenCourseWare encompasses only (under-) graduate courses the intended audience will have finished, or be currently in the process of attaining, a university degree. The intended audience will consist of teachers and educators, students, and alumni or other university graduates. Next to this, MIT has found, as an additional benefit, their own staff to make use of OpenCourseWare as well as prospective students contemplating to enroll at MIT. OpenCourseWare is thus clearly aimed at users in higher education.

Open Educational Resources proponents

Open Educational Resources was the term adopted by the Forum participants, defined roughly as educational resources that are openly shared through ICTs, free to use and adapted for non-commercial aims by users worldwide. OpenCourseWare has since been a specific subset of Open educational resources. - It falls under the broader Open educational resources definition but is published in the particular OpenCourseWare format. The forum participants envisioned Open educational resources as a 'resource for the future' (Witherspoon, as quoted in: UNESCO, 2002) available to all learners worldwide. Through its efforts towards Open educational resources they hope to mobilise a ‘'worldwide community of educators’'.

Aside from organising a forum, the education program of the Hewlett foundation has partly funded the OpenCourseWare pilot and is continuing financial support to MIT's OpenCourseWare, which is still dependent on external funding for half of the necessary yearly $3.5 million budget (MIT, 2011g). The Hewlett foundation funds a variety of Open educational resources initiatives with the goal of equalising " access to knowledge for teachers and students around the globe" (Hewlett Foundation, 2011b). The UNESCO-IIEP efforts focus mainly on creating awareness and fostering a global community with the shared goal of generating open content, thereby increasing the available Open educational resources (Johnstone, 2005).

Conclusion

In the previous chapter, the field in which OpenCourseWare and Open educational resources are located has been sketched. The stakeholders in OpenCourseWare production and support have been identified together with their motivations. For MIT, OpenCourseWare provided a way in which they can show the value they hold concerning the sharing of knowledge even when research showed that online MIT education was not financially viable. Added benefits were found in staff, (prospective) students and alumni making use of OpenCourseWare, next to the intended audience of learners and educators in HE that are not related to MIT. Both UNESCO and the Hewlett Foundation provided their support to OpenCourseWare because it fits in with their own broader goals and vision for online educational resources.

Subsequently OpenCourseWare was identified as a specific subset of Open educational resources, a concept that remains both broad and vague. There is, however, consensus on the general aim, use and criteria for access to open educational resources. The aim is to provide learners with a resource they can (re-) use for their own education or development of courses. Access to open educational resources largely aims to be as broad as possible, and open to everyone with a means of accessing the resources online. The three components of Open educational resources; the (type of) 'content' in combination with the technological 'tools' used and the possibilities provided by the 'implementation resources' such as Creative Commons licenses mainly determine the terms of access. A review of different Open educational resources initiatives showed the interrelation of the aforementioned components, which mainly concern the software(s) used to provide access, and that each provider of Open educational resources has a different interpretation of what the specifics of 'open' entail. Generally the base requirement for the resources to be called 'open' seems satisfied in all three initiatives. The review further showed different possibilities of (de-) centralisation and control by the Open educational resources providing institutions, indentifying OpenCourseWare as a fairly rigid and static resource of Read-Only materials

The concepts, issues and interrelations concerning OpenCourseWare, Open educational resources and the different technologies sketched out in this chapter form an introductory basis for further analysis of OpenCourseWare, its intended use and the vision(s) of stakeholders related to OpenCourseWare.

The Capability Approach: A Normative Framework

Introduction

The capability approach is an approach that is more inclusive of human wellbeing and quality of life compared to those current dominant development and economical welfare paradigms that tend to focus primarily on resources (Robeyns, 2006a). Development and quality of life in the capability approach are expressed in terms of functional capabilities and freedom, instead of just resources or utility.

Development policy usually focuses mainly on the availability of monetary and material resources (Chabbot. & Ramirez., 2000). A general increase in available resources, for example a higher Gross Domestic Product (which is often used as an indicator for this), does not guarantee every citizen an increase in quality of life (Nussbaum, 2011, p. ix) since gross domestic product is an indicator that does not inform us about the way in which the resources are divided, nor about quality of life: at best gross domestic product provides information on standard of living (Sen, as quoted in: Srinivisan, 1988, pp. 12-13). The capability approach looks beyond provision of resources and investigates what resources individuals have available, and if they actually lead to increased functionings: 'beings and doings' and capabilities: opportunities to reach functionings. To analyse how resources are subsequently developed into functioning the capability approach uses 'conversion factors': the essential circumstances needed to turn the available resources into capabilities and/or functionings.

The capability approach is an approach towards development which aims to move beyond the dominant resource focussed paradigm currently in place. It provides an alternative framework and view in which to conceptualise, evaluate and develop a resource[2]. The capability approach acknowledges the value and oftentimes the necessity of specific resources to increase capabilities and functionings, therefore resources are integrated into the capability approach. Resources thus are important in development, but in the capability approach resources are means towards an end (development) whereas resource focussed paradigms can perceive resources as an end in themselves.

[2] Although the capability approach can also be used as an addition to other development paradigms, in light of Sen's claim that the capability approach is the only framework which integrates *all* relevant factors (Clark, 2005), the focus here will be on the capability approach as an alternative framework.

In order to address or discuss advances in development, firstly one needs to identify areas that are underdeveloped[3]. Underdevelopment, in the capability approach is understood as a lack of capabilities: ''capability deprivation'' (Alkire, 2005), and not (insufficient) income alone. Since the capability approach aims at increasing development, and underdevelopment is understood as 'capability deprivation' we can say that if an individual (or a society) is capability deprived their capabilities are underdeveloped. Development in terms of the capability approach thus focuses on increasing underdeveloped or absent capabilities and functionings.

This particular approach – the focus on increasing capabilities (means) in order to have more freedom (ends) - will be contrasted to other paradigms, and the merits of the capability approach as an alternative to dominant paradigms will be shown. Applying the capability approach enables us to investigate what sorts of capabilities are created with the resources available, using the specific means-ends distinction found in the capability approach. The capability approach as introduced above is mainly based on the view of one of its most prominent contributors: Amartya Sen. The capability approach as developed by Sen evolves mainly around his aim to provide a framework for evaluation and comparison of quality of life.

Another prominent contributor to advancing the capability approach is Martha Nussbaum. She however presents the capability approach against a background of universal individual entitlements to come to a ''theory of basic social justice'' (Nussbaum, 2011, p. 19). Nussbaum's approach does not offer an assessment of quality of life as Sen does, but does specify a set of central capabilities, which Sen doesn't.[4]

Besides providing an evaluative framework for quality of life and a basis for a social justice theory, the capability approach paradigm has been extended and applied to education (Ingrid Robeyns, 2006a; Saito, 2003; Unterhalter, 2009; Walker, 2005). More specifically; how Education can lead to an expansion of capabilities, thereby improving quality of life. The capability approach is linked to education in a view that holds education both as a means towards development, and as an end in itself. In this, Education is identified as a driving factor in providing opportunities for new capabilities, or in Nussbaum's words as a ''crucial avenue of opportunity '' (Nussbaum,

[3] Arguably underdevelopment is often specified in terms of 'poverty'. Poverty however is more often used in resource focussed paradigms and therefore we will stick to the more capability approach related notion of capability deprivation. In addition to that, capability deprivation is more useful as a concept in context of the capability approach as an approach that is not specifically limited to lesser developed countries, since all countries are in development (Nussbaum, 2011).

[4] The reasons and motivation for this will be addressed at a later stage.

2011, p. 6). An expansion of capabilities generally is seen as a form of (human) development and an improvement in quality of life, and education can play a key role in the creation and expansion of capabilities. (Unterhalter, 2009).

Furthermore, the capability approach will be linked to Technology used in education, or 'educational technologies,' followed by a discussion on how the capability approach can contribute towards improving such technology. This will be supported by exploring the link between the capability approach and technology for which there recently has been increased attention (Johnstone, 2007; Oosterlaken, 2009; Zheng, 2007) in a way largely similar to that in which education is connected to the capability approach (i.e. expansion of capabilities as being innate to technology).

Since OpenCourseWare combines education and technology, and the capability approach can be applied to both of those, OpenCourseWare will be framed as an 'educational technology' and will be analysed and discussed as such.

Once the links of the capability approach to both education and educational technology have been made clear, this will be used to evaluate OpenCourseWare as an 'educational technology' in the final chapter of this thesis.

A General Introduction to the Capability Approach.

The capability approach is an approach towards human development which aims to move beyond the dominant resource focussed paradigm currently in place. Poverty in the capability approach is understood as a lack of capabilities. This will be contrasted to other paradigms, and the merits of the capability approach as an addition to dominant paradigms will be shown. Applying the capability approach enables us to investigate what sorts of capabilities are created with the resources available. The capability approach originated in the field of welfare economics and aims to provide a normative framework – called 'Human Development'[5] - in order to evaluate well-being and quality of life, and subsequently be of assistance in developing policies towards improving quality of life. The capability approach started off as an approach to welfare economics developed by Amartya Sen does not focus merely on the provision of resources, but aims to show how specific resources (or 'commodities') can be used to create capabilities. It understands poverty in terms of a lack of capabilities, instead of a

[5] Sometimes it is also referred to as the ''Human Development Approach''. This approach is strongly related to the way in which UNDP applies (parts of) the capability approach to comparatively measure development (Nussbaum, 2011). Although the capability approach's (eventual) aim is Human

lack of resources. Sen collaborated with Nussbaum to expand his approach and apply it to human development and Nussbaum's Aristotelian view on 'human flourishing' (Nussbaum, 1993). The capability approach is deliberately termed an 'approach' since it does not aim to explain (a lack of) well being, as much as it is a 'tool' for assessment and evaluation[6]. This in contrast to 'theories' of well being that do aim for a more comprehensive explanation of well being while applying it to the field of welfare economics (Crisp, 2008).

Well-being as a concept is closely related to welfare and quality of life. Well-being is often used in specific contexts, for example when discussing an individual's health. Well-being as used in philosophy has a broader scope and is used to refer to how 'well' a person's life is going: one's well-being, or how well one fares in life: welfare. Both well being and welfare can signify positive or negative states in a person's life, and are closely related to quality of life. Quality of life is a concept that evaluates general well being, if a person experiences positive well being in life, his quality of life will be high. If a person's well being increases, his quality of life increases accordingly. Quality of life thus can be seen as the evaluative summary of an individuals well-being in different areas (such as health, employment, education) (Crisp).

Although the capability approach originated in the field of welfare economics, it takes a distinctively different stance on indicators of quality of life compared to other welfare-economical approaches. In the following these differences will be explicated. Welfare economics is a field that is both descriptive and prescriptive. As a descriptive science it aims to explain the functioning of an economy (Keita, 1999). The prescriptive part of welfare economics makes several value judgements (and is thereby normative) on which indicators are to be used in measurement of quality of life. However, this branch of economics is often restricted to material means that (allegedly) contribute towards quality of life – such as income or possession of commodities – and is thereby not necessarily informative of quality of life.

The capability approach has been expanded and applied to fields outside of welfare economics, both in practical applications of the approach (in fields such as social policy) as well as to broaden and strengthen its philosophical basis (in fields such

Development, the focus will remain on application of the capability approach instead of the Human development approach.

[6] Although the capability approach can also be referred to as a ''normative theory'' as opposed to an ''explanatory theory''.

as political philosophy) As a result of this work, it has been part of justice theories, development ethics, policy paradigms and social sciences (Robeyns, 2011).

A key notion in the Capability approach is that of "Development as Freedom" (Sen, 1999). The underlying claim is that the freedom individuals have to achieve well being and reach, increase or maintain quality of life is paramount (in development efforts), and that this freedom can be assessed by means of capabilities. Capabilities are the options and opportunities people have available to choose from in order to achieve functionings they value, and have reason to value. The more capabilities to choose from, the higher an individual's freedom will be.

The capability approach as an Alternative Framework

Partly the capability approach has been devised as an answer to lacuna in other theories concerning well being and more specifically towards indicators for evaluation(s) of development and policies resulting from those theories. Sen has chosen to address mostly economic approaches and presents the capability approach as an alternative framework which is primarily concerned with capabilities and the freedom they provide as opposed to 'Opulence' (income, resources, commodities and assets) and 'Utility' (happiness and desire-fulfilment) (Clark, 2005), two theories Sen has identified as lacking in specific areas.

This is not to say the capability approach dismisses those theories or their usefulness in assessment completely, Sen even acknowledges their relevance or necessity and applications of the capability approach can produce results close to those found in either opulence or utility paradigms. However the capability approach presents itself as an approach that is more comprehensive than other theories, and as the only one able to ''address all relevant concerns'' (Clark, 2005). It does so by not merely - from an explanatory theory -specify material means that contribute towards quality of life. Instead it focuses on the opportunities for capabilities and functionings these resources - when combined with the appropriate conversion factors - can provide.

The difference between the capability approach and the other aforementioned approaches is also found in the means-ends distinction used in evaluations of quality of life and the focus on expanding a capability set in order to improve well-being, particularly in the context of development studies. Furthermore, although the capability approach is applied often in the context of (capability) deprivation, it goes beyond that and includes well being and quality of life. There is also no specific reason to restrict

the capability approach to development studies or to be applied only in the context of developing countries (Coeckelbergh, 2011; Nussbaum, 2011, p. x), nor do welfare economics contain such a restriction. We will now continue by elaborating on Sen's concept of capabilities and functionings, and how the two are related. Later we will return to the aforementioned rivalling paradigms to address and discuss the differences between them and the capability approach by means of an example.

Capabilities and Functionings in an Evaluative Framework

Capabilities are described by Sen (1993) as the ability of a person to "do valuable acts or reach valuable states of being" (p.30). A capability thus can be described as one's ability to achieve goals or perform actions that s/he values. A capability in itself does not inform us of an action, or of the attainment of a desired state of being. It merely informs us of the presence of a possibility to do so. A capability is having the freedom and opportunity - the effective and valuable possibility - of achieving a functioning. A functioning then, is the actual realization of a capability: the opportunity of a capability turned into an *action* or the achievement of a *state of being*.

A functioning thus represents what has been achieved by an individual, while a capability informs us on what possible options the individual had to choose from initially. These achieved functionings together are called a "functioning n-tuple" (ibid, p. 38), a combination of actions and states of being. This is related to the available options of choice: the 'capability set'; the options from which an individual can choose to achieve specific functionings, which represent the possible functioning n-tuples the individual had available to choose from.

Despite the clear prevalence of a focus on capabilities in the capability approach, those capabilities are still located 'in the *space* of functionings" (ibid, p.38). Capabilities and functionings are thus highly interrelated. We will clarify this relation by means of example: Being well-nourished is considered a functioning, the corresponding capability then would be the effective opportunity to perform the activities and undertake the necessary actions to nourish oneself, i.e. provide for food. However what is a functioning in one instance, can be a capability when considered in another functioning. Being well nourished, a functioning in the former example, can be a capability in a functioning such as performing labour. One of the pretences for performing (bodily) labour is one's body having the energy to do so, of which being well nourished is a substantial part.

Now that we have explained what capabilities and functionings entail, and how they are related to each other in the capability approach we can continue by positioning them within the broader claims on which the capability approach bases itself.

Why Capabilities?

When critically reviewing the capability approach one can come to wonder why its primary focus is on Capabilities (i.e. possible functionings) instead of on the achieved functionings themselves? The question can be rephrased as: what matters the most, ‘’opportunities or achievements’’ (Crisp, 2008)?

The capability approach claims that having the freedom, possibility and agency to achieve and improve one’s quality of life is paramount. Furthermore, capabilities (and to a lesser extent functionings) are regarded as the best indicators for evaluations of an individuals opportunities and quality of life (D.A. Clark, 2005). Sen claims that the capability set (the combined capabilities available) should be the "primary informational base" (A. Sen, 1993, p. 38) for such an evaluation. However capabilities are still ‘’defined in the *space* of functionings’’, meaning that from specific functionings capabilities are derived. Functionings thus remain an important concept and are vital in an evaluation along the lines of the capability approach. However, evaluating capabilities does not inform us of the *actual* functioning an individual has chosen to achieve from his capability set. Nevertheless the functioning is, at the very least, a part of the evaluated capability set and thus will not be excluded from the evaluation. In terms of the information that feeds the evaluation then, there is no loss of information with regards to possibilities.

By focussing on capabilities instead of choices made, or achieved functionings the only thing not included in the evaluation is just that: the actual choice made. Sen and Nussbaum agree on this point; they do not aim to advocate a specific view on what makes for quality of life. Instead they are interested in the possible choices available, thereby leaving the individual free to make their own choices without being prescribed what to choose or paternalised[7]. This signifies a liberal view on which the capability approach is grounded: firstly it does not aim to prescribe what choices should be made. And secondly when, through capabilities, we know what choices an individual has

[7] Some might argue however, that some form of paternalism is always implicitly present in the choice for, or selection of, capabilities or even a necessity. This will be addressed at a later stage, for now what is paramount is the choice for capabilities over functionings in this matter, based on, among others, anti-paternalist grounds.

available, it is then their own responsibility to become an active agent in their own lives (Amartya Sen, 1985).

Besides freedom of choice and possibility (e.g. choice opportunity), individual *agency* is an important concept in the capability approach. While closely related to freedom of choice and choice opportunities, agency goes beyond those by emphasising an active role in the shaping of one's own life. Furthermore in terms of development an emphasis on agency also distances itself clearly from development paradigms that tend to see or depict individuals as being passive towards the shaping of their lives (or worse, passive recipients of aid) (Amartya Sen, 1985).

Capabilities, Opulence or Utility?

In measurements of quality of life based on welfare economics, quality of life is often attached to either 'opulence' (income, possession of materials goods) an 'objective' indicator or 'utility' (Happiness and/or Desire Fulfilment) a 'subjective' indicator (D.A. Clark, 2005). In terms of the capability approach such indicators and constituents of quality of life related to opulence would be regarded as means towards an end, not as an end in itself. After all we are not interested in merely material possession, but in what our possession enable us to do and be. For example when one is hungry, having an income that allows one to buy sufficient food in order to be well-nourished, is what ultimately matters, i.e. ''income is not desired for its own sake'' (A. Sen, 1993, p. 41). (A. Sen, 1993, p. 41). Having an income which doesn't provide enough to be well nourished, or if food simply is not for sale, the income in itself becomes useless in regards to alleviating one's hunger.

In the same fashion, striving for happiness or desire-fulfilment is not what adequately represents what makes for quality of life (and thus no appropriate indicators of quality of life by the capability approach). One can for example have the desire to inflict pain upon others, it can even bring one happiness. However there is likely to be broad general concensus that this is not a desirable goal in life. Furthermore desires and happiness can be subject to 'adaptation': individuals finding themselves in a situation in which, through cultural and social conditioning, they belief to have their desires fulfilled and are in a happy state, but in the meantime are deprived of freedoms in a number of areas. It is therefore that the capability approach focuses on functionings and the capability to reach those functionings. Commodities and Utility are still included in the capability approach and related to development, but only in the following fashion:

Commodity -> Capability (to function) -> Function(ing) ->Utility (e.g. happiness) (Clark, 2005)

Commodity, income or resources thus form a starting point on the way towards utility. Resources thus are a means towards an end, the end (in this scheme) being utility. Although utility as the 'end' of development is problematic, we will leave Clark's scheme intact for now since it suffices for showing how Commodity and Utility relate to the capability approach, and focus on the two steps that are emphasized by the capability approach: Capabilities and functionings.

The Capability Approach in Practice

The next section will be used to show how the different elements of the capability approach combine in practice by means of an example, while relating it to development at the same time. In the foregoing both capabilities and functionings have been mentioned, and although directly connected the important difference is that capabilities are best described as 'opportunities from which to choose' and functionings as capabilities that one has realised. Robeyns (2005) describes this such that capabilities are related to possible options and freedoms to choose, as functionings are related to the realisation or achievement of capabilities.

These capabilities then, if properly converted, can lead to functionings: the ''opportunities to undertake the actions and activities that they want to engage in. An important note related to this, and which is also stressed in the capability approach, is the condition that the chosen functionings are also ones that the individual has reason to value. This means that reflection is a prerequisite for deciding which functionings are both valuable and desirable, while at the same time this will counter excessive choices where the value attached to the choice cannot be reasonably justified.

When the capability approach is operationalised and put into practice, the evaluation will investigate if and how people's capabilities are affected. This will include investigating whether the resources for valued capabilities are present, but also if the necessary conversions can take place to make sure those resources can lead to actual functionings. Now the main concepts in the capability approach - resources, functionings and capabilities, together with conversion factors- have been introduced these will be elaborated on in the following section.

An oft heard proverb in Development practice has come to be "Give a man a fish and you feed him for a day. Teach a man to fish and you feed him for a lifetime.". On a

superficial level this relates merely to nourishment of an individual, an aspect of life clearly vital for survival. Relating this to development practice (formerly) dominant paradigms tended to focus on the availability of resources, thereby reflecting the first part of the proverb "Give a man a fish and you feed him for a day". A resource is provided (fish, the means) and a valuable objective (nourishment through provision of food, the end) is reached. Although practices of this kind can at times be necessary, through natural disaster or war for example (i.e. incidental underdevelopment), it cannot be said to be a constructive long-term solution for an individuals' capability to feed himself. Furthermore, as far as the capability approach in the context of this thesis is concerned; the focus will be not on incidental but on chronic underdevelopment and capability deprivation.

A more constructive and longer-term approach is signified in the second part of the aforementioned proverb: ''Teach a man to fish and you feed him for a lifetime.'' Obviously providing lifelong skills will have prevalence above merely making available short-term resources (especially in the context of chronic poverty). Even with this more constructive goal in mind - providing an individual the skills to feed himself - commodities and resources would still be necessary. In terms of material resources a rod and tackle, a net, bow and arrow or at the least a piece of line with a hook would be needed. The provision of said resources, combined with the skills needed for one to catch a fish, would then together provide the means towards the end: being able to feed oneself. In terms of Clark's scheme this would then provide us the following:

Fishing gear -> Ability to catch fish -> Feeding oneself -> Utility (from being nourished).

Although the assumption that the functioning of feeding oneself provides utility is relatively straight forward, when applied in practice the scheme still leaves several matters unaddressed. In the following section, the 'conversion factors' involved in making use of the available skills and resources will be identified and shown how these influence the use of resources.

Means – Ends Distinction

Robeyns, in her review of the capability approach does address these issues and provides us a scheme of her own that is inclusive of these possible practical issues. Robeyns provides the following scheme to represent and distinguish between goods and services – the means - and functionings, capabilities and the resulting freedom(s) – the ends - on the other.

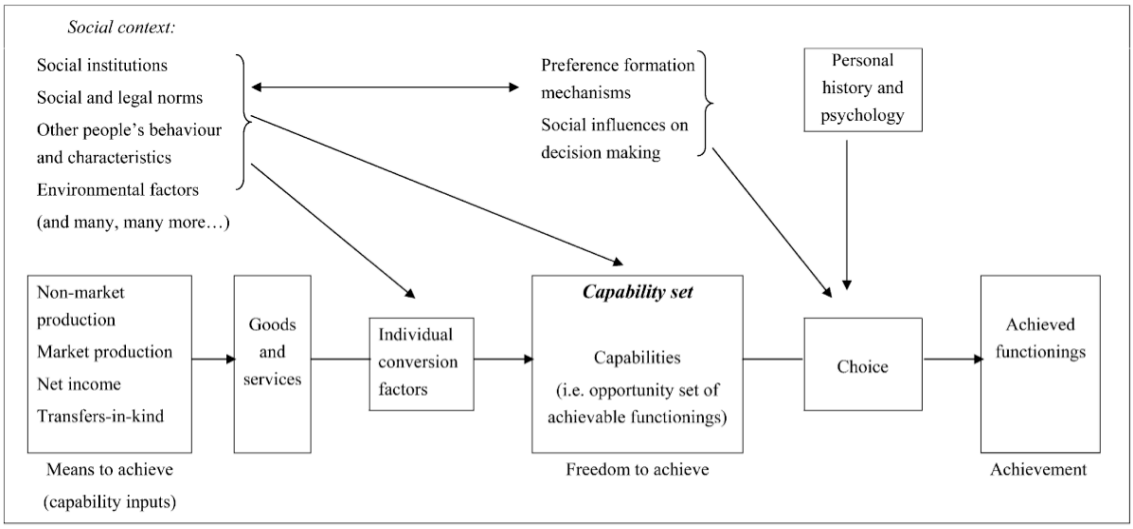

Figure 1. (Robeyns, 2005) Capability Process Scheme

Note that Robeyns already applies a definition of means and ends as specified in the capability approach, in which she identifies as means: 'capability inputs', 'Goods and services' and 'Individual conversion factors' which serve the ends, the 'freedom to achieve' through 'Capabilities', 'Choice' and eventually 'Achieved functionings'.

Robeyns argues that a good or commodity is of interest only because of the specific characteristics it possesses, and not merely of its material properties. Returning to the example of the fishing rod, the good (in this case a material resource as commodity) is of interest to an individual because of the functioning it enables: fishing and subsequently being able to feed oneself and/or others. Further elaborating on the fishing example, in which we have shown already that the possession of a fishing rod enables more and longer-term functioning(s) as opposed to the provision of a single fish, the capability approach can add yet another level to this analysis by the addition of several ''conversion factors''.

Conversion Factors and Human Diversity

These conversion factors form the link between, and are of influence on, the relation between a good and a functioning. Three categories of conversion factors are identified: ''personal'', ''social'' and ''environmental''. Looking at these conversion factors enables us to evaluate how the good or commodity can (possibly) be converted into a capability and/or functioning (Ingrid Robeyns, 2005).

In the phrase: ''Teach a man to fish and you feed him for a lifetime.'' lies the assumption that the 'skill' (a necessary conversion factor) of being able to fish is logically converted into the functioning of being able to feed oneself for a lifetime. The

conversion factors in the capability approach enable us to analyse this assumption in the following way: The personal conversion factor, for example physical condition (Robeyns, 2005) can show us that this can be a factor that might prevent an individual from converting the commodity into functioning, for example when one is disabled and therefore not able to fish or when fishing demands very intensive labour for which one does not posses the bodily strength, or for which one has lost the strength because of old age. A social conversion factor in this case could be (gender) discrimination: when fishing is only allowed to women and not to men. If the individual is male, he would be prevented from achieving the desired functioning. Likewise a cultural norm relating to the fish itself, for example fish being considered holy creatures and are therefore not to be caught, can pose the same obstruction to the functioning. Finally an environmental conversion factor, such as climate or geographical location can also play a role: imagine an individual living in a landlocked country so dry that there is no water available to fish in, or simply that fishing waters are so far removed geographically that the distance of travel alone would disallow one to actually fish, and turn the commodity into a desired functioning. Although the necessary commodity, and even the skill are present, a lack of the necessary conversion factors can render the skill and commodity useless. ‘’Hence, knowing the goods a person owns or can use is not sufficient to know which functionings he/she can achieve’’ (Robeyns, 2005).

This goes to show how the capability approach encompasses what commodity based approaches fail to do: focus on the array of factors and circumstances involved in order to evaluate to what use the ‘commodity’ can be used. In other words: the mere possession of a commodity is not of value, it is what this commodity enables one to do for which capabilities and the related conversion factors (which take in account the environment) are the appropriate indicators.

The Human Development and Capability Approach: A normative framework for development.

Notions of development and measurements and indicators of poverty that are brought forth by those notions come in different forms and constitute different meanings (Deneulin & Shahani, 2009, p. 3). The term 'development' can be applied to a variety of fields: sustainability, politics, society and economics, and remains ambiguous unless further elaborated on. In the following, different interpretations of development will be given, with the main focus on 'Human Development' (HD) and the capability approach

which will be contrasted to less-inclusive and more resources focussed notions of development.

Development is by its nature aimed at improving people's quality of life. All interpretations of it are therefore inherently normative since they aim not only to improve quality of life, but are also grounded in specific views on what constitutes or is relevant in assessment of quality of life. The view on quality of life, and the 'development' that would constitute an increase in quality of life, is based on certain valued characteristics by which one measures or evaluates quality of life and development. Policies devised according to a specific view prescribe actions to be taken, by groups or individuals, in order to develop further and come to an increase in quality of life based on the value judgments found in the conceptualisation of poverty (Ibid, p.4). Different views on development will thus be seen as a particular focus on, or the justification for a trade-off between, different variables when translated into policies. In other words, in order to measure development (or quality of life) one needs a normative framework on which to base the measurement.

The input for a normative framework can come from motivations such as human rights, human agency and human flourishing and constitute human-centred approaches with the aim of "human development", contrasted to dominant economic approaches that focus on economic output, growth of the Gross National Product and/or increase in income, assets and consumption (Ibid, p13-18).

Different notions of development and quality of life are connected to both a philosophical basis, providing the normative background, and an economic-political basis, which is made explicit in policy. The conceptualisation and theorization of quality of life is done on the basis of a philosophical underpinning of what quality of life constitutes. The practical application of the theorised concept is then reflected in the (economic) policies that result from it. The resulting policy then contains the ‘means’ for a higher quality of life, means that are usually not specifically theorized or made explicit in the philosophical underpinnings (means for wellbeing are usually theorized in politics and economics). Policy can thus be seen as the practical application of the normative framework through politics and economics, focussing on means for increased quality of life derived from the theorised quality of life conception. In the section on Education I will return to explicate the links between normative bases on which policies are based, and show how these are applied in practice.

Universal values and selecting capabilities

Among the critiques of the capability approach there are often questions asked about the operationalisation of the approach. For if one wants to use it as a normative or evaluative framework, inherently some claims as to which factors are vital and to be taken into account for evaluation. This difficulty is also acknowledged among capability approach scholars (Johnstone, 2007; Robeyns, 2006a) and it is usually argued that i) more works needs to be done on the capability approach in order to make this easier and ii) that does not do away with the merits of the capability approach as being a more comprehensive and more inclusive framework. Sen, despite all his work and publications on the capability approach refuses to provide a list of capabilities. He argues that the 'neutrality' found in the capability approach, i.e. the non-prescriptive nature towards how humans should live their life is paramount. Instead he proposes to leave this 'list' open to the individuals involved, thereby leaving them the opportunity to -through democratic deliberation- determine for themselves what kind of live they value. Note here that, as pointed out before, Sen and Nussbaum both focus on capabilities but that Sen aims to provide a framework for quality of life assessment while Nussbaum seeks a basis for a theory of social justice (Nussbaum, 2011, p.19).

Nussbaum claims that the list she provides[8] encompasses universal values and set the minimum threshold for a life of 'human dignity', thereby not making claims towards a good life (and thus adhering to her political liberalism) but merely setting a minimum of capabilities for a dignified life. The capabilities provided by Nussbaum however remain quite vague, or even 'fuzzy' (Lanzi, 2007). However it is acknowledged that, in operationalising the capability approach, input from additional theories might be necessary and as Nussbaum (2000) has stated herself that there is a need for adapting and further specifying the list to fit local circumstances and beliefs and to fit the specific case to which the capability approach will be applied. After specifying several important relations between capabilities and education and technology in the following sections, the actual capabilities relevant to the analysis of OpenCourseWare will be presented in the next chapter.

[8] The following main capabilities are presented in the list: Life (longevity); bodily health and bodily integrity; senses, imagination and thought; emotions; practical reasoning; affiliation; concern for other species; play and control over one's environment. (Nussbaum, 2000).

Capability Approach and Education

The following section will focus on how, in the view of the capability approach, education relates to capabilities. However, before doing so we will first elaborate on what we will define as education and where the focus will be in terms of types and levels of education in order to, at a later stadium, explore the relevant related capabilities. First however I will elaborate on the sort of education that will be discussed in this section.

In a broad sense of the term education, any situation in which knowledge and skills are gained by an individual -the student-, either through individual inquiry or under the guidance of a tutor can be seen as a form of education. When education takes place in an institutionalised setting, usually a school, but in the modern age also decentralised making use of ICTs it is referred to as 'formal' education, usually under the premise that there is some form of assessment and accreditation of said education. Although formal education is becoming more and more prominent and widespread [9], there is of course learning that takes place outside of formalised settings: informal learning. However vital and inevitable informal education might be, the focus concerning education in this thesis will primarily be on formal education, unless otherwise indicated.

Societies the world over acknowledge the 'centrality' of education in the development of their societies (Philips, 2009). Concerning HE, but also other types of education, there however remains an ongoing debate concerning what it is that students have to be educated in. Are we to focus on transmission and absorption of knowledge or to focus on the development of higher analytical and reasoning skills, through which the student can determine their educational path? Are we to focus on the development of productive skills (vocational education) or on enabling students to develop themselves as students, individuals and citizens?. In other words: is education valued for an intrinsic or an instrumental good?

The different roles of Education

In this regard education is also closely connected to economics and politics. Economically, education can make a big impact on "the economic fate of the individual" (Philips, 2009). This can for example be by job opportunities which open up to the individual because of his education or development of his entrepreneurial competencies

(Robeyns, 2006b). In this matter, education then plays an instrumental role: education is an instrument to improve economic capabilities. This "instrumental personal economic role" need not necessarily be purely personal, aggregation of personal economic roles can also lead to an 'instrumental collective economic role'. For example having well-trained and certified teachers and professors (which for them is a personal economic role) available that can lift the overall level of education and improve the education system can lead to more widespread economic development which then serves a collective economic role. Looking at these instrumental economic roles the relation between education and economy is already revealed. In a similar fashion is education related to politics; education policy is mainly reliant on governments (or governmental bodies), which often take into account economic considerations when making decisions on policy, as well as which role they want education to play.

There are however also "non economic instrumental roles" (ibid) to education. Being literate vastly improves what information an individual personally has available to base certain decisions on, and correspondingly through literacy societal changes can come about through for example the availability of information and association. Critical reasoning skills gained through education can also lead to higher political participation within a population (Unterhalter, 2009). Politics is thus not only indirectly connected to education through economics, it can also directly influence political processes.

Be that as it may, education is not necessarily to be merely seen in an instrumental fashion. Education also possesses intrinsic value, the personal achievement of being educated is valuable in itself. Besides that, the process of education (i.e. learning) can be a fulfilment of "aspirations for enlightenment, self improvement and social interaction" (Drèze & Sen 2002, p. 39).

In determining what students should get from education, i.e. which role we think education ought to play there are thus a number of roles possible (which are not necessarily mutually exclusive). And, even though questions concerning this matter (i.e. what education ought to do) might be rooted in philosophy of education, these have to be translated into educational policy in order to be put into practice. Therefore, in the following a number of educational policies, and more importantly their moral basis, will be discussed.

[9] e.g. the 'Education for all' program and the Millennium Development Goals by the UN

Educational approaches: Human Rights, Human Capital and Capabilities

As pointed out earlier, the 'Education for all' program and the Millennium Development Goals have drawn attention to education as a basic human right, acknowledged by the UN member states. However to what avail that education is put - i.e. what are the ends for which education are the means?- differs markedly. Robeyns (2005) has elaborated on this in her *"Three models of education: rights, capabilities and human capital*", in which attention had been given to the socio-economic role of education. In this she firstly elaborates on the role of education and subsequently analyses the three educational policy models, and their normative basis, mentioned in her title. Although her specific focus is on gender issues, and her findings include the (negative) implications these policies have on gender issues, her general findings in the analysis of the different educational approaches are still relevant to the following discussion on educational policy, because she makes explicit the normative bases of the policies discussed.

Although Robeyns starts out with an elaboration on human capital (i.e. productive capacities of individuals) to then contrast this to a rights-based approach, in the following section however, firstly the human-rights approach will be introduced and discussed. In this I will argue that the human-rights based approach can still either turn out to include either a capabilities or human capital view in practice, because of specific shortcomings in the human-rights approach. Although this does not do away with Robeyns' finding that a human-rights based approach provides a markedly different (and morally superior) principle as a starting point when compared to Human Capital, the start of the following discussion will be the human-rights based approach to education and educational policy, to conclude that this approach does not necessarily exclude either a human capital or capabilities based approach.

The human-rights approach to Education

The main starting point of the human-rights based approach is that, irrelevant of the expected economical returns, education is a basic human right and should be guaranteed to all (Robeyns, 2006b) [10]. UNESCO and UNICEF, as proponents of this approach play a leading role in the Education For All Movement as well as the Millennium

[10] as is specified in article 26 of The Universal Declaration of Human Rights. http://www.un.org/en/documents/udhr/).

Development Goals. The human-rights approach stresses that education has an intrinsic importance to individuals and societies alike, irregardless of any instrumental value that is to be gained. It also means that providing education is a priority to governments, instead of something optional from which a positive economical Rate of Return is expected.

Education as a right is undergirded by a position in which human beings are "the ultimate ends of moral and political concerns" (Robeyns, 2006b). An example provided by Robeyns is that mentally disabled children, on the basis of their human right, are equally entitled to an education as those with full mental capacities. Main strong point of the approach is that all individuals are legally entitled to an education in which the intrinsic (as opposed to instrumental) value education has for human beings in terms of their individual and societal development is paramount.

Lacuna in the Human-rights approach

Returning to the Education for All program and the Millennium Development Goals, we however encounter several issues that remain within the human-rights based approach. One of which is the strong rhetoric involved in these endeavours in which governments pledge to join the EFA and MDG programmes. What government would claim that they do not wish to provide a basic level of education to its citizens? However, both the MDG and EFA programme reports inform us that these strongly rhetorical commitments are not likely to be met in the specified timeframe (before 2015). The 2011 (UNESCO) education for all report even states that "If current trends continue, there could be more children out of school in 2015 than there are today." The strong rhetoric alone thus not guarantees in any kind of way that these programme goals are met.

This observation leads us to Robeyns second limitation of the human-rights based approach which concerns rhetorical versus effective rights. The rhetorical right being the right as it is described in the agreement to provide education, which can be granted by agreeing to join the aforementioned education programs. If, despite agreeing to provide education, a government still fails to do so (or fails to do it adequately), the right to education than merely remains a rhetorical right (i.e. a right granted, but not ensured in practice). What ultimately matters though, is that the rhetoric right agreed to is in practice turned into an effective right. However the effective right to education might need the government to go beyond the rhetoric it has agreed to. Providing what is

stated in the agreement does not necessarily ensure that all individuals receive an education (one of the lacuna of this approach and of the related agreements), even though the necessary prerequisites are in place, such as easily reachable schools, well-trained teachers and classroom materials. Governments might have to go beyond what is stated in said agreements in order to ensure education for all. If sticking merely to what has been agreed to initially, they can still claim they have fulfilled their obligation on the basis of the agreement, irregardless of whether the desired result - education for all- has actually been reached.

Connected to this is also a difference one can encounter in the presentation of human rights. The right to education can be seen as a "legal right"; meaning that the specific right is what its government holds it to be. However, one can also see it as a "moral right" (Robeyns, 2006b), meaning that it is not only the governments responsibility, but that society as a whole has the moral right to ensure education for all, for which social and cultural norms might need to change. Robeyns last point brings us back to obligations the state has towards providing education. Education for All appears to be very much government-focused, meaning it is placed in a "state-centered paradigm". However the government and their (lack of) policy can be part of the problem as well. Misallocation of resources, or worse, proper allocation of resources but the abuse of education for indoctrination or even to spread and feed hatred towards other nations and peoples or minorities in the region, are examples where governments can play a problematic role in the provision of education.

Thus, if presented as a singular approach there are some clear limitations to the human-rights based approach. However, despite the abovementioned limitations, the main strong point of the human-rights based approach remains: the view in which education is a basic human right, to which a moral obligation (which is not necessarily limited to government efforts) is present to ensure the provision of education for the intrinsic value of education itself. Nevertheless this does not mean that the ‘goal’ of these initiatives is to provide education for educations’ sake. Providing education inherently carries with it outcomes that will be instrumental towards other goals or applied to form other capabilities besides the direct outcomes of education. It however does show that education need not be purely instrumental, it has a strong moral basis as to why it should be provided, and connects to a number of social roles, instead of being seen merely in an (economical) instrumental role (Drèze & Sen, 2002).

The human-rights based approach thus has less of an economical implication than for example the human capital approach which will be discussed in the next section. Although human-rights provides a markedly different starting point for an education approach, in practice (as shown by the aforementioned limitations) it does not seem to provide a 'complete' approach to base an education policy on. Although Robeyns presents the three approaches she discusses as distinctly separable, I believe the lacuna in the human-rights based approach do not ensure that, even though the starting point is markedly different, it is ensured that the policy in practice will not turn out to be one which overly focuses on Human Capital, nor on education as capabilities. In effect, both of these 'alternative' approaches might be found in the practice of human-rights approaches, or at least, are not necessarily excluded. Human Capital and a Capabilities based approach will be presented, discussed and contrasted to each other in the following.

Capability Approach and Education; Human Capital or Capabilities

In the following section the differences between two different approaches to education, 'Human Capital' and 'Capabilities' will be presented and contrasted. In 'Human Capital' education is seen instrumental to economic productivity. The Capability approach states that education, *besides* being instrumental, is also "empowering and redistributive." and thus focuses on Capabilities and the Human Development that follows from it[11]. Education, Unterhalter states, is "a key dimension of human development" (Unterhalter, 2009, p. 207). Unterhalter approaches education as being "the driving force of change", in which change for the better is seen as the main aim of development. Following Unterhalter, in order to come to change, education is one of the necessary prerequisites and is central to "human flourishing" and Human Development. Furthermore, capabilities gained in education can form the building blocks for other capabilities.

Human Capital

A human capital approach to education adopts the 'general economic' paradigm that perceives development as economic growth. Human capital is described as productive skills, which increase economic productivity. Economic productivity increases will in turn be reflected in economic growth (and thus development, according

[11] Capability in education has a distinct Human development focus. Human development is based on the normative framework of the capability approach and shares the same definition of development as well as

to this particular approach). From an economic viewpoint, education in this approach is an instrument to increase productivity and growth, making the role of education an economical and instrumental one. In this instrumental view education is regarded as similar to investments in other sorts of capital such as physical or financial capital whereby continuing economic growth is ascribed to increases in human capital, continually raising productivity and thereby ensuring growth (Unterhalter, 2009 p.208),.

An attractive aspect of the human capital approach is the clearly marked area it provides for measurements (of productivity) (p.213). Thereby lending itself to economic analysis, on which (an education) policy can be based. If education is seen as an investment for economic growth, rate of return can then be used to analyse the returns on the investment (i.e. the 'cost' of education). Further specifying rate of return, different forms of investment can be analysed: for example rate of return on primary, secondary and tertiary education (p. 209). Rate of return studies of education have had and still have "a profound significance on […] policy". Among others this is reflected in World Bank practice, where rate of return studies still future prominently (Psacharopoulos, 1985; Unterhalter, 2009, p. 215). Maybe not very surprising, since it is after all still a bank staffed mainly by economists and, more specifically it is a bank where governments take out loans to provide funding for education, meaning that there must be a reasonable chance that the loan (i.e. the investment) will be repaid (i.e. a positive rate of return is required)

Unterhalter concludes that in the instrumental view (Unterhalter, 2009, p. 210) the economical framework that supports it tends to see schooling as a machine like-entity in which a certain input (resources) is converted into an output; the product being increased human capital. As a result education is evaluated in terms of economic *efficiency*, searching for ways in which to maximise output with the least amount of resources committed. What is also missing in this approach is the 'conversion factors' integrated in the capability approach. Not every student will generate the same 'output' even though the 'input' is similar. This instrumental notion towards education simplifies the process of education by assuming homogeneity among students, and does not allow for ''human diversity''. The capability approach thus provides a more comprehensive framework by including environmental, individual and social factors in the view of education as a diverse process.

its focus on capability expansion. Human Development will thus be used in the following as a capabilities-based approach to education.

Education as capability & Human Development

As elaborated in section one, the human development paradigm in which the capability approach operates holds a distinctly different view on development. Whereas human capital is concerned with economic growth as a measure of development, human development focuses on an economy's capacity to "provide opportunities for human flourishing" (Unterhalter, 2009, p. 211). Leading to a view more inclusive of quality of life and the availability of a variety of choices to organise their life as they value it. Human capital and human development however posses interrelated similarities; both focus on capabilities of human beings. However, the HC view holds a narrow view towards which capabilities are valued: it values only those that increase productivity and provide gains in Human Capital. The capability approach holds a wider view and values also those capabilities that are related to intrinsic goods, or that provide choice freedom in other areas than merely economical ones.

Human capital aims for increased capabilities related to production possibilities, human development includes and encourages capabilities beyond those merely contributing to production (ibid, p. 211). Education in this fashion is thus more open to additional roles of education outside of instrumentalist economic ones. Such additional roles can for example be improvements in literacy, communicative skills or skills that supply an individual with a wider range of choices in other ways.

The crucial difference between the approaches however is one related to the means-ends distinction addressed earlier. Human capital and the aim of economic growth do not inform us of the reasons why economic growth is sought after (in relation to development) (Sen, 1997). If the aim of this is to improve human capabilities, then these should be included in our understanding of the development process. Human capital and economic growth can then be understood as means to increase human capabilities and enable them to "lead freer and more worthwhile lives". This shows that the capability approach and human development do not mean to exclude human capital; its relevance is acknowledged. It does however call for a view beyond the resource on which it focuses to include the 'ends' of development. Human beings then are no longer merely "means of production" but, the end of the exercise; Human development. Quality of life is thus the main concern (ends) of human development, not economic growth although its relevance is acknowledged.

Where education is concerned, human development also focuses on "ways in which education enhances freedom" (Unterhalter, 2009, p. 212).

The ideas behind the capability approach are however not easily translatable into concrete policies, although there are already efforts ongoing that look beyond mere human capital, the examples given being the Millennium Development Goals and Education For All. What stands out in the capability approach - Education discourse though is the focus on critical reasoning. Critical reasoning meaning that one is able to reflect on the live and society they find themselves in, an aspect of education not given attention in the human capital paradigm. The broadened view of human development is thus one that goes beyond economic change, but finds a place for 'Social change' as well (Sen, 1997). Through the capacities to reflect, Saito (2003, as quoted in Unterhalter, p. 213) argues that individuals can come to live "examined lives"; empowering individuals to debate, explore their ‘’public reasoning’’ and include ‘’excluded voices’’.

An 'examined live' being part of human flourishing, as also argued for by Nussbaum, who supports Saito by stressing the need to be able to see the world "through the eyes of others". From individual experiences, being able to reflect on the surrounding world is something that should be catered for by education "in forming the student's critical and imaginative capacities" (ibid, p. 213).

The Capability approach and Education.

Although not easily translatable into concrete policies, the capability approach can be usefully applied in expanding education beyond human capital. When talking about capability it is important to distinguish that concept from functionings, when related to the process of education. Functionings or outcomes of learning are also important to review what progress has been made through education. However, since capability involves also freedom of choices available, it cannot be regarded the same as functionings. Functionings only inform us of a result, an outcome, not on choices made or opportunities given in the process. Similar functionings thus do not mean equal capabilities.

The capability approach is therefore inclusive of the "freedom or opportunities" (ibid, p.214) each student has had, i.e. *availability of resources*. Attention given to how capabilities are converted into functionings can become an important part of reviewing education. Human capital dominated education evaluation tends to focus only on inputs (resources) and outputs (examinations representing productive skills), thereby disregarding the process of education itself. Another issue raised by adoption of the capability approach in education is that of intra-personal diversity. Education review

under a human capital focus on resources tends to disregard these differences between students. Transformation of the resources into functionings will need differing inputs for each individual student, instead of the assumed homogeneity of students as the human capital paradigm.

The capability approach includes a 'conversion factor' to examine if resources are actually 'converted' into capabilities, leading to functionings (p.215). This can also be approached in terms of resource scarcity; the example used by Unterhalter concerns the capability 'literacy' (p. 216). One could inform oneself by reading the newspaper; conversion of a resource through a capability.

However, if the resource is not available a conversion that is to lead to functioning cannot take place; there is no opportunity for it. Conversion factors thus stress that all prerequisites are in place to enable conversion of resources through/into capabilities leading to functionings. Hereby making the point that although resources are vital, what deserves most attention is the opportunities available to convert the given resources into functionings. Conversion is thus important because, as we have already shown with interpersonal diversity: similar resources do not equal similar outcomes.

Unterhalter concludes that the main merit of the capability approach in evaluating education is the call for inclusion of "opportunities, processes and outcomes" (p.217), aspects that are often neglected in human capital approaches. Moreover, in terms of providing an approach to education on which to base educational policy, the capability approach has been shown to pay significantly more attention to the social process in which education takes place (as opposed to the machine-like process found in Human Capital). By inclusion of both resources *and* conversion factors the process of education which needs to eventually lead to the creation of capabilities as well as functionings. In doing so it also allows for diversity among students, and by focussing on specific individuals outcomes and processes can make clear how one student might need different resources or conversion factors in order to reach similar capabilities.

Thus, where a rights-based approach highlights the personal intrinsic value of education as well as non-economical instrumental roles, and Human Capital focuses on productive skills (i.e. the economic role of Education), a Capability approach to education can encompass both of these roles (Robeyns, 2006b). While doing so, focussing on Capabilities allows for inherent human diversity in Education and goes beyond efficiency or rights based decision towards education that aims to expand capabilities and enlarge effective freedoms (which can be, besides being valued in the

capability approach also encompass instrumental economical roles, and in which the right to education can be an instrument toward capability expansion and thus a valuable input for education policy.

Although shown to be more inclusive and comprehensive than its counterparts, the challenge for the capability approach in education (and in general) lies in its operationalisation. More precisely on which capabilities there should be specific focus, but as noted before in order to evaluate education (from which policy recommendations can follow) one needs to specify this. In a later stage I will identify several specific capabilities related to the case study of this thesis -the use of OpenCourseWare in formal education- which will form the basis for the OpenCourseWare analysis in the next chapter. Before doing so however I will narrow down the educational focus to Higher Education, and introduce the relation between the capability approach and technology in order to specify capabilities related to education and the educational technology that is a prerequisite for OpenCourseWare use.

Capability for Higher Education

Since the focus in the topic of this thesis is that of higher education (HE), which for a great part takes place in universities in formalised programs and settings, the term 'education' in the following will be used to refer to formalised higher education. Moreover, the type of HE we will focus on will be of the academic kind, instead of the vocational higher education that is sometimes encountered.

There is however a strong connection to lower level formal education -Primary and Secondary school- which is twofold: one having to do with resource allocation and one having to do with its preparatory role in HE. In terms of preparation for HE, lower level formal education is a necessary prerequisite for enabling students to move on to HE. Lower level education should prepare them with the capabilities needed to undergo fruitful higher academic education.

In other words: HE is reliant on a functioning education system (the system here comprising all relevant levels of education, i.e. primary, secondary and higher education taken together). Furthermore, HE and lower level education can be found to be in 'competition' for resources. Public education is generally provided for by a nations government, who, for the provision of education, have to make choices of where to spend its limited resources and funds (Psacharopoulos, 1985). The balance in this is a delicate one: is lower level education useful if there is no possibility to subsequently

move on to HE? But also, why provide HE to a lucky few while there are still individuals who have not undergone even basic education? The above examples are not meant as an introduction to provide pressing answers to these delicate questions, but simply used to show how different levels are related and that, in terms of allocation of resources, there are certain considerations to be made (however I might return to this disparity later). To return to the main point: Education in the following will thus refer to academic higher education in a formalised setting.

Capability Approach and Technology

In recent years there has been, besides interest in capability approach and what it can contribute to education, a similar interest in how and in which way the capability approach can be relevant to Technology. More specifically there has been a noted interest in the capability approach and ICTs, and how design of, and policy for these specific technologies might benefit from the capability approach (Oosterlaken, 2009; Zheng, 2007; Johnstone, 2007). Firstly I will make clear the connection between the capability approach and Technology in a more general fashion. This will be followed by a more explicit focus on ICTs in general and ICTs used in both education and development.

Technology is "by definition [aimed at] expanding human capabilities" (Oosterlaken, 2009) and therefore almost has an inherent connection to the capability approach. Concerning the relation between technology and capabilities, technology is seen as a 'resource' with the ability to expand or create capabilities, of the appropriate (or necessary) conversion factors are in place (Oosterlaken & van den Hoven, 2011). Technology is thus valued because of the expansion of capabilities and possibilities for empowerment and agency it provides (Zheng & Stahl, 2011), possession of the 'resource' Technology possesses no inherent value: it is merely instrumental towards capability expansion (although this is 'instrumental view is also a point of critique in the capability approach-Technology relation (Coeckelbergh, 2011) , to which I will return later) and only valued if it is connected to valuable ends. The capability approach, in relation to technology, thus follows one of Sen's main motivation for developing the capability approach: a dissatisfaction with a focus on resources instead of capabilities, and a failure to address 'human diversity' (Johnstone, 2007).

Moreover the capability approach, besides conceptualising Technology as a means towards an end, provides a framework in which Technology can be evaluated in

terms of the necessary prerequisites to make use of it. Moreover, it can disclose specific limitations of (or barriers present in) technologies in everyday use, certain ideologies embedded in technology and how there might be certain pre-determined well-being impacts embedded in technology design that do not comply with the capability approach's 'neutral' view towards individuals shaping their life and the quality thereof. The capability approach provides a basis for both "normative and descriptive analysis of technology" (Johnstone, 2007), and can provide an alternative to other forms of evaluation which do not take values as their starting point, and thereby fail to address important issues such as globalisation and the digital divide, issues that do not fit into existing approaches[12].

Following this I will now focus more explicitly on ICTs, a topic for which there has been much interest from a capability approach perspective[13]. More specifically there has also been a focus on ICT for Development: ICTs designed specifically with development in mind. Connecting this to the case study of this thesis - Use of OpenCourseWare in Education (for development) - OpenCourseWare and the technologies needed to make use of it are not specifically designed as ICT4D. Nevertheless, some of the works on ICT4D can still provide useful insights into use of technology in different geographical and cultural contexts which will be shown in the following.

Furthermore, what Education (as discussed in the foregoing in relation to the capability approach) and Technology share is the capacity to expand and create capabilities. Although education is not necessarily seen as instrumental towards specific goals or capabilities - a point of difference when compared to technology - they have a strong relation in terms of what the capability approach considers to be paramount: capabilities that empower individuals to shape their lives and choose "valuable beings and doings" (Alkire, 2005).

[12] This is not to say there evaluation any approaches that are able to address this, see Brey, 2009.
[13] E.g. the recent issue of "Ethics and Information Technology" on ICT and the capability approach.

Capability Approach and Educational Technology

The focus concerning ICTs will here primarily be on educational technology: technology used in educational settings, which, although also not necessarily designed with education in mind, will be taken to be all technology, involved in educational purposes surrounding OpenCourseWare.

One of the most important contributions of the capability approach to educational technology is the view that technology is a resource which when provided, in itself does not possess value. It is only when students are provided the "capacities" to make use of the technology and the appropriate " environment" is catered for (environment here implicates more than just material surroundings) that the technology can be said to be of value (Johnstone, 2007). Additionally, the value eventually comes from the conversion of the resources and the subsequent expansion of valued functionings and capabilities. Use of ICTs in education, whether to communicate or find information, can be seen as a specific capability set with its own inputs, outputs and processes taking place both for the student (internal) as in the technology (external). This capability set can then subsequently expand capabilities and capacities relevant in education (i.e. one's capability set as seen in an education perspective). Therefore it is important to take notice of these different capacities and capabilities involved in the use of educational technology and what kinds of capabilities might be expanded (or diminished) in students. Issues found in this can be, relating to educational technology used for finding information, related to power, trust and source identification and other "social and technical arrangements" (Johnstone, 2007).

In the foregoing I have elaborated in how technology used in education can be seen as a specific subset of capabilities, which in turn can, as a set, contribute further to the education process by expanding the capabilities of a student. Besides that I have shown what education and technology have in common in terms of the capability approach: both are means through which capabilities can be created and expanded. With regards to the analysis of Educational technology several vital factors have been identified. These will form the basis, supported by the necessary additional theories, of the analysis of the OpenCourseWare case study in the next chapter.

Conclusion

In the foregoing the capability approach has been presented as an alternative to the currently dominant development paradigms that focus on resources or utility. The capability approach has been shown to be more comprehensive in its scope, and more inclusive of human diversity and external influences with regard to the use of resources. Where other approaches conceptualise quality of life in terms of possession of resources or utility, the capability approach instead focuses on the functional capabilities facilitated by resources. Development in this is seen as an expansion of choices concerning capabilities, so that one has more freedom of choice with regards to achieving functionings. A capability is the freedom and opportunity to reach a functioning; the functioning is the actual achievement of the option found in the capability.

Resources are acknowledged as important in the capability approach, but merely as a means towards the ends of expanding capabilities. Resources are thus only of interest because of what they contribute towards creating and expanding capabilities. What the capability approach adds to this is the inclusion of the conversion factors that are necessary in the process of resources that enable capabilities, which in turn can be turned into functionings. The (increase in) possession of resources is only of value when this contributes to expanding capabilities. Resources can become an input for capabilities when the necessary conversion factors are in place. These conversion factors, besides showing what is necessary next to resources to come to capabilities, also allow for human diversity. This diversity acknowledges that, given equal input, an equal outcome is not ensured because of the conversion factors needed to go from resources to capabilities. The capability approach thus provides a framework with which we can analyse which resources provide capability inputs for which functionings, and which conversion factors are necessary for the capability input to be turned into a functioning. It also shows that the possession of a resource cannot be equated directly to a functioning: the process in which resources can become functionings becomes clear through applying the capability approach.

Both education and technology have been attributed the inherent capacity of being able to assist in expanding capabilities. Education has been linked to the capability approach to present the role of education the expansion of capabilities, and related capacities relating to choice of functionings. The capability approach has been contrasted to a resources focussed paradigm in education: human capital. The role of

human capital in education concerns only the expansion of productive skills, in the most efficient manner possible. Next to that, human capital reflects a simplistic view of the process of education and a focus on humans as productive resources. In this, the outcomes of education are merely instrumental in economic activity. While the capability approach does not exclude education outcomes that lead to improved productive skills, it does not take it as a starting point. The role of education on the capability approach is that of enhancing freedom and fostering development through the expansion of capabilities. Furthermore, the capability approach takes education to be a social process and not the machine-like entity human capital takes it to be. This is also reflected in the conversion factors taken from the capability approach: when applied to education this allows for human diversity in the process of education.

In a similar fashion to that of education, technology has been linked to the capability approach, both for application of the capability approach to technology in order to evaluate and to influence design of technology by means of advice resulting from a capability approach analysis. Technology in the capability approach is a means towards the end of expanding capability. Technology is thus seen as a resource that provides a capability input or forms a conversion factor in the process of expanding capabilities. Technology is thus valued because of the possibilities for expanding and creating capabilities it provides and possesses no inherent value of its own. The value of technology is thus only present when combined with the necessary capabilities and resources to allow use of the technology. When the conversion factors and capacities needed to make use of technology in order to expand capabilities are taken into account, a normative and descriptive analysis of technology can be made. This analysis will take place in the next chapter of this thesis.

A Capability Approach Analysis of OpenCourseWare

Introduction

The first section of this chapter will focus on an analysis of what is envisioned by OpenCourseWare stakeholders; what do they identify as means and to what ends do they expect them to be put? Analysis of documents, publications and statements of each of the separate stakeholders themselves, or at times individuals directly related to OpenCourseWare projects, will provide the basis for this analysis. A general 'vision' of each of the stakeholders will be drawn on the basis of the foregoing analysis, with the aim of presenting a veridical picture of how OpenCourseWare is viewed by the stakeholders. The described 'vision' of each of the stakeholders will form the basis of a normative analysis by applying the capability approach framework to it, which will be done in section three.

Section two will identify and address several issues found in the visions and underlying assumptions towards production of, and support for, OpenCourseWare. These will be: the link between education and development, the socio-economical role of education, the 'process' of education and the role of ICT in education. Specific attention will be given to the views held towards OpenCourseWare and the (envisioned) role that OpenCourseWare, in relation to education in lesser developed countries, plays in the issues addressed.

Based on the discussion of the aforementioned issues, and the normative framework provided by the Capability Approach, an analysis of OpenCourseWare will be given. First step will be to analyse what OpenCourseWare actually contributes towards the creation and expansion of capabilities, and which role it plays in the process of education as presented in the capability approach. Following that, based on the conclusions drawn in the analysis of OpenCourseWare, some recommendations towards making meaningful use of OpenCourseWare in the context of development (of capabilities) will be made.

Vision of OpenCourseWare Stakeholders

A *vision analysis* will be used to identify and describe the 'visions' held on OpenCourseWare. Production of and support for OpenCourseWare obviously involves a vision as to why it should be produced and/or supported. This vision however will likely be shown to include envisioned users of OpenCourseWare and outcomes related

to the use of OpenCourseWare. The vision analysis will identify OpenCourseWare stakeholders and show for whom OpenCourseWare has value and why. The research will review OpenCourseWare and mainly limit itself to MIT as 'OpenCourseWare producer', and UNESCO and the Hewlett Foundation as leading organisations that fund and support OpenCourseWare initiatives as 'OpenCourseWare proponents'. Both the Hewlett Foundation and UNESCO have been involved in OpenCourseWare from its conception.

OpenCourseWare Producer

As discussed in chapter 1 the MIT OpenCourseWare initiative came rather unexpected from a team within the advisory "MIT Council on Educational Technology" (Abelson, 2008). This team was originally tasked with researching in which way MIT could become part of the rapidly expanding online education market, while staying true to MIT's high educational standards and its values concerning the sharing of knowledge globally (MIT, 2011h)[14]. General expectations were that MIT would also venture into for-profit online education, but this was found to be financially difficult and not reflective of the leadership MIT tries to exuberate in its field. The team's eventual recommendations also included a last minute addition: the idea for a non-profit online repository: OpenCourseWare.

The surprising idea for OpenCourseWare, although not something that would generate revenue but did stay true to MIT's values, was greeted with enthusiasm (Vest, 2004). This resulted in the launch of MIT's first website specifically for openly and freely sharing their courses online in 2001. In the meantime OpenCourseWare has evolved: MIT currently shares over 2000 courses, and in 2005 the OpenCourseWare-Consortium was founded in which over 250 other universities participate (MIT, 2011b). The universities in the consortium share MIT's goal to build a global web of knowledge by sharing their educational materials, and MIT has been able to fulfil one of its goals towards OpenCourseWare: ''inspiring other institutions to offer their own OpenCourseWare'' (Lerman et. al., 2008). Furthermore OpenCourseWare is acknowledged as the first large-scale Open educational resources initiative and emblematic of the Open educational resources movement (UNESCO, 2002).

[14] MIT in its mission statement explicates as one of its goals the sharing of knowledge to ''serve the nation and the world''

A number of benefits MIT would gain from OpenCourseWare were included in the original plan. Among these were showing that MIT is concerned with sharing their knowledge openly, a positive effect on the on-campus "intellectual activity", a positive influence on MIT's reputation together with the (moral) leadership the initiative would show. Furthermore, there was extensive media coverage of the news that MIT would launch OpenCourseWare, prospective students are now able to preview courses (with a positive effect on student admissions) and MIT students and lecturers alike use OpenCourseWare to pre- or re-view courses and select subjects (Abelson, 2008).

OpenCourseWare is seen by MIT as a publishing initiative that provides an opportunity to spread their view on "the structure and organisation of teaching" (Lerman & Miyagawa, 2002). An opportunity supported and valued by MIT faculty because they could now share their course materials with learners worldwide to influence how subjects are taught with the positive side effect that sees faculty producing improved materials (Carson, 2010). Carson (2007) describes the OpenCourseWare initiative as an excellent reflection of MIT's commitment to "advance knowledge and educate students [...] that will best serve the world and the nation", While Vest (2004) states that the goal of OpenCourseWare is to "build a web of knowledge that will enhance learning worldwide", a goal – that of ‘’advancing education around the world’’- that is shared among MIT faculty (Hockfield, 2011) who want their work to benefit global society. The publishing of course materials also shows that MIT values their ideal of freely sharing knowledge more than making profit, and thus decided in favour of providing freedom of access to their education materials.

The expansion of OpenCourseWare into an OpenCourseWare-Consortium has described its mission as "to advance education and empower people worldwide through OpenCourseWare" (MIT, 2011b). Additionally the culture of open sharing that OpenCourseWare showcases and aims to expand, holds two distinct promises towards transforming education. Carson (2007) describes these as providing educational resources to people who otherwise had been deprived of such materials because of "economic, political or social disadvantages" and will enhance education quality to "levels never before imagined". However, if OpenCourseWare will live up to its promise can only be evaluated at a later stage (Lerman & Miyagawa, 2002).

This grand vision and promise of OpenCourseWare however comes with several prerequisites, especially when applied to countries that are less technically developed and where internet access is not as easily obtained (Vest, 2004). However, besides such

'technical' limitations, the idea remains that OpenCourseWare materials provide ‘’high-quality’’ additional resources to both educators and students to add to their formal classes, and provide an opportunity to "create better classroom experiences’’ in which OpenCourseWare are used as "building blocks" (Carson, 2009). MIT seeks to disseminate its resources as widely as possible, and sees the 'building blocks' that OpenCourseWare provides as "ingredients of learning" to be used in traditional "teacher-student interaction" (Goldberg, 2001). OpenCourseWare thus acts as a repository which holds publications of educational materials.

Among the wider societal benefits from OpenCourseWare, It has also been shown that OpenCourseWare is not purely ‘’intellectual philanthropy’’ (MIT, 2011h), but that MIT also benefits from OpenCourseWare itself on a variety of levels. On the use of OpenCourseWare outside of MIT - despite some limitations and footnotes acknowledged by MIT with regards to OpenCourseWare- it envisions their efforts as an answer to a ‘’global need for access to educational content’’ (Carson, 2009). While at the same time showcasing an ‘’institutional manifestation’’ of the value of sharing that MIT holds (Lerman et. al. 2008, p. 213), with the online sharing of educational materials as a ‘’natural fit to what the web is really all about (Vest, C.M, as quoted in: Goldberg, 2001).

To sum up: OpenCourseWare is presented as ‘high-quality’ educational content, to be used as additional resources, or ‘’building blocks’’ in formal teacher-student interactions. Next to the actual content MIT also aims to share their particular view on what should be taught and in which way with regards to the content that is shared through OpenCourseWare.

In its broadest depiction, OpenCourseWare will enhance education quality and access to educational resources in order to advance ‘’education around the world’’ through a ‘’global web of knowledge that will enhance the quality of learning and, therefore, the quality of life worldwide’’ (Vest, C.M, as quoted in: S. M. Johnstone & Witherspoon, 2002). A view that is in line with MIT’s mission ‘’to advance knowledge in ways that will best serve the nation and the world’’(MIT, 2011h) by ‘’unlocking knowledge, [and] empowering minds.’’ (MIT, 2011i).

OpenCourseWare Proponents

In the foregoing the vision that MIT holds concerning their motivation for producing and sharing OpenCourseWare, and the possible uses of these materials, has been

presented. This will now be followed by the vision that two of the institutions that provide support to OpenCourseWare hold. The two institutions involved in this vision will be the United Nations Educational, Scientific and Cultural Organization (UNESCO) and more particularly their International Institute for Educational Planning (IIEP), and the Hewlett Foundation, which have been identified as important stakeholders in the first chapter. Besides both UNESCO and the Hewlett Foundation making individual contributions towards OpenCourseWare and open educational resources there are also collaborations between the two institutions. For example, activities by UNESCO's international institute for educational planning - which have a special focus on OpenCourseWare and Open educational resources - find their activities towards this field supported by the Hewlett Foundation (UNESCO-IIEP, 2005). Furthermore both the Hewlett Foundation and UNESCO have from the beginning been involved in the OpenCourseWare and Open educational resources movement, among others by organising the "Forum on the Impact of OpenCourseware for Higher Education in Developing Countries" (UNESCO, 2002). Although the role of both UNESCO and the Hewlett Foundation are of a different nature: UNESCO focuses on creating awareness for, and the building of a global community surrounding Open educational resources while the Hewlett Foundation is mainly a provider of grants towards Open educational resources activities, the visions in practice are largely similar. If distinctive differences are found however, these will be specifically indicated. While the focus of the particular case study is OpenCourseWare and the aforementioned institutions focus is on the broader category of Open educational resources, OpenCourseWare will be taken to be a specific subset of Open educational resources (as elaborated in chapter 1).

The Hewlett Foundation strategic plan of 2002 intends to make use of the opportunities for sharing and access provided by development in ICTs in order to "catalyze universal access to and use of high-quality academic content on a global scale" (Atkins et.al., 2007). The Hewlett Foundations' motivation towards financing Open educational resources is also described in their "Open Educational Resources Initiative" (Hewlett Foundation, 2005). The Hewlett Foundation's efforts are based on the belief that "knowledge and education are common goods" of which the access to them should not be hampered by a limitation in (educational) resources or an individual's geographical location. In acting on this belief it supports the use of ICTs "to improve education globally by making high-quality academic materials for teaching, learning,

and research available to all" (Hewlett Foundation, 2011a) and to ‘’promote equal access to knowledge worldwide’’ (D'Antoni, 2008)

The basis for this was found in the work of Amartya Sen, whose work was specifically chosen because of his approach to development that expands on more narrow development paradigms to "include educational, social, economic, political, health, and civil rights determinants of human freedoms." (Hewlett Foundation, 2002). In line with Sen's view on what makes for development (i.e. development as an expansion of substantive freedoms through capabilities) the Hewlett Foundation focussed its efforts on removing "unfreedoms". The primary focus of the Hewlett Foundation's education plan was on improving the "limited access to higher levels of education [which] also confine human capability". Moreover, the Hewlett Foundation believe "access to education and knowledge as having a multiplier effect, because it enables the removal of other “unfreedoms.”(Hewlett Foundation, 2002).

By increasing global access the Hewlett Foundation envisions its "high-quality content [...] to be used to increase human capital" (Atkins et al., 2007) by colleges worldwide, and particularly in higher education in lesser developed countries (Hewlett Foundation, 2002). However with regards to the enormous need for higher education in lesser developed nations, and a specific focus on lesser developed countries concerning the uptake of OpenCourseWare (Hewlett Foundation, 2002), a review of the Hewlett Foundations efforts so far has found that "the impact on the developing world has been solid but modest with respect to the need [for higher education]" (Atkins et al., 2007, p. 32). This in contrast to the vision that promoted the Hewlett Foundations involvement in the aforementioned educational resources that "connect 'education for all,' the United Nations' call for everyone in the world to have a basic education by 2014, with the goal of closing the digital divide." (D'Antoni, 2009; Smith & Casserly, 2006). In the same article there are also several uses of Open educational resources envisioned in which students normally deprived of access to online educational resources -mainly situated in lesser developed countries- are now using them to "access knowledge", or even collaborate online.

The long-term goal of the Hewlett Foundation is to provide " rigorous, relevant, and innovative educational opportunities" through online resources (Hewlett Foundation, 2002), whereby there is also attention given to the conditions that are necessary to make Open educational resources available and accessible. These conditions include "financial, technological, legal, cultural, and language barriers " that

need to be addressed. Additionally the Hewlett Foundation expresses the desire to go beyond the one-dimensional "body of knowledge" MIT provides through OpenCourseWare. and incorporate other bodies of knowledge in their efforts to "equalize educational opportunities across the world" (Hewlett Foundation, 2005) . In this Open educational resources are to be taken as "the parts of that knowledge that comprise the fundamental components of education—content and tools for teaching, learning, and research. "

Although the above described vision has been mainly based on the Hewlett Foundation, UNESCO still plays a significant role in the Open educational resources movement. UNESCO has worked together with the Hewlett Foundation in their shared vision, towards establishing goals and determining opportunities for use(s) of both OpenCourseWare in specific and Open educational resources in general (Witherspoon, 2002), and is making an ongoing effort in promoting uptake and availability of Open educational resources and building the community necessary to sustain Open educational resources (Johnstone, 2005b). However where the Hewlett Foundation mainly focuses on individual opportunity for access to educational materials, education and education opportunities, and building human capital in those who otherwise would have little opportunity (Hewlett Foundation, 2002), UNESCO draws these efforts into a broader societal perspective. In UNESCO's belief that education to construct a "knowledge society" (D'Antoni, 2009) is vital to economic development, they hold that OpenCourseWare is a "huge opportunity for universities in poor countries" (UNESCO-IIEP, 2002), and believe that the UNESCO view is included in the broader vision the Hewlett Foundation has formulated on OpenCourseWare and Open educational resources.

What stands out in the above vision of the OpenCourseWare supporting institutions is a focus on access to high-quality academic content in order to ‘’equalize educational opportunities’’ (Hewlett Foundation, 2005). One of the goals of lending support to OpenCourseWare can be described as equalising access to knowledge globally, inspired by the belief that ‘’knowledge and education are global goods’’ (ibid). Although their efforts to do so are global, for the materials are freely published through internet, specific interest is given to the possibilities of use of OpenCourseWare in lesser developed countries (Hewlett Foundation, 2002). UNESCO even presents the availability of OpenCourseWare as a ‘’huge opportunity’’ for universities in lesser developed countries and both institutions incorporate Open educational resources in

their strategy towards reaching 'Education For All'. Despite this particular focus, a review of the efforts made has found that – notwithstanding the capacity for change Open educational resources hold – the impact in those lesser developed countries has been modest (Atkins et al., 2007). This might be related to some of the barriers concerning Open educational resources (Hewlett Foundation, 2002; UNESCO-IIEP, 2002). Based on the work of Amartya Sen, the Hewlett Foundation aims to remove 'unfreedoms' such as limited access to Higher Education, and does so on the level of the individual. UNESCO in turns supports this, but draws this into a broader frame of use for universities and how this relates to knowledge societies and economic development as a whole. The Hewlett Foundation on the other hand aims to build 'human capital' among individuals that otherwise would have limited economic opportunity.

Analysis of OpenCourseWare Vision

This section will entail an analysis of the vision that the OpenCourseWare stakeholders, both the producers and proponents, hold towards the use and impact of OpenCourseWare. The aim is to make explicit the embedded values and underlying assumptions of the OpenCourseWare vision, and relate these to both the technology and the content of OpenCourseWare. In order to do so the concept and content of OpenCourseWare and the technology that facilitates it will be assessed on their (embedded) values and assumptions by means of a review of the stakeholders' visions towards OpenCourseWare. What is the aim of OpenCourseWare, what is actually delivered through OpenCourseWare and what is embedded in the process of OpenCourseWare provision? When these aspects are related to theories of learning, development and (educational) technology, an assessment of the process in which the use of OpenCourseWare is envisioned will be undertaken.

Education and Development

Both the OpenCourseWare producers and proponents in their vision have linked OpenCourseWare and the opportunities for education it provides to development in lesser developed countries. MIT states that through OpenCourseWare it aims to improve quality of learning which in turn they expect to improve quality of Life (thus a form of development). OpenCourseWare proponents are more explicit in both their view and focus concerning the relation between OpenCourseWare use, education and

development in lesser developed countries. This can be seen in the forum organized which specifically focused on the impact of OpenCourseWare on higher education in lesser developed countries and the link that is made between OpenCourseWare, education and the building of knowledge societies and human capital in order to improve the rate of economic development.

What this seems to represent is a rather simplistic assumption that there is a direct positive relation between education and the rate of a nations' economic development. This seems to follow conventional wisdom, especially in the field of agencies that concern themselves with lesser developed countries (Chabbott & Ramirez, 2006; Hannum, 2005), where the same assumption is often found. Notwithstanding the importance of education in a number of individual and societal fields, this assumption on the relation between education and economic development might prove to be more complicated. A review questioning the empirical foundation to this widely held assumption included as a part of their focus the relation between education and economic development (Hannum, 2005).

In their general conclusion they found a direct relation between educational expansion and a positive development in the areas of health and life expectation and outlook for children, together with a reduction in demographic growth. Concerning education and development they found that yes, there seems to be a relation between education and economic growth. However they have not been able to determine uniformly whether growth drives education or vice versa. Furthermore they found such relations to be highly context related meaning that it is dependent on the type of education and the level of economic and educational development of a nation. On the collective level this relation thus remains ambiguous (Chabbott & Ramirez, 2006), while the belief in this assumption has been growing.

On the matter of individual economical benefits and education the same context dependency was found. Rate of Return studies often applied to education in development settings showed a positive relation between education and economic development (ibid), but were inconclusive as to how big the rate of return actually was (Hannum, 2005). Among others this was caused by a lack of contextual focus in the studies, e.g. was the focus on the quantity of education or the quality? Both of these factors were found to be significant, but not (sufficiently) included in the studies they reviewed.

To sum up, although there is a definite relation between education and economic development, its effects are hard to measure meaning that the claim to a direct positive relation - the one that prevails in conventional wisdom on the subject - remains controversial. More importantly these findings show that education in itself cannot be seen as the means towards the ends of economic development directly and that although arguably education is a prerequisite for development, it does certainly not provide a guarantee for development. Quality, context and level of development of individuals and society are to be taken into account before such claims can be made (Hannum, 2005). Therefore, since we have identified the relation between education and economic development to be an ambiguous one, the relation between the provision and use of OpenCourseWare to improve education cannot be taken as the means towards the ends of economic development.

Knowledge and Education

One of the main aims of MIT's OpenCourseWare project is to make their knowledge openly available through making their educational materials openly accessible online. Besides the basic educational content OpenCourseWare also provides syllabi to guide learners through the course literature whereby the manner of teaching is also included (i.e. it prescribes what is to be taught and how). They envision the use of OpenCourseWare as building blocks to be adapted to local contexts and needs in formal teacher-student interactions, hoping that through this the quality of learning will be improved. The OpenCourseWare proponents however quickly draw provision and use of OpenCourseWare into a broader view in which they aim to improve education globally through providing access to knowledge. Where MIT thus perceives OpenCourseWare as education material to be used as part of formal education and aims to improve the quality of learning, supporters of OpenCourseWare believe that through their efforts they will improve access to knowledge and provide education opportunities.

However, providing or enhancing access to information (e.g. OpenCourseWare) does not equal access to education or necessarily provide an opportunity for education (Lynch, 2008, p. 106). The two are closely interrelated and access to OpenCourseWare indeed provides opportunities for learning, but learning here is not the same as an education. Lynch discusses educational materials such as OpenCourseWare in its specific relation to Higher Education, thereby assuming that students who have

progressed that far in education are have the necessary (ICT) skills to make use of OpenCourseWare. Initiatives such as OpenCourseWare have a clear intention to provide educational opportunities for learners but the learners lack the guidance, social interactions, assessment and certification otherwise provided in formal education settings (p. 107).

Therefore ‘'to equate access to information resources and access to education is to miss the fundamentally social character of education’’ (McGrath, 2008, p. 21). While acknowledging the current unmet need for higher education in lesser developed countries, and the potential that educational resources such as OpenCourseWare possess to play a role in meeting that need, Lynch argues that it remains vital "to articulate clearly the differences between access to information resources and access to education" (p. 117). OpenCourseWare is thus, as correctly depicted by MIT a resource: an input for a more elaborate process. A process vital to ensure the envisioned goals can become a reality.

Now that we have shown that education is more than just access to educational resources such as OpenCourseWare, and that the two are therefore not to be equated the focus will not turn to the related matter of 'knowledge'. More specifically if OpenCourseWare actually does provide access to knowledge, or merely information? And if so, what is needed to turn information into knowledge? Dreyfus (1999) has written on this subject with special attention for education through the internet. Although we have just established that access to educational resources online does not equal education, his take on how information accessed through the internet can be converted into knowledge provides an interesting point of view. Knowledge, here taken to be "the perspective and insights that derive from the synthesis of information" (Dolence and Norris, as quoted in: Dreyfus, 1999) relates to information in such a way that the learner needs to process the information in order to convert it.

One of the most important capacities needed to convert information into knowledge is that of being able "to distinguish what is relevant to what is irrelevant". In order to do so the learner must possess a certain expertise in the specific domain that provides a basis on which to judge relevant from irrelevant information, which is to follow from "involved engagement with actual situations". Involved engagement such as for example can be found in the social process of education, or at least in situations that go beyond the way in which information remains free of engagement when there is no (part of an) education process involved.

In the above it has been shown that the relation between open educational resources such as OpenCourseWare and education and knowledge involve both a process of learning and a conversion in which specific capacities are applied to information in order to convert it into knowledge. So, although OpenCourseWare provides opportunities for both education and gaining knowledge, it is essential to keep in mind the necessary processes to turn those opportunities into reality.

ICT in Education

Besides looking to improve education and disseminate knowledge globally through access to education materials both producers and proponents of OpenCourseWare have also devoted part of their efforts to the technical side of OpenCourseWare and more particularly to barriers that prevent access. For example MIT has chosen to use mainly file formats that can be opened with free software, and they have installed mirror sites throughout lesser developed regions in order to improve access (MIT, 2011e). More so, the Hewlett Foundation stated as a specific goal the removal of "unfreedoms" regarding access to educational resources like OpenCourseWare in order to promote equal access. These efforts concerning access focus mainly on technical barriers, i.e. the hardware and connectivity prerequisites that need to be satisfied, and on other 'supply side' issues such as legal constraints on OpenCourseWare. In the efforts surrounding OpenCourseWare access ICT are the means towards the ends of ensuring universal access. The technology in this case thus serves as a means of access to OpenCourseWare. However in order to be able to access OpenCourseWare there are some prerequisites to be fulfilled. The most basic of those are hardware and connectivity, or more simply put having access to a computer that has an internet connection with sufficient bandwidth so that OpenCourseWare can be accessed through it. Having fulfilled those two prerequisites does however not yet guarantee equal access. There are certain human capacities needed in order to make use of the opportunity for access. Information literacy is a term that encompasses those capacities needed to make use of OpenCourseWare and is defined as: "The set of skills needed to find, retrieve, analyse, use, and manage information" (Patkar, 2009) with regards to accessing digital resources (e.g. OpenCourseWare). These skills are prerequisites for i) accessing OpenCourseWare and ii) being able to actually make use of them. Equal access, as advocated by OpenCourseWare proponents, thus not only means ensuring global

'technical' access. Truly equal access would also encompass not only the technical and material prerequisites, but the necessary human capacities as well.

The role of Education

The three issues discussed above: the link between education and development, the link between knowledge and development and the use of ICTs to equalise access will come together in the following issue. In the visions towards OpenCourseWare 'quality' appears to be an important notion, both relating to quality of content and quality of education. These notions of quality are in turn attached to envisioned outcomes of the process: removal of unfreedoms to empower people and improve quality of life through building human capital and form knowledge societies which form a vital part of economic development. Despite the Hewlett Foundation specifically stating that its efforts are inspired by the works of Amartya Sen, the focus of OpenCourseWare proponents still appears to be on an instrumental role towards education. In order to evaluate quality of Education and/or content however, one needs to specify the goal of education first. As has been shown by means of Robeyns analysis of approaches to education there are different roles related to different approaches. Those related to human capital and economic development are the 'economic individual role' and the 'economic societal role'.

Now that we have established which role of Education is envisioned (i.e. Human Capital) and thus what the goal of the OpenCourseWare efforts is, we can turn now to assessing the claims towards quality. Human Capital approaches to education also possess a generally strictly economical view towards the process of education, in which it is seen as a machine like entity of input-process-output. The output then being the improvement in productive capacity of the students, and the input being the resources committed to education. In the foregoing we have shown that OpenCourseWare is merely a resource for input in the process of education, and not the provider of education or a disseminator of knowledge directly.

Conclusion:

A lot of the activities undertaken seem to focus on ensuring access to and use of OpenCourseWare. However how and to which goal education OpenCourseWare serves can remain ambiguous, or has been shown to be unable to deliver what was envisioned. Where limitations of OpenCourseWare are identified, it is also not necessarily clear yet

how these are to be addressed. The four issues discussed in the foregoing will return in the next section where the capability approach will be applied to the OpenCourseWare case study.

The capability approach provides an evaluative normative framework to i) make explicit the assumptions underlying the OpenCourseWare visions and the means-ends distinction within it ii) can be used to provide a more detailed insight into already acknowledged limitations and how these might be addressed (i.e. which factors play a role in it). The aim of this exercise is to show the value of the capability approach towards the specific case study of OpenCourseWare in relation to education and development.

Analysis of OpenCourseWare in terms of the Capability Approach

Based on the foregoing analysis I will now use Robeyns' scheme to elaborate on the issues discussed above: the link between education and development, the socio-economical role of education, the 'process' of education and the role of ICT in education. The findings from this will be largely similar as to those in the section above, thereby showing the value of the capability approach as an evaluative tool for the specific case study on education, technology and development. This section aims to show how OpenCourseWare can be used to foster capabilities in the setting of education and development. OpenCourseWare will be discussed in terms of how this technology can possibly add to expanding valued capabilities, which in terms of the capability approach is an improvement in quality of life. If the hypothesized resource based paradigm among OpenCourseWare proponents is found and made explicit in the vision analysis, investigating how this paradigm can benefit from the capability approach will follow subsequently. By applying the capability approach to the vision that the stakeholders hold towards OpenCourseWare some of the assumptions underlying production, dissemination and design of OpenCourseWare will be questioned. The capability approach enables us to investigate these in terms of how OpenCourseWare might be hampered by specific assumptions in OpenCourseWare technology, design and vision(s) of OpenCourseWare stakeholders that should be addressed and improved.

Firstly I will analyse the OpenCourseWare vision as it is presented and elaborate on what it currently provides in terms of capabilities. Following that I will show what OpenCourseWare *might* provide if the limitations found in the section above are addressed.

Before starting the analysis of OpenCourseWare by means of the normative-evaluative framework the capability approach provides us, I will shortly summarize the main points of the capability approach, as presented in chapter 2 of this thesis. These main points will then together form the basic framework in which the analysis of OpenCourseWare will be placed.

The capability approach has largely been a reply to economic development paradigms that focussed on resources or utility. The capability approach presents itself as an evaluative framework by which to judge development that is more comprehensive and inclusive compared to resources or utility based paradigms. Development within the capability approach is seen as an expansion of effective freedoms by means of an increase in capabilities. Although resources are included in the capability approach, resources can merely be means towards and ends, not and end in itself. In other words: resources in themselves have no inherent value, they are only of interest because of what they allow for or provide in terms of capabilities.

The capability approach provides a framework for analysing which capabilities can be created from the available resources, i.e. to which ends the available resources can serve as a means. For analysing how and which capabilities can be expanded or created from the availability of a resource, the scheme provided by Robeyns (2005) will be used. In this Robeyns depicts the process that is to take place in order for resources to be turned into capabilities and functionings. The three main elements she identifies in this are "Capability inputs", the "freedom to achieve" and the actual "achievement". Furthermore, as the scheme shows, resources are dependent on conversion factors in order to be converted into an actual capability. The set of capabilities one can choose from taken together form a "capability set", this can range from the total number of capabilities together to a set of specific capabilities that serve specific achievement, or that together form a building block for another capability.

In between the capability set and the actual achievement(s) that follow from it we find another important element of the capability approach: freedom of choice. Capabilities thus form the opportunities from which one can choose to achieve specific functionings. As for the other elements, Capability inputs are the *means* to achieve, which are usually "goods and services" that one has been provided with. The freedom to achieve is found in the capability set: the options from which one can choose to achieve functionings, which then culminate in the achievement of functionings.

Education and Technology in the Capability Approach

In order to analyze the case study in this thesis -OpenCourseWare and its use in education- a short summary will be given of how educational technologies relate to the capability approach, to subsequently review which position they take in the aforementioned scheme of the capability process.

Both education and technology have an inherent capacity to expand capabilities. However much of this capacity is dependent on the use and role this plays in a process. Education in terms of the capability approach is a process in which information is combined with engaged reasoning in order to create capabilities and expand one's knowledge. Education is seen as an important "force of change", which is aimed at empowerment and the forming of agency through critical reasoning, that can together form a building block for other capabilities.

The principal aim of education in the capability approach is thus the expansion of capabilities and the associated capacities for choice, to empower individuals to be active agents in the shaping of their own lives with regards to the achievement of functionings. Furthermore, the capability approach itself as an evaluative tool for education through its inclusion of human diversity in the conversion process between capability inputs and capabilities: the same input does not guarantee the output. Education is seen as a collection of "opportunities, processes and outcomes" (Robeyns, 2006), not merely a process in which inputs can be directly related to (expected) outcomes. The capability inputs related to the process of education can be used in a means-ends distinction in order to analyse what the available resources may produce in light of the conversion factors that are present.

Technology possesses a similar capacity as education: it can serve as an instrument for expansion of capabilities. However, technology has a more instrumental role to play than education in this particular OpenCourseWare case study. Technology, a capability input in itself, is the means towards the ends: access to OpenCourseWare. However in light of the scheme provided by Robeyns, there is also a need for conversion factors in order to make use of the 'resource' technology. This use can involve both conversion factors, as well as a specific capability set that is needed to make use of the technology.

The role of OpenCourseWare in the process of Education.

In chapter one OpenCourseWare has already been identified as an educational resource to be used as building blocks for courses that are taught in formal student-teacher interaction. ICTs have provided a solution to a distribution problem with concern to educational resources. What formerly was scarce is now available in abundance. The challenge following this abundance is to make meaningful use of the educational resources.

In the provision of OpenCourseWare there has been a lot attention given to ensuring access to OpenCourseWare by addressing technical and social issues that would otherwise prevent sharing of content. This entails technical issues as well as social ones, the technical issues being software, hardware and connectivity, the social issue for example being copyright limitations. These are important issues, however they lie mainly on the supply side of OpenCourseWare: it shows what OpenCourseWare stakeholders did in order to ensure open access.

Now, in the process of education according to the capability approach, OpenCourseWare will be incorporated into the capability process scheme in order to analyse what OpenCourseWare currently adds to the process of expanding and creating capabilities. As elaborated before the main elements in this are: capability inputs, conversion factors, capability sets, choice and achieved functionings. Capability inputs are taken to be OpenCourseWare, as its description in the foregoing has shown, is to be seen as a resource to be consulted for educational content. OpenCourseWare is then to be adapted to local contexts and incorporated in courses taught in a formal setting with traditional student-teacher interaction.

In terms of the process of capability expansion, capability inputs have been identified as mainly consisting of resources, in which those resources are the means to expand capabilities and eventually lead to the achievement of valuable functionings. In terms of the process of education, OpenCourseWare -which has already been indentified as a (educational) resource- thus falls into the category of capability inputs. OpenCourseWare thus provides a means to achieve outcomes in an education process: it provides a resource from which educational content can be drawn and subsequently incorporated into a formal education process. This process of education is presented in the capability approach as a social activity that incorporates opportunities, processes and outcomes. As noted before resources in the capability approach are merely means towards an end, they have value because of the capabilities they might expand or create. Especially in the process of education, a capability input is only the start of a process.

Although capability inputs are necessary prerequisites in order to start the process of education it is important to keep in mind that they are just that: a starting point. This means that the 'value' of this resource is dependent on how these resources are converted into capabilities, which depends mainly on the process that is to follow the provision of a resource.

Whether OpenCourseWare as a capability input thus possesses value, depends on how successful the process of conversion of the resource, that is to culminate in expansion of capabilities, turns out to be. Now that OpenCourseWare has been identified as a capability input we can judge it to be a small contribution to the process in which capabilities are expanded and created. Following this, we will now turn to the larger process in which OpenCourseWare is placed and analyze which factors play a role in the conversion of the capability input OpenCourseWare into capabilities in the education process.

From OpenCourseWare to Capabilities: Prerequisites for use of OpenCourseWare

To follow up on the starting point of OpenCourseWare as a capability input, we will now analyse which other elements are required in order to access OpenCourseWare and make use of it in terms of having access to the provided resource, from the point of view of an OpenCourseWare user. While OpenCourseWare stakeholders have focused on ensuring open accessibility through 'open' licenses and 'open' technologies there a number of other prerequisites in order to ensure access to OpenCourseWare. Access in this case will not be confined to merely having the material resources needed to access OpenCourseWare, such as access to a computer with an internet connection (i.e. hardware and connectivity). Access will be taken to include -besides (material) prerequisites- personal, social and environmental conversion factors.

A prominent feature of the Capability Approach is the means-ends distinction it advocates in its analysis of resources, together with the relation between resources and capabilities. Where capabilities are concerned, these are not one-dimensional entities. Meaning that what is a capability in one instance can be a conversion factor in another situation, or that what is a conversion factor in one situation can turn out to be a capability in another one. Access to OpenCourseWare provides us an example of this: in order to make use of OpenCourseWare in an education process, the user needs to be able to access OpenCourseWare. Access to OpenCourseWare can be a material resource

(i.e. a capability input), meaning that the hardware and connectivity prerequisites are fulfilled. OpenCourseWare access however also needs a certain capability set to be present in order to ensure the user is able to access and make use of OpenCourseWare. This specific capability set then contributes as a conversion factor to the overall capability of 'making use of OpenCourseWare'.

In the foregoing the role of ICT in education has been described. ICTs were found to be the means towards the ends of OpenCourseWare access, technology in this matter is thus a capability input: a means to achieve access. In chapter one we have found to be clearly ingrained in the design of OpenCourseWare the prerequisite that the user at which OpenCourseWare is aimed has received primary and secondary education and is therefore equipped with the capabilities (including language) needed to makes us of the OpenCourseWare content which is aimed at higher education. Besides that we have identified that certain material prerequisites are necessary for access to OpenCourseWare: hardware and connectivity. Both of these, the material prerequisites and the preparation for higher education through lower level education, are also made explicit in the OpenCourseWare vision. The capability approach can however show that another set of capabilities is needed: "information literacy".

Information literacy encompasses a skill set that is specifically catered towards being able to access digital resources, such as OpenCourseWare, and to make use of the information found in these resources in order to come to 'meaningful use' of digital materials. In terms of the capability process with regards to accessing OpenCourseWare we can now say that on a basic level, OpenCourseWare as an online resource is a capability input. What OpenCourseWare stakeholders have addressed is ensuring 'open' access through specific licenses and technologies to ensure "equal" access. When this is analysed by means of the capability process in terms of being able to access OpenCourseWare, these are found to be capability inputs: means to achieve access. However when looking at the capability process in which the functioning is 'access to OpenCourseWare', there is a need of conversion factors and capabilities in addition to the aforementioned capability inputs. Information literacy forms the 'capability set' that encompasses the personal skills needed for gaining access to OpenCourseWare and making meaningful use of it. The material resources concerning hardware and connectivity, open licenses and open technologies alone thus do not guarantee equal access. What the capability approach shows in this is that the human skill involved (i.e.

information literacy) also deserves attention because otherwise the capability process is not complete.

Furthermore, the capability approach shows that there are several conversion factors involved in accessing OpenCourseWare that can be personal, social or environmental. Examples of these can be users with disabilities -a personal conversion factor- that complicate OpenCourseWare access, although the necessary capability inputs are in place. A social conversion factor can be having access to internet but only on a limited basis in which one can find the access to OpenCourseWare to be blocked. This human diversity with regards to conversion factors goes to show that equal capability inputs do not guarantee equal outcomes. The way in which 'equal access' is envisioned by OpenCourseWare stakeholders has been shown to mainly relate to capability inputs such as material resources and prerequisites for access on the supply/production side of OpenCourseWare, instead of on the 'use' side.

The capability approach through applying it to OpenCourseWare access has made clear that access to OpenCourseWare encompasses more than just sharing resources online through open licenses and technologies, if equal access is to be reached. What needs to be kept in mind is the conversion factors and human diversity involved, as well as the capability set (i.e. information literacy) that is needed to ensure 'equal' access to OpenCourseWare. Furthermore the above analysis has shown there to be different levels in the analysis of OpenCourseWare with regards to capabilities: information literacy has been identified as a capability set needed for the capability 'being able to access OpenCourseWare'. This capability set however becomes a conversion factor when it is applied to the capability 'being able to make meaningful use of OpenCourseWare'.

The role of OpenCourseWare in Education.

In chapter two several socio-economic roles of education have been discussed. The three main approaches to education have been identified by Robeyns as being based on Human Rights, Human Capital and Human Capabilities. A review of this found the human rights-based approach to provide a strong moral argument for making education available for all. Nevertheless, as an approach it lacks a practical application of the approach to ensure a certain outcome of the education process besides that of making education available. Therefore in the following the focus will mainly be on the two other approaches. This is not to dismiss human rights as an approach to education, the

choice for this has been made based on the finding that the human rights approach can encompass both human capital and/or human capability.

The findings in the analysis of the vision of OpenCourseWare stakeholders have towards the role of education are twofold, and seem to encompass both human capital and human capability. In terms of human capability and the capability approach it is interesting to note the claim by the Hewlett Foundation that they have been inspired by the works of Amartya Sen and therefore aim to remove 'unfreedoms' with regards to education in order to equalize access. Furthermore the Hewlett Foundation shares the belief that education possesses a positive multiplier effect that allows more unfreedoms to be addressed as a result of education. The foundation aims to do to so by providing support to open educational resources initiatives such as OpenCourseWare. MIT, without explicitly stating so, also connects to the capability approach through its vision that the issue of those deprived of access to education (a capability deprivation) should be addressed. A further empowerment through education is then envisioned as a result to those who were formerly deprived. So, on a rather abstract level, related to what the providers and proponents of OpenCourseWare aim to reach by providing educational resources this seems to fit nicely within the human capability paradigm of education.

However, when these abstract aims are translated into more practical goals towards the envisioned goals OpenCourseWare is to serve this picture changes. The assumptions underlying the stakeholders vision and their 'practical' aim then quickly turn to a view on what education entails and to which goal it serves that is closely related to human capital. In this I will differentiate between two main lines of thought found in the vision: one that concerns the process of education and one that concerns the role of education.

Starting with the role of education, in their vision the OpenCourseWare stakeholders express that they hold OpenCourseWare to be a contribution towards creating human capital, and the building of knowledge societies, which are deemed vital for economic development. So although on the abstract level the OpenCourseWare stakeholders seem to connect to the capability approach in terms of empowerment and addressing capability deprivations, in practical terms the connection to the human capital role of education is stronger. This is reflected in the focus on economic development and the relation they assume this has to education. Besides that, the focus on creating human capital suggests a lack of attention for creating freedom through capabilities while instead the focus is on productive skills. These are clear and explicit

examples of the perceived human capital role of education presented by the OpenCourseWare stakeholders.

Besides these examples, a deeper analysis that addresses the process of education, based on the findings from the capability approach analysis, will show that human capital is pervasive throughout the OpenCourseWare stakeholder vision. From the described vision of the OpenCourseWare stakeholders one of the most important features is the claim towards providing 'high-quality' educational content. The 'quality' in the case of OpenCourseWare is reflective of the standards OpenCourseWare sets for it on campus education, since OpenCourseWare are derived from those courses. However, in order to judge 'quality' of education, and of educational content, one must first define the goals and outcomes of the education process.

However, OpenCourseWare stakeholders seem to be unable to differentiate between what they perceive as quality in OpenCourseWare and how this translates to the different uses of OpenCourseWare. In terms of a human capital approach to education, in which the process of education revolves around equipping learners with economic productive skills, the most efficient way to expand the necessary productive skills might be seen as a 'quality' outcome of education. The role of education in the capability approach on the other hand, aimed at expanding and creating capabilities, will not perceive an education of which serves merely as the means to the ends of increasing economic productivity as a 'quality' education. What can further explain that OpenCourseWare stakeholders still claim a universal 'quality' to their educational content, is the specific human capital view on the process of education. In human capital education is seen as a machine like process in which an input guarantees an outcome, thereby largely the (social) process of education. A related assumption to this is the lack of attention for human diversity: if, in the machine like process of education, an input is directly related to an output this entails that for similar input, similar output is expected. This expectation leaves no room for heterogeneity among students, a common factor in the education process that the capability approach does allow for.

OpenCourseWare as education?

Where the capability approach views education as an elaborate and social process, we have shown the OpenCourseWare stakeholders to hold a human capital view which largely disregards the process of education. A number of issues related to the human capital view which is dominated by a focus on resources, have been identified in the

analysis of OpenCourseWare. Among these are the claim to quality of the shared content and the education that is to follow from it. Another issue the view of the OpenCourseWare stakeholders entails is also a result of the lack of attention to the process of education. The stakeholders, in their envisioned impact of OpenCourseWare, seem to equate the provision of the educational content that is OpenCourseWare to education itself. In other words their vision seems to suggest that they at least expect the provision of OpenCourseWare to naturally lead to education. Related to this, instead of presenting the educational content of OpenCourseWare as information to be used as input for an education process, it is steadfastly referred to as knowledge. The underlying assumption in this is that knowledge exists independent of the learner and is not to be constructed out of the information in the educational content in combination with the education process.

The analysis of OpenCourseWare has made clear that in the process of education found in the capability approach, OpenCourseWare is merely an information resource to be used as input for a larger education process. The capability approach has also shown that there are more factors involved concerning 'equal access' than merely capability inputs. Furthermore the OpenCourseWare vision has been shown to largely disregard the process of education, assume homogeneity among students and to hold a simplistic view of education as a machine like entity, together with an explicit focus on resources and the economic role of education. Through analysis of the OpenCourseWare vision it is clear that the narrow and resource and human capital focused view is incomplete. Therefore the vision of equal access to education, the creation of human capital and economic development through provision of OpenCourseWare is unrealistic. Although OpenCourseWare holds opportunity as an input in a formal education process, it is clear that the envisioned outcomes related to providing access to OpenCourseWare are far from realistic. The overarching view in which OpenCourseWare is to provide education and economic growth might become reality in the future, at the time being however, and keeping in mind the issues that have been identified in the foregoing analysis, the vision towards OpenCourseWare still holds large discrepancies when compared to the opportunities that are actually provided by OpenCourseWare.

Conclusion and Recommendations

Conclusion

On the basis of the foregoing analysis on the possibilities of OpenCourseWare this conclusion will address which (embedded) aspects and assumptions of OpenCourseWare should be kept in mind and addressed when used in Higher Education in lesser developed countries, in order to provide capabilities through OpenCourseWare. Firstly conclusions from the foregoing analysis will be drawn to show how OpenCourseWare can be seen in terms of the capability approach and how this approach can usefully be applied for evaluations of technology in terms of improvements in quality of life defined by the capability approach.

Furthermore the implicit and explicit assumptions in OpenCourseWare design, production and technology will be shown. Analysis of both the stakeholders and the content and technology itself have led to the identification of possible issues involved in the development and dissemination of OpenCourseWare. Both of these analyses are brought together here to make suggestions for future improvements in use and policy concerning OpenCourseWare. Starting from the embedded assumptions, points will be brought forward in need of further research and subsequently recommendations towards improvements will be made.

One of the first findings of applying the capability approach as a normative framework towards the use and vision of OpenCourseware were the possibilities and limitations encountered. By following the means-ends distinction from the capability approach the technology used for OpenCourseWare was shown to be the means towards the ends of gaining access to the resource OpenCourseware. Technology in this thus fulfils an instrumental role in the capability process of gaining access to educational resources. Furthermore the educational resources accessed through technology in turn form a capability input in the process of education and expansion of capabilities. Both technology and the educational content accessed through it thus are clearly resources and form capability inputs for the process of capability expansion. They are means towards the ends, which in this case are gaining access to educational content to be subsequently used as a capability input in the process of education.

Furthermore by analysing the other factors in the process of capability expansion the process that is to follow the capability inputs in order to come to meaningful use of the resources (i.e. creation or expansion of capabilities and/or functionings) can be

made explicit. In terms of accessing OpenCourseWare it was shown to need several (material) capability inputs such as hardware and connectivity. These inputs then needed to be combined with the necessary human capabilities in order to not only have the opportunity of access but to make use of the resources of which access ensured by material means. The capability set needed for this was identified as ‘’information literacy’’: the skills needed to access, evaluate and make use of digital resources. This capability set then becomes a conversion factor when OpenCourseWare is employed as a capability input in the process of education. The capability set needed for accessing OpenCourseware thus is an enabling factor for the process in which OpenCourseWare becomes part of the process of education.

However in the education process the capability set ‘information literacy’ becomes one of a number of conversion factors, which can be personal, social or environmental. What these conversion factors further show is that the human diversity inherently found among learners needs to be kept in mind in the process of education. Similar capability inputs cannot be expected to provide similar results across a group of learners because of the conversion factors involved.

By means of assessment in terms of the capability approach we have now shown both the possibilities and limitations of OpenCourseWare content and technology in education. It does provide access to a vast amount of educational resources. However the focus of OCW stakeholders seems to have mainly been on ensuring ‘technical’ access through open technologies and licenses. This however does not ensure the ‘equal access’ they have set themselves as a goal. Even when the materials prerequisites for access are met, the conversion factors needed to access and make use can still distort the perceived equality of access. Equality of access thus encompasses more than just material prerequisites: accessing OpenCourseware and making use of it is a process in itself in which more elements are relevant than just the technical ones.

Within the capability approach technology and other resources only posses value because of the role they play in the process of enabling capabilities. In this the resources are highly dependent on the surrounding process that is needed to convert resources into capabilities. The value of the technology thus depends on its (possibilities) for use and the result of that process. The same applies to the educational content accessed through technology: it provides a resource of which the value is largely dependent on the process of conversion towards capabilities. A focus on resources alone, which seems to

be prevalent in the vision towards OpenCourseWare is thus found to be lacking in these perspective.

Returning to conversion processes: in the OCW visions discussed several claims of quality have been made. Both in relation to the quality of the OpenCourseWare content as well as to the quality of the education that is expected to follow from it. In order to make such value judgments on quality however there must be an expectation concerning the use of the content and the outcome of the process of education. In the foregoing the vision concerning OpenCourseWare has already been found to be largely resource focussed. Concerning the outcome of education there is a similar focus: education is seen mainly as serving an instrumental role towards economic development that it is to the removal of unfreedoms and the expansion of capabilities. Through this the process in which education is to take place seems to be neglected, and additionally the outcomes of education seem to focus again on resources such as human capital. In relation to what OpenCourseWare then contributes to education for development and quality of life the impact of OpenCourseWare will be limited as is acknowledged by the a review of resources such as OpenCourseWare. The potential for contributions towards quality of life remains present, the challenge is how to use and develop OpenCourseWare in such a way that its impact will increase. In the following some recommendation towards this will be made.

Recommendations

The analysis of OpenCourseWare based on the vision OpenCourseWare stakeholders hold towards the application, impact and use of OpenCourseWare in terms of the Capability approach has provided some useful insights. At this point I would like to make some recommendations towards the vision and use of OpenCourseWare based on the foregoing analysis. An interesting point that has come forward from the analysis of the OpenCourseWare vision in relation to the Capability approach is the fact that on a more abstract level the aims of the OpenCourseWare stakeholders seem to be aligned with those of the capability approach. The Hewlett Foundation even states to be inspired by the works of Amartya Sen, while UNESCO has applied Sen's work by means of their human development index. However when the vision is further analysed it takes a turn towards a more resource focused human capital approach. Thereby the link links to the capability approach are being severed: instead of a focus on capabilities, a focus on resources remains. Since in the vision towards OpenCourseWare there are also claims

made towards development and quality of life, these also are more closely allied to the traditional resource focused paradigms instead of the capability approach's focus on freedom and expansion of capabilities. Furthermore, a rather simplistic view towards education in which the process of education is largely disregarded has been identified. The framework provided by the capability approach has been able to identify such issues. It has shown, that it is not realistic to expect similar education outputs from similar education inputs: human diversity and a variety of conversion factors need to be considered. Moreover, education is to be seen as a process. An education input such as OpenCourseWare can thus not be equalled to providing an education in itself. The same goes for providing access, the claimed goal of providing equal access, turned out to have a focus mainly on the supply side of OpenCourseWare thereby ignoring what the user might need for access. This is not to say that OpenCourseWare producers or proponents should supply all of this next to the educational resources they are providing. It is however important to at least acknowledge the limitations found in the use of the technology that is OpenCourseWare. At the moment however what seems to prevail in the vision towards OpenCourseWare is the promise and opportunity held by it, together with the efforts towards ensuring technical access to OpenCourseWare.

Returning to the relation that was found between the OpenCourseWare vision and the capability approach: in practice the possibilities provided by OpenCourseWare clearly do not live up to the expectations attached to it. The main argument here is thus that, had the capability approach been used as the starting point of the OpenCourseWare endeavour, and not just as literature that provides a strong rhetoric but to which lip service is paid, the discrepancy between the expectations of OpenCourseWare and the actual opportunities provided by it would be greatly reduced.

What remains now is: how to maximise or improve the impact of OpenCourseWare in terms of contributing to education for development and improvements in quality of life. As argued before, OpenCourseWare provides a valuable resource from which capability inputs for the education process can be taken. In light of this process the logical step seems to be to use OpenCourseWare in such a way that it is incorporated into formal education settings. For we have found that the information found in OpenCourseWare to be turned into knowledge requires a process of engagement. This process can be ensured through formal education and traditional teacher-student interactions. The added benefit of this is that in those formal settings the

material prerequisites such as hardware and connectivity will be more readily available, and the knowledge on the other conversion factors can be transmitted in the process.

The further recommendations I would like to make will on the one side be related to the technological aspect of OpenCourseWare and on the other to the education process in which OpenCourseWare is to be integrated. Concerning the technological side I believe that ‘’value sensitive design’’ (Van den Hoven, 2007) provides an interesting perspective towards engaging with the values embedded in technology. Concerning the process of education a rethink on the role ICT is to take in the process of education in which pedagogy becomes paramount. This opposed to a ‘’focus on technology as workforce training’’ such as in resource focussed paradigms like human capital (Watson, 2001).

Watson, in the article ‘’pedagogy before technology’’ calls for a clarity of objective towards the role that ICT is to play in education. He identifies two main purposes ICT serve in education: one is aimed towards providing the necessary skills so that information can be readily accessed, the other is its use as a tool to improve learning in the rest of the curriculum. He argues that where ICT skills such as information literacy are developed are used merely for accessing online educational resources, these merely focus on a need to ‘’acquire information’’. However accessing this information needs to be complemented by a processing of information: a judgment of relevance, a challenge of its assumptions and the source. Knowledge and reflection are considered vital in the education process, and ICT should play a supportive role in that. A supportive role is thus different compared to one were the focus is very much on enabling access and perceiving information as knowledge. For ICT to assist optimally in education Watson argues a need for it to be taken out of the resources focussed technical paradigm and be implemented into the existing pedagogical structure. The educational potential found in such resources can be used more readily when ICT remains a tool in the process of engaging with information.

In doing so we can return once more to the capability approach which provides us a number of important capabilities that can be fostered in higher education. In the process of choosing from a capability set which capability to achieve, the capability approach focuses on freedom and agency. This can be implemented into pedagogy by including practical reasoning, critical reflection ensuring a liberal teaching environment. Such academic values can then be integrated into a pedagogy that aims to prepare learners to make optimal use of the capabilities offered to them through expressing their

freedom and agency in choices they make towards improving their quality of life (Walker, 2005).

Furthermore, Van den Hoven suggests to make explicit ‘’moral values part of technological design’’ in order to make use of the potential of ICT to improve quality of life. Imparting values and norms in technology design will aid in the process of maximising the potential of ICT. Besides that, the active engagement with embedding values in technology forces one to reflect on the –normally implicit- values and norms that are to be incorporated and reflected in technology. Furthermore it is argued that ICT is partially constitutive of the domains to which it is applies, which in this case study would signify the OpenCourseWare in and education process. If combined with a pedagogy that incorporates technology as a tool in its process, the technology can be placed in a context in which pedagogical values can be ingrained in it. Combined with the insights from the capability approach towards what makes for development and quality of life, these values and normative considerations can then become integrated into both the tools for education as well as education itself. I believe doing so will improve the desired impact OpenCourseWare is to make on education, development and quality of life.

Conclusion

This thesis aims to contribute to the current debate on development with respect to technology and education, and examines how they can contribute to development and improvement of the quality of life. More specifically, I have analysed and evaluated visions towards, and expectations of, a specific educational technology: OpenCourseWare.

In doing so the aim of my research is twofold. First, it is to provide a framework to analyse the combination of education and technology in relation to development and the quality of life. The framework chosen here is the capability approach, which I have presented as a framework that is more comprehensive and inclusive towards the quality of life in comparison to the dominant development paradigms such as those based on utility or resources. Second, this thesis has attempted to offer recommendations on how to make better use of open educational resources in improving education through which development in lesser developed nations can be enabled. The case study in this thesis, OpenCourseWare, therefore is subjected to an analysis through the normative and evaluative framework based on the Capability Approach.

Following from my analysis, several recommendations towards optimising the impact of OpenCourseWare for lesser developed nations are made. The analysis and recommendations made with the capability approach in mind, however, are not necessarily restricted to the use of OpenCourseWare. I believe the analysis of the OpenCourseWare has shown its merits in the analysis with respect to both the technology and education (and, relatedly, the role of technology in education) in relation to the evaluation of the quality of life. The framework used here can be applied to other cases related to education and/or technology as well. Of course, dependent on the specific cases, additional theories may be needed to do justice to various particularities.

Basis of analysis

My analysis in the final chapter is based on the result presented in chapter one and two. In chapter one the concept and nature of OpenCourseware are discussed. I have also identified the relevant stakeholders of OpenCourseWare. What became clear in this exercise is that OpenCourseWare has never been intended to be a distance education initiative, but as an open repository from which higher education learners and academic

staff could employ educational materials. Accordingly, we can differentiate between content, tools and implementation resources that, all together, form OpenCourseWare. I have tried to show that the term 'open' in OpenCourseWare is to signify 'free of charge' instead of 'without limitations'. And, the openness here mainly refers to technical access to OpenCourseWare on the supply side, and not so much on the openness of content or access seen from a user's point of view. Choices of the implementation resources and the technological tools have influenced the content. It should now be clear that the rigidity of the OpenCourseWare is mainly due to the limitation of tools and resources. This, in conjunction with MIT's decision to ensure a reflection of MIT standards in its OpenCourseWare by making it 'read-only', has made OpenCourseWare a fairly rigid resource which still contains several 'unfreedoms'.

After describing the concept of OpenCourseWare and its stakeholders, chapter two has provided a normative and evaluative framework by which OpenCourseWare and the vision of the stakeholders towards it can be evaluated. My choice here is the Capability Approach, which grows from Amartya Sen's dissatisfaction with the dominant development paradigms that focused merely on resources or utility. According to the capability approach, development should aim at improving the quality of life through an expansion of capabilities. Quality of life thus comes from a set of capabilities from which one can choose as well as the freedom and agency to make personal choices as to what makes for improvement in one’s quality of life. Resources, therefore, merely provide a means towards the end of an expansion of capabilities. The value of resources is, therefore, to be found in what they enable in terms of capability, not in the possession of or access to the resource itself. Next to this normative stance on what makes for development and the quality of life, the capability approach provides a framework in which an evaluation of how the conversion from resources to capabilities is made possible. The capability approach pays special attention to the necessary circumstances and environment, as well as the human capacities required for conversion of resources into capabilities. It does so by combining resources with conversion factors, which can be personal, social or environmental. In other words, resources alone are insufficient.

Education and technology both have the capacity to expand human capabilities, but are heavily dependent on the related conversion process. While technology plays mainly an instrumental role towards capability expansion, education is seen as a building block for development of other capabilities. Through development of

capabilities such as critical reasoning and agency, individuals are empowered to make more informed choices on achieving functionings that contribute to an improvement in their quality of life.

The capability approach for education presents an alternative to the dominant human capital paradigm which is often seen in education for development settings. The human capital approach seems to mirror the development paradigm in which there is a focus on resources regarding improvement in quality of life. Although the capability approach does not disregard the value of the instrumental, economic role education can serve, it does not take this as its starting point. The starting point for education in the capability approach remains at promoting freedom through expanding capabilities. Furthermore, it makes clear that education is a social process and not the machine-like entity that human capital perceives it to be. In doing so, it can also account for the human diversity found among learners through evaluating which conversion factors are needed to convert the capability inputs in the process of education into capabilities.

Currently, technology seems to become an integral part of education. So, the combination of OpenCourseWare and education for development provides an interesting case from the perspective of the capability approach. OpenCourseWare in education is generally viewed as serving an instrumental role: it provides an input to the education process. Yet, OpenCourseware in itself is also subject to several conversion factors in order for to be able to serve an instrumental role. Based on the capability approach, I have offered a descriptive and normative analysis in chapter three.

Analysis of OCW

Before beginning my analysis of the use of OpenCourseWare, I have ventured to examine how OpenCourseWare are being used. In this analysis, various aims of OpenCourseWare stakeholders have been identified and are connected to underlying assumptions in the analysed visions. Interestingly, there seems to be a (almost) logical connection between the visions towards OCW and the capability approach at first sight. In effect, the Hewlett Foundation has based its program on the works of Amartya Sen, in which he argues for a removal of 'unfreedoms'; at the same time, MIT has aimed at empowerment through OpenCourseWare. When addressing the means-ends relation of OpenCourseWare towards development and the role of education, a more resource focussed human capital perspective to education has been identified. Accordingly, OpencourseWare has been directed to education outcomes in which the process of

education is generally disregarded. Furthermore, in the efforts towards creating equal access, a technical resources-focused paradigm can be found in which the attention has mainly gone to ensuring open access from the supply side of OpenCourseWare, instead of approaching this from the view of the users (demand side). Several claims towards quality of educational materials, education and life are made in relation to OpenCourseWare without specifying the context and definition of those concepts. OpenCourseWare and education for development is in need of a clearer means - ends distinction and an inclusion of the process and role of education. This should be combined with an analysis of the underlying assumptions and values found in OpenCourseWare and the vision towards the use of OpenCourseWare.

Findings

One of the main findings from my analysis of OpenCourseWare through the perspective of the capability approach is concerned with the role of OpenCourseware. OpencourseWare should be viewed as an input for an education process, not as provision (of access to) education itself. Furthermore, technology used for accessing OpenCourseWare is a means towards the ends of accessing education resources. This is to be combined with the relevant conversion factors, e.g. information literacy, if OpenCourseWare is to become an input for an education process. Technology is thus a tool for gaining access and plays only an instrumental role in the process. The resources involved are dependent on the process of conversion in order to gain value. The stakeholders' visions in which OpenCourseWare is equated with education itself or an outcome of education process has disregarded the process in which education takes place.

OpenCourseWare could have benefitted from deploying the capability approach as a framework in developing the technology and the visions towards it. And, it is also an important perspective for investigating the possibilities and limitations of OpenCourseWare. An additional benefit of the capability approach is that the role of education will receive more explicit attention, instead of being overshadowed in the dominant resource-focused paradigms towards education, development and quality of life.

Recommendations

Finally, other than the recommendations of using the capability approach as the framework in developing and implementing OpenCourseWare, the capability approach can also benefit from additional theories and research. For instance, Value Sensitive Design can be used to offer concrete recommendations to improve the technological aspects of OpenCourseWare. In other words, by making explicit the values one embeds in technology, designers are forced to engage with these values and reflect on them. Here, the capability approach can serve as a framework in which these embedded values can be made explicit, and thereby serve as an input for Value Sensitive Design. Moreover, if pedagogy is placed before technology, the role of technology in education can become one that is partially constitutive of the process – of education – in which it is employed. Pedagogy can then receive inputs from the capability approach as to what are desirable learning outcomes of the education process with respect to education and technology towards improvements in development and quality of life. I believe these recommendations can contribute towards enlarging the impacts of OpenCourseWare in education for development, thereby truly realising the potential of its contribution to an improvement of the quality of life.

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