Education for Development

Exploring the potential of innovations in education, in particular in the Kenyan context

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Colophon

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1 Introduction

1.1. Prologue

The central theme for this thesis is based on the notion that education is an important factor for future-proof development. Education is the mechanism used by groups of people to transfer the collective knowledge necessary to drive development. At the same time it is not always evident how to make this work. Reports and research show that simply more education is not automatically providing the solution for more or higher levels of development. What seems to be relevant is that in countries were access to good quality education is guaranteed, development processes are stronger. Development in itself however is a concept hard to understand. In international discussions development is often reduced to economic development. But over the last decades discussions have led to the view that development is more than a higher GDP.

The impact or effectivity of education to drive development often is discussed as a quality issue. But the discussion itself does not make education more effective nor do many proposed solutions. Although certain basic factors seem to play an important role, solutions that influence these factors have not solved all problems. Future proof development is still out of reach for many regions and the people living there. The central theme for this thesis is to collect and process scientific information that leads to a better understanding of the complexity of the relationship between education and development. The interest is in interventions that influence factors that are crucial for development. The central theme as it is formulated has a global scope. In this thesis the emphasis is on the situation in Kenya. Therefore it is relevant to discuss those factors that are crucial to development in the Kenyan context. Do models for solutions that seem to work elsewhere apply to the Kenyan situation? As to the question 'why Kenya?' the answer is very personal. Personal interest and connections built during years of collaboration have created a basis for the project that has resulted in this thesis. To complete this thesis several years of literature study on the concepts of development and education have been combined with collaboration projects with partners in Kenya on curriculum innovation. As a result the knowledge derived from the literature and the information collected during course development have been brought together in this thesis. The research conducted can be indicated as explorative research where the process is as important as the outcomes.

This work would however never have been completed without the inspiring interaction with my promoters and co-promoter. The three supervisors have had crucial roles in the process of writing this thesis.

Prof. van Dam-Mieras not only was the coordinating supervisor and first promotor.

With her the research questions, the research approach and the structure of this thesis has been discussed. Furthermore, she was instrumental in the discussions when writing chapters three on development, and four on education and development.

The second supervisor, prof. Fred Mulder, entered the supervision at a later stage and especially contributed to the work reported in chapter four on education and development and chapter five on innovations in education. His constant challenging has resulted in the work on the 'Iron Triangle Scan' that has become an important achievement. As a critical reader he more than once has helped me to improve the quality of my work.

The third supervisor, prof. Hans van Ginkel, introduced me to the concept of Education for Sustainable development, and helped me position ESD in this thesis. Using his experience in the field of international cooperation prof. van Ginkel helped me to understand and cope with the complexity of working in an international environment. Conducting research in such an international environment requires special skills. I was fortunate to have someone as experienced as prof. van Ginkel to help and guide me in this.

1.2. Introduction to this thesis

The history of this thesis is as long as the history of my personal professional development based on my academic education, and the interactions with colleagues, students and stakeholders involved in higher education in the Netherlands and far beyond. One decisive step in my development as a professional has been the involvement in international networking (Knight & de Wit 1995; Varga-Atkins et al. 2009). My academic training as a geographer already partly satisfied my curiosity for different cultures, different landscapes and especially the variation in creativity mankind displays in utilising the natural resources offered by planet earth. Stimulated by colleagues and family the idea to make all this experience accumulated over a period of 30 years useful to others has led to the project that is the basis for this thesis.

When defining the central theme for the project it all came down to a simple question that is extremely difficult to answer: "What does really work for people that want to improve their living conditions and quality of life and how can I contribute?" The first premise for the project was that it would be led by ideas and suggestions by stakeholders and not limited by my personal prejudices. It was Mr. Ronald Kefa (then a student at Tangaza University College in Nairobi, and now a successful businessman and social entrepreneur) who in 2007 provided the key by telling me: "Help us with the knowledge to help ourselves". It was in 2008 that a group of students from Tangaza University College in collaboration with Dutch students from Delft University of Technology came with the suggestion to teach entrepreneurship to those that need the knowledge and skills to help themselves and their community.
This is where the exploration of the question "What does really work …" was

reformulated into: "How can conceptual and instrumental developments in education contribute to a more future proof regional development and how do stakeholders respond to these developments."

While exploring the central question I found that my experience in education and in the field provided excellent entry points. These entry points form the building blocks of the remaining chapters of this thesis and will be elaborated in the rest of this chapter.

1.3. Geography and development

The first entry point is my initial academic education as a geographer, specialised in regional geography. The holistic view of a geographer researching the way that people living in a region interact with the geographical potential for development of that region, was what fascinated me then, and is still driving my observations. My favourite work approach still is to start with a bird's eye view and then dive into the details. As a critical academic student I was also aware of the weak points in the development policies of that time which now have led to a fundamental discussion around the need and purpose of development cooperation, as for example can be retrieved from the website of the Dutch government:
*Development cooperation needs to become more effective and efficient. The Netherlands has therefore undertaken a fundamental review of development policy. It has decided to assist fewer partner countries while focusing on four spearhead areas in which the Netherlands can add special value. (*http://www.government.nl/issues/development-cooperation*, accessed July 14,2016).*
To put the rest of this thesis in perspective it felt like natural to start with an overview of the current understanding of development and development cooperation to provide a background and to explain the choices made.

1.4. Role of education

My work experience as an assessment expert and educational technologist in both the administration and the research department of the Open Universiteit for more than 10 years, provides the second entry point. In this period I learned to look at education at the organisational level from an assessment point of view. The advantage of such a view is twofold. It forces one to focus on the tangible results of educational interventions. In educational assessment the focus is on the measurable (mostly short-term) results. And what is even more valuable is that it makes one take a different view on the educational process. If it is clearly defined what is to be measured in the assessment, it is much clearer what teaching is required. This approach is described as 'the tail wagging the dog' principle (Dochy 1997). Even, depending on the learning outcomes defined, it is sometimes more obvious to put the student in the centre instead of the teacher, as it is the student who has to show a certain performance that is assessed. The impact of education and therefore the return on investment of the

learner increases if the learning objectives are clearly defined, the learning is designed to meet these objectives and the assessment is targeting the measurement of the learning process that occurred. Although this seems to be trivial, it requires a solid educational organisation, including a quality assurance system, to ensure the direct relationship between education and educational goals and an efficient process to accomplish all this (Cohen 1981). I learned the importance of quality mechanisms and I learned to analyse organisational problems that affect the learning from different perspectives. Thanks to this work environment I have been submerged in the latest ICT developments and developed an interest in technical solutions that actually support people in their activities, especially learning.

1.5. Education for Sustainable Development

The third entry point for the search is my engagement in Education for Sustainable Development (*ESD*). Thanks to this engagement I not only met the people who are instrumental for the realization of this thesis: my promoter and one of my co-promoters and the research partners. Prof. dr. Rietje van Dam-Mieras, who is my promoter, has a vast experience in innovation in education, especially in Education for Sustainable Development. She is also a strong advocate of the integrated approach where higher education engages with other stakeholders in society to improve the outcomes of education. We share the idea that where society is developing more into an individualised society, education should also take the individual learner as a point of focus. When putting the learning individual in the centre of educational activity the distinction between formal and non-formal education changes and becomes less relevant. Together we built the Regional Centre of Expertise on Education for Sustainable Development in the Rhine-Meuse border area where Belgium, Germany and The Netherlands share their borders (in short RCE Rhine-Meuse) to put these ideals into practice (van Dam-Mieras & Rikers 2007; Rikers et al. 2010). This RCE was the first in Europe of what has grown into a global network of over 120 regional centres by the end of the decade in 2015, under the umbrella of United Nations University. We also collaborated closely in the work program of the UNESCO Chair on 'Knowledge Transfer for Sustainable Development Supported by ICTs', of which prof. van Dam-Mieras was the first chair holder (2006-2010). It was in this period that prof. van Dam-Mieras convinced and motivated me to start the project leading to this thesis.

Prof. Hans van Ginkel was one of the inspiring professors at the Institute of Geography at Utrecht University in the Netherlands where I finished my degree in Geography. In 1997 Prof. van Ginkel, became the Rector of United Nations University (UNU), and brought the concept of RCEs to the table of the international community. The initial idea of creating regional centres where stakeholders would collaborate to tackle regional sustainability issues was launched at the UNESCO World Conference on Higher Education in 1998. The concrete RCE concept was introduced at the Copernicus Conference in Lüneburg (October 2001), a meeting to prepare for the World Summit

on Sustainable Development in Johannesburg in 2002. The RCE concept is part of the Lüneburg Declaration (then called Regional Centres of Excellence). Around the Johannesburg summit the RCE concept re-appears in the Ubuntu Declaration. In the UN Decade Education for Sustainable Development van Ginkel was again instrumental in pushing the RCE concept and launching a program for the building of such centres around the world. Through the Institute for Advanced Studies in Yokohama (a UNU institute), that acted as the Global RCE Service centre, van Ginkel as Rector of UNU was strongly involved in the building of the first generations of RCE (Glasser 2008; Van Ginkel 2010; Van Ginkel 2003). On the practical development of the global RCE network, the reports by the Global RCE Service Centre are most informative (Fadeeva & Mochizuki 2005; Aipanjiguly et al. 2010).

What is essential in the RCE concept is that stakeholders are brought together to work on an integrated approach towards sustainability issues. In this concept it is important to note the distinction between education on sustainable development and education for sustainable development. The 'for' is essential as it indicates that next to understanding sustainable development, education should also provide the competences to deal with this concept (Rikers et al. 2012). Whenever this distinction needs to be emphasised the abbreviation E*f*SD will be used. Competence development for sustainable development became the leading topic in the education and research of the School of Science at the Open Universiteit (de Kraker et al. 2007; Lansu 2013).

Through the network of RCEs the contact with the partners in Kenya was established and Tangaza University College became a collaboration partner. In addition engagement in E*f*SD gave me the insight in the importance and significance of learning for individuals and communities. I am convinced that E*f*SD is crucial for the future development of society on a global level as well as on a local level. People have to learn to live together, to share natural resources and to improve living conditions. This looks like the only peaceful alternative given the limited availability of resources. Being educated in the social sciences for me *EfSD* was not so much about the environment, the protection of biodiversity or climate issues. For me *EfSD* was the process of creating knowledge and understanding that helps people to redefine the balance between economic development, environmental consciousness and socio-cultural development to secure a sustainable future. Finding this new balance through collaboration between educators, learners and experts across the globe to come up with learning experiences that make people learn and benefit from what is known already is the key issue for *EfSD* (Rikers et al. 2012).The purpose of the learning experience is that it fosters the ability of the individual to become an independent thinker and actor, capable of controlling his/her life and the decisions taken during this life. This is in line with the work of Amartya Sen, economist and Nobel Prize winner, who focussed on development from the human perspective "… develops the basic

idea that enhancement of human freedom is both the main object and the primary means of development" (Sen 1999, p.53). In this thesis the abbreviation ESD is used as it is more common, but E*f*SD is intended.

What I have learned from the confrontations and discussions with people in different living environments is that a sufficient economic basis and donor independency is crucial for people to develop independent thinking and responsible behaviour. One way to accomplish this is by helping people to become more entrepreneurial in their activities. Not to say that everybody should become an entrepreneur, but to stress that one merely should reflect on the consequences of one's decisions and actions especially in relationship to one's own future and living conditions. At the same time those who take responsibility for organising social and economic transformation, traditionally rely on sponsorships and donor money. It is a growing trend that these 'change agents' turn to alternatives for this donor driven approach and take a more entrepreneurial stand. To help these 'change agents' entrepreneurship training is offering them the knowledge to do so. The objective for this type of entrepreneurship training is threefold:

1. The trained entrepreneurs will be able to start a business and run this business successfully over a longer period of time.
2. The trained entrepreneurs will not focus on maximisation of profit to satisfy anonymous shareholders, but to be able to provide jobs in their community.
3. The trained entrepreneurs will be conscious of the impact of their business activities on the environment and will make sure that they run their business in a sustainable way.

In the literature the type of entrepreneurship that is focusing on the use of entrepreneurial techniques and approaches to support societal change is referred to as social entrepreneurship. Sometimes (when there is a focus on sustainability), it is referred to as sustainable entrepreneurship. Authors like Shepherd (Shepherd & Patzelt 2011, p.142) define sustainable entrepreneurship as: '*Sustainable entrepreneurship is focused on the preservation of nature, life support, and community in the pursuit of perceived opportunities to bring into existence future products, processes, and services for gain, where gain is broadly construed to include economic and non-economic gains to individuals, the economy, and society.*' E.g. Mair & Marti and Seelos & Mair (2006; 2005) explore the term social entrepreneurship and come with the following working definition: '*Social entrepreneurship is a process where value is created by combining resources in new ways*' (Mair & Martí 2006, p.37). The goal of these activities is social change; community development and catering for the basic needs including the poor. In this thesis the focus is on those entrepreneurs that want to run a successful business, focus on job creation in the community, care for sustainable community

development as well as the environment. Throughout this thesis the term social entrepreneurship will be used.

1.6. Open Educational Resources

The movement of Open Educational Resources (OER) is the last point of entry for the exploration of the central theme of this thesis. This movement started in 2001 with MIT's Open Courseware initiative and became a global development after UNESCO adopted and redefined the concept now known as OER (UNESCO 2002b). The key notion of this movement is that it should be possible to arrange access to high quality learning materials for all individuals who want to learn. It takes collaboration of experts, sharing of resources, but also a systems intervention in the educational system on the national level (Mulder & Rikers, 2008; Mulder, 2012, 2013; Rikers & Mulder, 2012). The second co-promoter Prof. Fred Mulder, in his position as Rector at the Open Universiteit (2000 – 2010), became one of the leading pioneers in OER in Europe. Holding the first UNESCO Chair in OER, Prof. Mulder has intensified his engagement in the OER movement and as a colleague gave me direct access to the core of the activities and expertise. This close connection to the OER developments provides an opportunity to analyse and comment on the latest developments.

The relevance of OER for education for sustainable development lies in the fact that OER is a key factor in taking education across the bridge from formal to non-formal learning. Where most people are outside the formal learning structures, it is vital, especially for the impact of ESD, that as many people as possible have access to the learning materials. Where OER is important for ESD it has a broader importance. OER is part of the concept of Open Education, which is considered a major innovation in education and believed to be crucial for solving problems related to the role of education for development. Where many questions around OER are still under investigation, the thesis project produces and uses OER learning materials. This way the project bridges the discussion on the policy level and the level of the teacher and lecturer, actually working with OER. By doing so the project contributes to the knowledge base adding experience of working with OER across cultural boundaries and different technological circumstances. As a bonus the project produced video and text based learning materials that are made available to the general public under the Creative Commons CC-BY license[1].

1.7. Africa: source of inspiration

To further define the setting and boundaries of this PhD research project it is necessary to clearly define the research setting, the central research problem and a number of related measurable research questions. The research problem and the related research questions are addressed in chapter 2. The setting for the project is in

[1] More information on the Creative Commons licensing: http://creativecommons.org/licenses/

East Africa. Africa has long been regarded as the lost continent, where only negative developments were reported and economies only survived on foreign aid. For the last years (when the financial crises and following economic crises hit the Western economies) Africa however reports remarkable growth figures and developments that seek to stabilise these growth figures. In education developments are also speeding up and the need for solutions is high. Where the economic growth is relying on export and increasing domestic produce, the need for skilled labour, governance and other relevant expertise is growing. The educational sector is looked upon to provide it. This project wants to contribute to this development. The long standing relationship with Tangaza University College enabled an inside view to witness the enthusiasm and energy applied to make the change happen. It is indeed a source of inspiration to experience the commitment of all involved in following new ways, adopting new ideas and modelling them to fit the local needs.

Tangaza University College is a constituent college of the Catholic University of Eastern Africa and in its mission explicitly states to aim at educating change agents for human development for the Eastern African context. As stakeholders in development staff, students and alumni are committed to the notion of development through education. The founder of the Institute of Social Ministry in Mission (ISMM), Fr. Francesco Pierli, a Comboni missionary, envisaged to educate change agents who could go in to the community and create jobs (ISMM Handbook 2012). Any development implemented in the setting of Tangaza University College will find its way to the communities in Eastern Africa through the network of alumni and other stakeholders. Research connected to the alumni activities is seen as crucial to enhance and improve the educational programme and enlarge the actual impact of the work of the alumni in the communities in Eastern Africa.

1.8. Chapter overview

Chapter 2: Research approach. From literature study to course design, the research approach is explained. The research setting is connected to the higher education sector in Kenya, representing higher education in Eastern Africa. The cooperation with Tangaza University College is based on the understanding that the need for change is there and it should happen by preparing individuals to be change agents that can work in a community towards sustainable future development.

The research question composed of three sub questions is introduced, based on the central theme of the project that delivered the information and data for this thesis.

The research approach is one of exploration based partly on literature research and partly on design research. The literature study is focussed on identifying and connecting information on the concept of development and the connection with education. A course design project is reported, dealing with both the design- and

development process and the feedback from management, staff, students and alumni. Stakeholders in the course development project are the university, the institute of ISMM and its management, the ISMM staff and ISMM students. Also involved and connected to the project are ISMM's alumni and the communities they work in. Some of these alumni and communities have been engaged in the project itself.

Chapter 3: Development. This chapter provides an overview of how the view on development evolved from a view on economic development to a view on development in the broader sense of development of a better life. The chapter sets of at the time that economics became a field of study on its own. The urge for measurable and interpretable data deprioritised the moral philosophical influence and let to an approach with a focus on production factors and production means. The work of e.g. William Petty and Adam Smith mark the start of this development. The view on economics largely defines the notion of developing countries. In this chapter it is discussed what distinguishes developing countries form developed countries and whether the distinction is still justified. The orientation of the chapter is that of a geographer and not of an economist. Therefore the discussion is more on how the ruling view on economics influences the developments in especially Africa. In the chapter it is argued that development is not a steady state but a process that is applicable to all regions in the world.

Chapter 4: Education and development. The assumption that education is a major driver for development is explored in this chapter. To understand this relationship it is important to understand how education can drive development. Exploring this question starts off with discussing the challenges for education in Sub-Saharan Africa from the days of colonialism in the18th and 19th century throughout the days of independence in the 1960 until the reality of today. In the second part of chapter 4 the discussion focusses on performance indicators for education that are relevant locally and provide means of comparison globally. Indicators are needed to establish conclusions on what education can and cannot do as a driver for development.

Chapter 5: Innovations in education. This chapter is dedicated to the need for transformation of education. Where innovations are often hyped when introduced, asking the critical question what the real impact is on education and the claim to support development, is relevant. Therefore the problem why the current educational systems are not capable of meeting the demand from society to deliver up to expectation is reframed. Based on this reframed problem description the next step is to scan alleged innovations for their power to solve the problem in all its aspects. These innovations are: Open Education; Education for Sustainable Development and Online Learning. Based on the performance indicators discussed in chapter 4, the Iron Triangle Scan is introduced. This scan is based on three pillars: accessibility; quality and efficiency. The Iron Triangle Scan is used to scan Open Education, Education

for Sustainable Development and Online Learning for their potential as innovative concepts. In the remaining part of this chapter it is presented how Sub Saharan Africa is keeping up with global innovations in education, and especially the three innovations discussed in this chapter.

Chapter 6: From theory to praxis: the course on social entrepreneurship. It is in this chapter that the design and development project at Tangaza University College is reported. Design decisions; material design; material development and stakeholder involvement is reported. Data are presented that have been used to support the decisions during the project. The research is action research based. The researcher and the stakeholders have worked as a team in the project reported. Three major moments for decision making are reported. The first being the decision to start the project. The second decision was on the design of the program and the third decision on how to launch the product after finishing the development phase.

This chapter will end with conclusions drawn from the research data. Recommendations for further research as well as for further development of the educational program of Tangaza University College are made. Where applicable others can use this information as an inspiration for research as well as the development of the educational sector in Kenya and Sub-Saharan Africa.

Chapter 7 provides an evaluation section and a section containing recommendations for further activities. The research presented is organized around three research questions. In the evaluation section the outcomes of the research are used to answer the research questions.

In the recommendations section some ideas for further activities are raised. Some of the recommendations target the research community, where others target the partner organization (Tangaza University College).

The bibliography provides an overview of the literature sources and other sources used in this thesis. The bibliography provide entries for further reading, discussion and research. The work of all those that have published their ideas and their findings so they could be reused oblige me to salute all these authors and thank them.

2 Research approach: from literature study to course design

2.1. Prologue

Innovation in higher education can be driven by theoretical models, expert experience or by trial and error. In the project that is the basis for this thesis these three approaches where combined. The starting point was a series of discussions with the assistant director, Mr. Aloys Ojore, at the Institute for Social Ministry (ISMM) at Tangaza University College. The question was how to solve the problems reported by alumni after an evaluation of the bachelor program. In the discussion solutions like the use of ICT, a problem or project based approach and introducing entrepreneurial skills were discussed. E-learning theory and the experience in e-learning at the Open Universiteit were addressed in the discussion. Options for implementation where suggested and a project was born. It was decided to take a step by step design based approach with clearly marked decision points. It was also agreed that the process would be monitored and reported in this thesis.

2.2. Background for the research question

The central theme for this thesis is formulated at the beginning of chapter one as: How conceptual and instrumental developments in education can contribute to a more future proof regional development and how do stakeholders in the educational process respond to these developments. This theme is operationalised as a design problem to design and develop an educational product. The central theme comes from the notion that education is an important factor for future proof development. Education transfers the knowledge necessary to drive development. At the same time it is not always evident how to make this work.

The problem under investigation in this PhD research is an operationalization of the central theme.

How can the development and implementation of a course in social entrepreneurship, that is based on a competence based learning model and uses ICT and OER to ensure efficiency and effectiveness, be positioned in the Kenyan context of economic development and reduction of poverty?

The research problem as formulated, needs to be decomposed into several components that need to be investigated. These components are:

- Kenya as a developing country.
- The role of education in development, with special focus on the use of ICT and OER.
- The development and implementation of the course in Social Entrepreneurship.

2.3. Development and entrepreneurship in Kenya

The performance indicators of economic development in use have been criticised and changed over the years. On top of the question what they really measure is the question whether they can really be helpful in the Kenyan context. The question of appropriate development policies and strategies is relevant given the revision of the policies in donor countries and the strong, but recent, development of social society in many so-called developing countries and especially in Kenya.

Framing the notion of development is the purpose of a literature study on the relevant factors that influence Kenya's development. It seems that there are two realities where the description of the economic situation in Kenya is concerned. The formal reports and statistics based on the formal economy provide one reality. It is very clear however that the number of people depending on the informal economy must be very large given the fact that half of the population is living on or under the poverty line. It is even claimed by some people that the term informal economy has been invented in Kenya. It is for sure that the Kenyans have a word for those active in the informal economy: Jua Kali[2]. Taking the informal economy into consideration shows another reality. An understanding of the situation is necessary to feed the discussion on the needs for development.

2.4. The role of education

An important role in development is traditionally given to education. The best example is the UNESCO Education for All program. This program however is mainly focussing on access to primary education for all. Although it is clear that this situation has not been reached in Kenya, considerable progress has been made on the primary school level. This now results in the question what are the next options for further education like professional education or university education.

In the African context next to access to education the quality of education (is it efficient? is it effective? and for what?) is a problem. In terms of access and quality there are some developments in education that need to be considered and judged for their appropriateness in the Kenyan context. As traditional educational systems have not solved (and probably will not solve) the demand for access to good quality education, relevant innovations in education are discussed. This discussion is both on what a real innovation in education is, and what innovations can be identified to be recognized as real innovations. A conceptual innovation – Open Education – is discussed. A more instrumental innovation, Online Learning, is also discussed. A separate quality related question is about the curriculum. What to teach in order to increase the role of education to drive development. Educational for Sustainable

[2] Swahili: hot sun. In the 1980s first used to refer to the informal artisans working under the hot sun because of lack of premises.

Development is seen as a second conceptual innovation in education to be discussed as a framework for the content orientation.

2.5. The course on Social Entrepreneurship

The course on Social Entrepreneurship will be used to experiment with the new educational model for the institution based on Competence Based Learning, Online Learning and the use of OER. The research activities will entail an investigation amongst the stakeholders to discover their support for the new model and to register their response. This will lead to valuable information for the institute for further development of the educational model and the development of an innovation policy for the institute and possibly for the university. When the limitations for general applicability of the results of this study as a case study are taken into consideration, it might still be helpful to others that are engaged in similar projects and can learn from it or get inspired.

2.6. The research question

From the research problem it is necessary to operationalize towards research questions that can be investigated and where answers can be formulated based on measurements or literature analyses. These are the research questions in this PhD study.

2.6.1. Question 1

What can we conclude on the concept of development?
If development is the ultimate goal it is essential to understand the concept of development. A desk research is conducted to look at the concept of development, understand how this concept is used and how this concept connects to the Eastern African region and Kenya in particular. Should the dominance of economic theories in the development discussion be challenged and what are the latest opinions.

2.6.2. Question 2

Can literature clarify the understanding of the role of education in development, particulary for the Eastern African situation and Kenya?

If education is to drive development, what identifies developments in education that support this drive? Developments in education that can be linked to this question are discussed on the Kenyan level, as well as the global level. A desk research reveals the background for the current situation in the educational system in Kenya, against a historical background of colonialism and post-colonialism. Further the literature study focusses on identifying models to judge potential and relevant innovations in education and models that support the policy development to enable the implementation of these innovations.

2.6.3. Question 3

Can the theoretical arguments raised in the discussion on development and innovation in education be translated to the level of course development?

To address this question the development process of the course on Social Entrepreneurship will be used as the research environment. The research will focus on the organisational drive for innovation as well as the demand for relevant and high quality education from the students. The research can be identified as a case study. Where the interpretation of the research results will be limited to the case itself, and therefore on only contribute to general knowledge development in a very limited way. For the institution, its management and staff, it is the first time that strategic developments have been followed in a structural way using scientific methods to document and interpret the results.

2.7. The case of social entrepreneurship

After preparation and selection of design methodology and implementation tools the first stage of the design process is to present these decisions to management, staff, students and alumni of ISMM. These are the stakeholders involved in the process of curriculum development. The presentation is organised in the form of compact workshops introducing the design and implementation decisions. The response to this presentation is captured in interviews with management and staff and in questionnaires and a World Café session with students and alumni. The data gathered will provide indication of support for the educational model and will provide information that can be used to improve the next stages.

The second stage is where the course material is developed. The framework for the course is the outline of a business plan. The course will guide students through the business plan writing process, following the chapters in the business plan outline. Materials for the course are collected and re-used, inspired by co-creation activities organised with students or developed on purpose for the course. The material mix is implemented in the course blueprint.

The third stage will focus on the presentation of the completed course to the stakeholders (management, staff, students and alumni). The course will be part of the curriculum for the BA program replacing the existing course on Social Entrepreneurship. Responses from students on the finished product will be collected. Based on the development and implementation process as well as the first experiences of students, conclusions will be drawn and recommendations will be formulated. Conclusions and recommendations will address the competence based learning model; the used technology; the development and implementation process and student support.

3 Development

3.1. Prologue

Before the relationship between education and development can be discussed it is important to gain better understanding of the complex topic of development. In particular the development of Sub-Saharan African countries. It is all too easy to take theories and concepts from the western world and apply them to other regions as a basis for policies and strategies. It is questionable whether approaches that do not include local and regional differences will bring solutions. Simply by the fact that all the decades of interference with developing countries since the 1940's have not resolved the most urgent issues is proof enough for such a statement. It is therefore relevant to investigate the concept of development: to understand how and why throughout history development approaches have changed. The shift in attention from a focus on material (economic) development to development of quality of life is of particular interest. It is important to understand what actors and factors influence the progress in development to be able to discuss a way forward. In this discussion where Sub Saharan Africa is involved it is inevitable to look at the influence of the colonial era on development as much as it is relevant to shed some light on the progress since independence.

As a basis for the discussion on development the model in Figure 3-1 is used to structure the actors that influence development policy. In the following chapter these actors are discussed in detail.

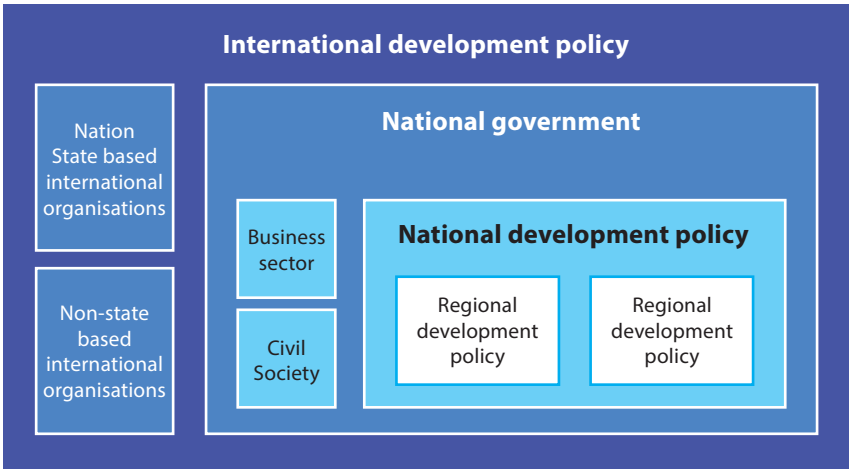


Figure 3-1: Actors influencing development policies

3.2. Focus on economy

What the actors influencing development policy have in common is that there is a strong influence from economic theories. A strong believe that economic growth and development equals wellbeing and prosperity has been dominating development policy for a very long time. It is only since the 1990's that there is room for a broader view, putting the individual people that development policy is targeting in the centre of attention.

Sir William Petty, the 17th century British economist and philosopher (Hull 1899), studied and published on the relationship between expenditures and tax income of a country. Raising money to go to war was an important driver for introducing tax laws on a national level. Petty contributed to the notion of value, introducing an input-based theory: all things ought to be valued by two natural denominations, being land and labour. Both of these would be prime sources of taxable income. Petty additionally favoured the division of labour as a mechanism to raise quality of what is produced and lower the price at the same time by reducing production costs. He was also in favour of full employment, because of the relationship with taxable income. With his work Petty pushed the use of statistics and national accounting. The way the modern world deals with the relationship between labour, resources, production and taxation is still based on these principle notions introduced by Petty and others. From Petty's time onwards the individual's position and interest has become more and more connected to larger economic systems and to the globalised economy of today.

Adam Smith's book 'An Inquiry into the Nature and Causes of the Wealth of Nations', originally published in 1776 (Smith 1776), partly builds on Petty's work although Smith does not mention Petty in his book. The importance of Smith's work lies in the fact that he presented a comprehensive theory that explains the correlation between basic concepts as labour, resources, production and the accumulation of wealth. Smith spoke of a 'system of perfect liberty' reflecting the spirit of his time. That time was defined by a shift (in Europe) from a feudal system to a (liberal) democracy. In the slipstream of these developments the position of the labourers changed dramatically. Where they were constricted in their options to sell their labour for the best price due to commitments to the landlord, this was changing in those days. The Black Death or bubonic plague was haunting Europe since the 14th century and had continuous outbursts, diminishing the number of labourers. Hence land was not used for production as the labourers where not available. Obligations to landlords were relaxed to give labourers the opportunity to move to where the work is to be done (and where there is better pay). At the same time however the strongest pull factor for attracting labour was the city with its factories. With less labourers to work the land, and more profit to be made in manufacturing, the importance of landownership (a fundament in Petty's theory) was reduced and the importance of capital increased (machineries, resources, energy).

Very fundamental is Smith's assumption that the wealth of a nation and the desire for a good life by individuals is served best by producing more goods and services. He makes this clear in the opening sentence of his book (Smith 1776):

"The annual labour of every nation is the fund which originally supplies it with all the necessaries and conveniences of life which it annually consumes, and which consist always either in the immediate produce of that labour, or in what is purchased with that produce from other nations."

Smith argues that the ability of men to barter has brought about the division of labour between people. The division of labour is the one major factor that has boosted the ability to increase production. Given the on-going drive for an increase in production the limitations of the home market stimulate trade and expansion of the market. This drive stimulates innovation and international trade but also the introduction of money as a common medium of exchange. Smith writes:

"Between whatever places foreign trade is carried on, they all of them derive two distinct benefits from it. It carries out that surplus part of the produce of their land and labour for which there is no demand among them, and brings back in return for it something else for which there is a demand. It gives a value to their superfluities, by exchanging them for something else, which may satisfy a part of their wants, and increase their enjoyments. By means of it, the narrowness of the home market does not hinder the division of labour in any particular branch of art or manufacture from being carried to the highest perfection. By opening a more extensive market for whatever part of the produce of their labour may exceed the home consumption, it encourages them to improve its productive powers, and to augment its annual produce to the utmost, and thereby to increase the real revenue and wealth of society" (pp. 742/743).

The times of William Petty and Adam Smith were an era where the nation states were the evolving concept in Europe and beyond (USA established in 1776). The academic debate (although interesting as such) of what came first the nation (from nationalism) or the state (Wimmer & Feinstein 2010) is not relevant here. Nor is the discussion relevant here on what philosophy the government of such a state is to follow to run the state affairs (liberal, socialist, communist).

What is relevant for the arguments used later in this thesis is that the nation state today is the de facto situation, where the government is responsible for the defence of the nation's territory and certain public affairs (education, health care, income distribution, taxation, human rights). They all finance this out of tax income. The instruments used for taxation are mostly based on theories and notions dating back to the work of Petty and Smith (and others given their political orientation). Basically all nations work from the concept that economic activity is to be expressed in

(money) value so that exchange can be based on the derived value and values can be accumulated in national statistics. This presumes that all citizens perform this kind of economic activity and that it is possible to accurately take stock of the nation's wealth. Each nation strives to reach a situation where production is organised in the most optimal way and where surplus production is exported elsewhere. Goods and services needed can then be purchased with the money gained in trade. Hence introducing the importance of a stable currency exchange system for international trade that will be discussed later. Arguments will be presented that these assumptions are not correct in certain cases. Therefore in certain cases the discussion on development is blurred because the basic assumptions for the discussion do not apply. Especially the work of Amartya Sen (Brown 2010; Sen 1992; Sen 1999) will be used to provide argumentation for an approach to development that is more human centred and less income centred.

The wellbeing of individuals is influenced by the national income, requiring individuals to connect to the national system (both the economy and the political system) to benefit from the accumulation of the wealth of a nation and to benefit from the redistribution of some of this wealth through the services provided by their government. The wellbeing of individuals is also depending, through the ongoing optimization of production, on their options to connect to the international market place and their ability to compete on that platform. In other words by developing specialised labour possibilities all individual citizens should have a place in the national economy in order to build a secure and satisfying life (at least achieve the basic freedoms (Sen 1999)). Those not fully connected to the national economy operate outside the system and are supposed to operate in the informal economy. Those not connected to the national economy and therefore not to the global market are left in a marginal position, either self-supporting or depending on aid, mostly on a level of poverty and vulnerability. This not only is the situation for the people living in remote areas in developing countries, it is also the case for the millions of refugees driven from their homes in areas of conflict. In fact it is true for those living in areas where because of globalisation production facilities have been shut down and no alternative employment is available.

From the international perspective it is argued by Smith that international trade is key to the chances for development of every nation. Access to markets therefore is an important factor in international politics up to today. One could argue that the movement of development aide that evolved in the 1950's is a product of human interest and the growing notion of Human Rights as well as an attempt to stabilise and develop the global market place to secure future accumulation of wealth to meet the ever growing demand. All this however can only function to the benefit of all when access to international markets is open to all and the power balance between seller and buyer is levelled.

The present-day discussion on effective development policy still takes the long standing notions on economic growth and development into consideration, but also addresses the imperfections in the current system of identifying development indicators and the inequalities in access, options and power-balance on the globalised market. In this chapter I will address the notion of development with a focus on nations that traditionally have been indicated as developing countries.

3.3. The birth of the concept of developing countries

There is no clear and generally accepted definition of what makes a country a developing country. The Wikipedia definition is: "A developing country, also called a less-developed country (LDC), is a nation with a low living standard, underdeveloped industrial base, and low Human Development Index (HDI) relative to other countries. There is no universal, agreed-upon criteria for what makes a country developing versus developed and which countries fit these two categories, although there are general reference points such as the size of a nation's GDP compared to other nations." [3]

What is introduced in this description is the fact that the definition in one way or the other is connected to some statistics and indexes. Before examining the nature and meaning of these indexes and look at the world of difference between the use of GDP[4] and HDI[5], the use of the term developing country in the context of this thesis has to be discussed.

Generally the term developing country is referring to countries that have, compared to other countries, a weak economy. Weak is the term used here to indicate that the economy does not succeed in creating enough economic activity that results in a level of accumulation of wealth that enables all its citizens to live on an generally accepted minimum level. In the context of the discussion before one could argue that these countries have not progressed as far as others in terms of division of labour and maximizing production of tradable goods (Smith 1776). Or alternatively these countries have not (yet?) succeeded in offering the freedom to individual citizens to live the live they value (Sen 1999). Following the ideas of Smith industrial production is seen as an advanced way of division of labour, increase of production and increase in the quantity of tradable goods. From this basic assumption the concept of the 'Three sector economy' has been described by Colin Grant Clark (Meier & Seers 1984), one of the pioneers involved in the development of the GDP. According to the 'Three sector economy' concept, every country has to develop from an agricultural based economy through an industrialized economy to a post-industrial economy where value is added

[3] https://en.wikipedia.org/wiki/Developing_country, accessed November 15, 2016

[4] GDP: Gross Domestic Product

[5] HDI: Human Development Index

by services. In other words development into a post-industrial service based economy ensures a growth in GDP that will cater for the wellbeing of all citizens as it is seen as the optimal way of division of labour. Development policies have been based on this assumption. But analysis of the development of countries shows that an increase in GDP is to narrow a concept to explain development (or lack of development). Johnson & Bourguignon (2006, p.65) in a World Bank study simply conclude: '*the broad picture is that the rich are getting richer while the poor are getting poorer'.* Kaufmann (2008) in a World Bank Special Report on aid effectiveness and governance addresses the connection between the political agenda of donors and the ineffectiveness of aid programs due to governance issues (corruption) on the side of receiving governments. Johnson & Bourguignon (2006, p.68) discuss the relationship between increase in GDP and population growth. Where the population grows fast, countries need to increase their GDP just to maintain the same level of 'wealth'. Stiglitz (2009, p.8) formulates the GDP discussion as follows: '*When there are large changes in inequality (more generally a change in income distribution) gross domestic product (GDP) or any other aggregate computed per capita may not provide an accurate assessment of the situation in which most people find themselves. If inequality increases enough relative to the increase in average per capital GDP, most people can be worse off even though average income is increasing*'.

The arguments put forward that a pure economic view on development is too narrow to enable understanding could be summarized in two main groups. The first group looks at the position of the states in the global system and concludes that the countries considered under-developed do not have equal access to the (globalised) market. The second group looks at the internal situation in the country itself were one could argue that all the individuals in the population of these countries do not have equal access to the countries mechanism of redistribution of the nation's wealth (Johnson & Bourguignon 2006; Stiglitz et al. 2009; Sen 1999; UNDP 2012). Especially for those countries e.g. in Africa that are known for their abundance of natural resources one might even post the statement that the so called developing countries actually do have the means and economic bases to feed, house, educate and take care of their citizens, but because of malfunctioning redistribution of the nation's wealth it is not happening (Johnson & Bourguignon 2006).

3.3.1. Colonial systems

Most countries now considered developing countries have a history of colonialization. Some former colonies however are now considered developed countries. It is therefore of interest in the development discussion to take a closer look at the colonialization models and understand how they lay a basis for development. In colonialization two basic models apply. Adam Smith already (1776, chap.VII) gives an adequate analyses of these models and its variations. The first model is where the surplus of population in an area immigrates to a new territory and starts a settlement that more or less is a copy

of the motherland. The economic model, society and rules and regulations are taken from the motherland. The level of control of the motherland over the colony seems to influence the growth pace of the colony. The looser the link with the motherland the faster the colonies thrive (Lange 2004; Nunn 2007). The second model is that of private initiative in search for wealth (e.g. gold and the slave trade), sanctioned by the government of the motherland. In this model the motherland mainly takes a percentage of the profit from the colonies but leaves the running of the colony to the private initiative. Smith (Smith 1776, p.452) describes the development of the Spanish and Portuguese colonies in Latin America to explain this model. While looking for an explanation for large differences in income per capita between countries, it is assumed that the institutions governing the country and the system of property rights are important factors (Acemoglu et al. 2001, p.1369). In parallel with Smith, Acemoglu et al (2001) distinguish two models of colonialization. The extractive model, where the major goal was to extract natural wealth from the colony and ship the resources to the mother country. '*These institutions did not introduce much protection for private property, nor did they provide checks and balances against government expropriation. In fact, the main purpose of the extractive state was to transfer as much of the resources of the colony to the colonizer*'(Acemoglu et al. 2001, p.1370). The second model is the migration and settlement model. '*The settlers tried to replicate European institutions, with strong emphasis on private property and checks against government power*' (Acemoglu et al. 2001, p.1370). Acemoglu et al (2001) further assume that the choice between the models was dominated by the settlement conditions in the colony. A relatively healthy environment (e.g. not subject to tropical diseases) stimulated settlement. In their empirical studies Acemoglu et al (Acemoglu et al. 2001, p.1372) conclude that Africa is poorer than the rest of the world not because of pure geographic or cultural factors, but because of worse institutions. This conclusion is supported by the findings of another study focussing on the impact of European institutions introduced during colonialization on development (Acemoglu et al. 2002; Lange 2004). Mainly the organisation of society through these institutions, where the focus is on incentives and opportunities for investment (Acemoglu et al. 2002, p.1234) explain for the difference in growth of GDP over time. Nunn (Nunn 2007, p.158) points to the security situation in Africa over time linking it to the slave trade as one of the important determinants of Africa's poor performance: the widespread presence of robbery, theft, fraud, corruption, and civil conflict, citing a World Bank report (World Bank 2005a).

The turning point for colonialization was the end of the Second World War (WWII). The British Empire lost its position as the world's leading nation to the USA and Europe was in ruins. The USA (a former colony) promoted the right of nations for self-rule and independence. In the early 1960's Meriwether (2008, p.739) concludes a strong relationship between the growing number of African states gaining independency, the importance of African American votes for the presidential campaign and the de-colonialization policy of the Kennedy administration. The growing number of

independent African nations joining the United Nations, the World Bank and the IMF changed the focus of these organisations (Woods 2006; Boskey 1957; Stephey 2008). Firstly these organisations were established to bring Europe and its economy back on its feet, to block the increasing influence of communism in Europe and to increase and secure market opportunities for US products. Secondly it was important to prevent system failures that could lead to global armed conflict, like the Great Depression. Stable systems of currency exchange were needed and the IMF was created. Where the Gold Standard had failed (Frankel 2003; Frankel et al. 2008; Schuler & Rosenberg 2012) and the Great Depression followed, it was replaced by the US Dollar as the currency of reference creating a more flexible system. The effect of WWII was that a new world order became paramount. Two blocks representing opposite philosophies on how to arrange the world economy had emerged. The Western block lead by the USA and the Eastern bloc lead by the Soviet Union. It was in the interest of the leading states of these blocks to release the ties between the European Empires and their colonies. This would create better access to the resources and markets in these colonies to serve their economic and political interests.

3.3.2. The influence of the colonial systems after independency

For the former colonies the period of occupation and the way independence was achieved are directly influencing the situation in these countries, and some effects are still experienced today (Bertocchi & Canova 2002; Lange 2004; Bell 2010; Acemoglu et al. 2002; Acemoglu et al. 2001). During the period of occupation regional entities were created according to the needs and wishes of the colonising power and as the outcome of armed conflict with the competition in the area. When independence arrived, again these entities created randomly form the basis for the new nations. In the process many sources for future conflict where introduced. Groups of people with a similar ethnic background suddenly found themselves in different colonies and later in different independent nations. Groups of people that traditionally moved around in an area, suddenly were confronted with borders. At the same time different ethnical groups and or groups with a different religion or different economic background were joined in one nation. In some cases new countries were formed out of former colonies, where the new countries were cut off from valuable resources (fresh water, the coast, migration routes, etc.). These ingredients in itself form the basis for internal conflicts in the newly formed nations and conflicts between nations.

The way the occupation resulted in a system of local administration and local economy to serve the home countries national interests defined the situation at Independence Day (Lange 2004; Bertocchi & Canova 2002). When occupation started Empires started to invest in colonies as part of their national economic policy (Bell 2010, p.36). Support for the administration and to introduce the state supported public services regarded necessary, money started to flow towards the colonies. It is important to realize that in the relationship between colony and motherland the money flow was bi-directional.

The discrepancy between the development regarded necessary in a colony and what a country needs when it becomes independent is quite large. It is e.g. in the interest of an occupying nation to suppress groups in the population by awarding privileges to competing groups in the region. In colonies ethnic rivalry has been introduced that destabilised nations after independency and prohibits development of democratic features. In his study Lange (2004) emphasises the difference between direct and indirect rule, where indirect rule involves local leaders. Another example is the introduction of an educational system educating the local elite to enable them to enter the local administration and serve the home country. This is not the system a young independent country needs to develop a civil society that can contribute to the development of the nation (Lange 2004; Bertocchi & Canova 2002). On the other hand one can also wonder if the new ruling elite of the independent nation wants to change the inherited system. Certainly the continuation of the bi-directional money flow (now called trade and development aid) based on the model used before, would not automatically benefit the now independent former colony, but would indeed benefit the ruling elite.

It can be concluded that the gap in development of most African countries against the western countries or within most Asian countries has some roots in their colonial history. The colonial model (extraction or settlement) and the model used for ruling the colony (direct or indirect rule) seem to be of influence. It seems that after more than 50 years of independency it is relevant to study the organisation of a countries society and how it evolved during independency to understand its level of development.

3.4. Instruments for international development policies

The commitment that governments around the world have made to development is reflected by the establishment of nation state controlled global organisations like the United Nations[6]; The Worldbank[7] and the IMF[8]. In addition regional organisations are established to further regional collaboration and development (AFDB[9], ASEAN[10], EU[11], OAS[12], and OECD[13]). The actual performance of the UN system can be seen as

6 http://www.un.org/en/documents/charter/preamble.shtml

7 http://www.worldbank.org/en/about/what-we-do

8 http://www.imf.org/external/about.htm

9 http://www.afdb.org/en/about-us/mission-objective/

10 http://www.asean.org/asean/about-asean/history

11 http://europa.eu/about-eu/eu-history/index_en.htm

12 http://www.oas.org/en/about/what_we_do.asp

13 http://www.oecd.org/about/history/

All eight websites above are accessed on May 25 2015.

an indicator of political determination of the individual nations to actually act in line with the mission of this organisation. The World Bank nowadays represents the global financial toolkit for development, and the International Monetary Fund represents the ambition for international monetary stability. Looking at the shifting missions and achievements of these organisations over the last 60-70 years could shed some light on the process of development.

Overexposure of the importance of the global nation state based organisations is not doing justice to the sectors in society on the national level. Of course the public sector under the authority of the national government is an important sector to be discussed, as it is directly responsible for the development and implementation of development policies as well as educational policies. Non-governmental organisations (NGO's) have played an important role in the development agenda. That role however is more on the project level, operating within the framework of internationally accepted policies and international agreements. A special position for NGO's is in disaster relief. Having people on the ground enables NGO's to respond quickly. Because of their experience with project implementation NGO's have very extended and well developed local networks. This enables them to be the first to respond to disasters and to arrive in the disaster area in a relatively short time. These same NGO's however also have played and still are playing an important role in awareness raising and in shaping international treaties and policies like The Geneva Convention, The Universal Declaration of Human Rights, and the Millennium Development Goals. Finally the accumulation of wealth, the basis for income and economic prosperity is within the economic sector dominated by the private sector in most countries. The role of the three sector society in development in Africa is discussed in paragraph 3.5.

3.4.1. The United Nations

Joining forces for mutual benefit is a strategy of all times. By the end of the 19th century nation states started to use this strategy to build alliances and international collaboration. The first alliances were on communications and postal services (UN 2013). With warfare becoming more and more destructive and conflict areas increasing to the global level (World War 1) alliances where built to keep and promote peace, and work on peaceful conflict resolution. The first attempt to create a global body to work on peace issues (The League of Nations) failed to prevent the Second World War. During the Second World War the foundations were laid for what is now the United Nations. Immediately after the war (October 1945) the UN where founded. Up to now the UN still engages in efforts to resolve conflict, and deploy peace keeping forces in several conflict areas. Next to this agenda the UN has become the major global player for development assistance. The current UN organisational structure shows a broad commitment to all issues related to development (http://www.un.org/en/aboutun/structure/index.shtml) following from the purpose as stated in its charter:

1. To maintain international peace and security, and to that end: to take effective collective measures for the prevention and removal of threats to the peace, and for the suppression of acts of aggression or other breaches of the peace, and to bring about by peaceful means, and in conformity with the principles of justice and international law, adjustment or settlement of international disputes or situations which might lead to a breach of the peace;
2. To develop friendly relations among nations based on respect for the principle of equal rights and self-determination of peoples, and to take other appropriate measures to strengthen universal peace;
3. To achieve international co-operation in solving international problems of an economic, social, cultural, or humanitarian character, and in promoting and encouraging respect for human rights and for fundamental freedoms for all without distinction as to race, sex, language, or religion; and
4. To be a centre for harmonizing the actions of nations in the attainment of these common ends.

The motivation for the establishment of the UN at first glance seems straight forward. After failing to prevent the Second World War from happening, causing horror and suffering to millions of people and destruction of property around the world, the international community was looking for an escape out of armed solutions for conflicts. As these conflicts would mostly arise between nations, an agreement between nations to resolve conflicts without taking to arms was a hopeful development. In due course the UN refined its mission according to the Millennium Report and developed a set of aims to work on. Eventually one could say that these aims developed into the Millennium Development Goals[14]. From the early years back in 1945 to the adoption of the MDG's in September 2000 the United Nations has changed in many ways. With the MDG's the UN members committed themselves to targets well defined and a clear deadline (2015).

But has warfare, armed conflict, suppression, poverty, denial of rights been eradicated? Obviously the answer is no. The latest report (United Nations 2013) on the achievement on the Millennium Development Goals so far shows progress in many areas, but not all. And where progress is made it differs from area to area and from country to country. The control mechanism the UN is supposed to be is not working at all times and in all places.

3.4.2. The Bretton Woods System

At 'The International Monetary and Financial Conference of the United and Associated Nations' in Bretton Woods, USA, 1944, a well prepared conference of 44 allied states took place. The result of that conference is now referred to as the Bretton Woods

[14] http://www.un.org/millenniumgoals/bkgd.shtml, accessed May 25, 2015

System (Boskey 1957; Dooley et al. 2003; Ikenberry 1993; Schuler & Rosenberg 2012; Stephey 2008; Woods 2006). At this conference the first mission was on the establishment of the IMF. The goal was to bring exchange rate stability to the international monetary system and to encourage members to eliminate exchange restrictions that hinder trade. The agreement on the IMF is remarkable as it balances the interest of large and small economies, despite the dominance of the US and UK delegations at the conference. The core of the problem the IMF was to solve is the establishment of the value of the different currencies issued by the world's independent governments. In international trade it was and still is essential to have a system that regulates the relative value of a currency against other currencies. The value of a countries currency reflects the economic power (in terms of production and purchasing power) expressed in a way accepted by other nations.

The second focus point in the Bretton Woods conference was the need for economic reconstruction of Europe. This would ensure stability in the region and prevent new wars. At the same time would a strong block in Western Europe be helpful in containing the communist powers in the East of Europe and Russia.

Unlike the UN the World Bank did not have a broad global mission from the start. On the World Bank website[15] is written: '*Our mission evolved from the International Bank for Reconstruction and Development (IBRD) as facilitator of post-war reconstruction and development to the present-day mandate of worldwide poverty alleviation in close coordination with our affiliate, the International Development Association, and other members of the World Bank Group, the International Finance Corporation (IFC), the Multilateral Guarantee Agency (MIGA), and the International Centre for the Settlement of Investment Disputes (ICSID).*' (Woods 2006; Stephey 2008). At the conference in 1944 the focus was on a system to prevent inflation and currency devaluations and to prevent a feared post-war economic depression. This focus resulted in the institution of the International Monetary Fund (IMF). The Bank initially was thought to provide the loans to rebuild destroyed assets. But development was written into the agreement thanks to the Latin American countries present, that did not need reconstruction themselves, but were more interested in development (Boskey 1957). The transcripts of the actual conference are now published in full detail and offer a rare verbatim record of what delegates to a major international conference said in a situation where they expected most of their remarks to remain unrecorded (Schuler & Rosenberg 2012).

3.4.3. Beyond the Bretton Woods System

Before the introduction of paper money, the value of money (in coins) was directly connected to the weight in gold or silver that the coin represented. For centuries the supply of gold and silver was relatively stable and depended on the production

[15] http://www.worldbank.org/en/about/history, accessed on October 8, 2013

capacity of the known gold and silver mines. This stabilised the value of the coins in circulation, but also blocked growth when industrialization started to take off. Paper money was introduced by the Chinese in the 11th century (Iavorschi 2014) and the concept has been used throughout the following centuries, where its success was clearly related to the convertibility of the paper to gold or silver. Paper money was introduced by nation states to solve the problem of the shortage of gold and silver available to make coins that arose in the 18th century. Another practical reason was that paper money is easier to transport than gold or silver. In 1844 through the Bank Charter Act the British government regulated the Gold Standard by awarding the Bank of England the monopoly to issue paper money that was backed by gold. In other words the paper money was still convertible in gold directly. Exchange rates between currencies was defined by each currencies value against gold. The system prevented governments from printing more money than the domestic economy could support, based on the trade balance with other countries. A negative trade balance for one country would create the obligation to transport gold or silver to the other country to restore the balance. When the country failed to do so, the trust in the currency would devaluate and so would the purchasing power. A country could simply not print more money, for which it did not have the gold in stock, without risking to lower its purchasing power against other currencies (causing inflation).

The events in the first decades of the 20th century (Great Depression and World War 1) caused the European governments to violate the rules connected to the Gold Standard. This was the reason for the US administration of that time to take over. The agreement leading to the IMF replaced the original Gold Standard system and was based on the US Dollar as the gold convertible exchange. All other currencies where now valued against the US Dollar, giving the US the central position in the global economy. Convertibility to gold was abandoned and replaced by convertibility into the US Dollar. This new system was built on the agreement that the US government would convert a US Dollar into gold at USD35 per ounce of gold. This provided the nominal anchor for the exchange rate system. This convertibility is the heart of the Bretton Woods System. Governments could now sell gold to the United States treasury at the price of USD35 per ounce. Instead of a gold reserve, countries would now build a US Dollar reserve. This reserve would then be used to balance trade deficits and stimulate the economy. Ultimately, Bretton Woods collapsed in 1971. It was under pressure in the 1960s with a series of "competitive devaluations" by the UK and other countries who were facing chronically high unemployment due to persistent trading problems. Ultimately, the system collapsed when the US administration decided to suspend USD convertibility to be able to spend more money than was backed by the gold reserve. The need to do so was triggered by the high cost of the Vietnam War. This was the final break in the links between a commodity that had intrinsic value and the nominal currencies. From this point in time governments fiat currency is the basis of the monetary system. The fiat currency money system is based on trust,

where governments are trusted that they make sure that goods and services can be purchased with the money they issue. Since then the world economy has shown growth rates as never before. The so called new economies (the BRICS countries) developed rapidly and more and more former colonies turned to the IMF to get their internal financial affairs in order. Looking back even experts involved in these processes at the time now conclude that, although the fundamentals of the global financial system changed with the failure of the Bretton Woods system in 1971, the economic models, and solutions applied after this date to analyze and solve economic problems are still the same (Stiglitz 2000; Stiglitz 2003; Stiglitz 2006; UNDP 2012). That this is risky has been shown by many examples where national governments have broken the trust based system causing high inflation rates. The system of floating exchange rates can create severe problems for developing countries, when their financial sector is fragile, and relying on financial injections in dollars (through the IMF), causing strong balance sheet effects (Kwan 2000). The Argentina crisis, and other examples show that the answer to these problems is not easy to find and mistakes can cause loss of jobs and deep recession (Stiglitz 2002; VanGrasstek 2013)

3.4.4. Can the international community gain control over development?

In a way the Bretton Woods System, and especially the attention for development in the work of The World Bank, was a return to the macroeconomics of growth and development as introduced by Adam Smith and similar thinking scientists. The difference was that the focus was now on the Asian, Latin American and African countries (Meier & Seers 1984). Another difference was that now the United Nations were the platform of discussion. Because of the membership of large numbers of countries that were former colonies, the power balance in the UN shifted. Leaders of developing countries demanded attention for the need for development of their economies.

With the establishment of the Bretton Woods System a new notion of development economics arose, different from the colony economics that were in use before. The motivation for this change was based in the changes of power and thinking at the end of World War 2. The fear that the new nation states (the former colonies) would, because of social unrest caused by lack of development, fall under communist influence was one. Also the new ideas of humanitarian rights, and equality for all (used in the war as propaganda) now reached out to the people in the developing countries believing that mankind had the power to control the development of its own species. The work of Armartya Sen (Sen 1992; Sen 1999) was instrumental in changing the way the development problem is addressed since the 1990's.

In practice the discussion was on finding a balance between the wish of industrialized countries to buy raw materials at a low price and developing countries to be able to establish a home industry able to compete with imported products. Industrialized

countries base their income largely on making a profit by adding value to the raw materials imported and selling the end product on the global market. Developing countries wish to develop a home industry to be able to do value addition to their raw materials and sell end products on the global market or at least on the home market. The result was a series of agreements where developing countries where allowed to create protection programs and policies to protect their emerging economies and especially stimulate industrialization (GATT 1949; Bhala 2002).

The period following the collapse of the Bretton Woods System, was extremely difficult for the developing economies of the former colonies and other so called developing countries. The role of the IMF changed from the spider in the web of the Bretton Woods System to the global monetary watch dog. The IMF started to play a central role in the development policies of the developing economies, issuing loans and dictating the conditions for these loans. This approach forced loan receiving governments to adopt their fiscal and monetary policy to repaying the loans. Budget cuts on education and other public services as a consequence of the IMF dictates resulted in economic regression and an increase in debts and the interest on debts. Ultimately this approach resulted in the Multilateral Debt Relief Initiative (IMF 2013). One of the major causes of the failure of development policies through international organisations is that development was strictly seen as economic development (Meier & Seers 1984), and did not include development of governance and democracy (Stiglitz 2000; Stiglitz 2003; Stiglitz 2006). Another factor that can block decision making for further development is the hidden agenda of member states in international organisations, especially in the UN Security Council, where the permanent members have the veto right. Member states can use the international organisations to pursue political goals that are not directly related to the issues on the agenda, or simply ignore decisions taken on such podia, as long as they are backed by the most influential members. Even more complex are the conflicts within countries, (Rwanda, Liberia, Sudan, Libya, and Syria) where it becomes almost impossible for the international community to act. Last but not least a new shift of power is taking place over the last decades. Did under Bretton Woods the US take over from the British Empire, now the oil rich Arab States, a revived Russia and especially economic giants like China claim their position at the negotiation tables of the international organisations. This situation results in a more dispersed picture of power groups, and does not seem to make the international community more capable of reaching global peace and the development goals.

3.5. A three sector society in Africa

The effect of development ultimately should be experienced by the individual citizens in a society and not only in statistics and economic reviews. If development is freedom (Sen 1999) individual citizens should be able to live the life they choose. On the local, regional and national level this requires a political and economic system in place that allows for this freedom on the individual level. In the eyes of many politicians,

donor organisations and individuals a society that offers such freedom should be based on a democratic political system and a liberal economic system (Mercer 2009; Mitaru 2009). An in-depth analyses of the political and economic systems in Sub-Saharan states and the relationship with development in those states is an interesting topic. But it is not attempted here. In this thesis I take a closer look at the actors in democratic political systems as they exist e.g. in European states. Actors in the political system organise themselves in groups next to the political parties that represent the citizens in the government. Some of these groups are pressure groups challenging the government for transparency or to promote their particular interest. These groups have many different features, targets and organisational structures. There are grassroots organisations (GRO); non-governmental organisations (NGO); youth groups; women groups, etc. This phenomenon is of interest as many (international) organisations believe that these groups can play an important role in creating a society that will provide the freedom for development (Mercer 2009). The general idea is that in a balanced society, geared for development, the balance is between the influence of three sectors in society: the governmental sector (the state government and its agencies); the economic sector (businesses) and the third sector also called civil society (Makumbe 1998; Fadakinte 2015). The concept of civil society is of interest in the development discussion, because it is believed that where in African states the three sector society is not yet existing, these states can be transformed by introducing the civil society. This assumption is challenged in the literature (Fadakinte 2015; Devarajan et al. 2014; Chaplowe & Engo-Tjega 2007). The conclusion is that although the civil society is a strong concept, it cannot be transplanted into the African context. A form of civil society is emerging in Africa but there are serious challenges (Chaplowe & Engo-Tjega 2007; Devarajan et al. 2014; Makumbe 1998):

- Civil society organisations operate within the boundaries of what the government allows and the government is mostly more interested in the status quo and not in transformation including a shift in power and control.
- Civil society can operate if strong players are on board. In African countries some groups that are considered civil society groups (trade unions e.g.) are not always on board. These groups (through the mechanism of clientelism) have more to gain when maintaining the status quo.
- Civil society groups do not have the same interests. In African nations these groups can be organised along ethnic and religious lines e.g., which means that they pursue particular interests that are not shared by others.
- Civil society group activities are in many cases targeting the efficiency and transparency of the government agencies in the execution of government policies. Corruption and other issues play a role here. But without support from national government, or the political system, the effect in terms of change or transformation of society is minimal or non-existent.
- Local civil society organisations like GRO's and NGO's lack the most important basic facilities. They are mostly poorly financed, lack well trained staff and are not by

definition democratic themselves in their operations. Most of these local groups rely on donors or the state, which is no guarantee for autonomous operations.

The hope and believe that civil society can transform a society into a status where democracy; transparency and governance can be the cornerstones of a society that is geared towards development cannot be supported from the existing literature. Nevertheless civil society organisations play an important role in the lives of the people living in poverty or confronted with disaster. International donors (World Bank; International NGO's; and others) work through local civil society organisations to avoid the corruption in the governments involved (Brass 2012b). But their effectiveness can still be questioned as they are not working from the needs and motivations of the people involved. They operate from programs and agendas designed in headquarters far away from the lives of those living in poverty. '*The aid industry is fraught with donor self-interest and political/economic priorities that often supersede the missions of civil society organisations.*' (Chaplowe & Engo-Tjega 2007, p.265). Finally the international NGO's and other international organisations always have to consider their relationship with the government. To be able to operate they need permissions and licenses. Being expelled from a country is the most direct way of no longer being involved (Brass 2012a).

The business sector can play a role in the development of civil society. For businesses the interests of development and the business can go hand-in-hand. E.g. it has become common amongst multinationals to have a Corporate Social Responsibility program. The Global Reporting Initiative (Global Reporting Initiative 2014) supports multinationals to report on their contribution to development on a continuous (annual) basis. Multinationals have developed the policy to produce a sustainability report next to their annual financial report. Amongst these companies are top brands like: The Coca Cola Company, Shell, Caterpillar, Ford Motor Company, Heineken, Unilever and Toyota and many more. The advantage for multinationals when engaged in development issues is that they are so to say footloose. They are not controlled by governments, they operate according to the policies of their boards and the control of owners or stakeholders. Multi nationals move capital and production capacity across boarders according to company policy (Dahlman 2007, p.51). This is irrespective of the fact that multinationals too have to operate within the laws of the countries where they are active. This requires companies to train employees in new technologies in places where they move production. This way companies contribute to the spreading of knowledge. Next to the factors related to production and the company's core business other drivers to engage in development can be strong. One of these strong drivers is reputation (Hedberg & Von Malmborg 2003; United Nations: DESA 2007). Reputation is important to respond to the demands of critical customers as well as the general public. The annual sustainability reports are meant to build reputation. Reputation is also important in sectors that rely on high skilled labour. It is an important factor to attract and keep key

personal that is critical on sustainability and development issues. Reputation is also working for the business itself as it provides the business a profile that employees like to identify with. The business sector has organised its sustainability efforts in several ways. The GRI is one way. Another level of international organisation is the World Business Council on Sustainable Development[16], which has a program towards sustainability and society development supported through a network of over 60 multinationals. The majority of the economic activities in Sub-Saharan Africa is however only lightly touched by these initiatives. The main purpose of these initiatives initiated by multinationals is not to rapidly overthrow the systems in the countries they operate in. The interest of these companies is in political stability and protection of their investments. The focus is therefore on a more long term gradual development.

The numbers of jobs provided by international companies is limited considering the pool of potential workers. In countries where around 50% of the population is under 25 years of age, large numbers of individuals are looking for jobs. On the other hand the economy is still mainly agricultural based (often largely on a subsistence level), with more than half of the population living in the countryside (Kenya National Bureau of Statistics 2014). A study by Nyaga (2010) on the income distribution in Kenya shows e.g. that the unemployment rate for Kenyans between 15 and 64 years of age, varies within the country between 25% and 53%. The formal sector of the Kenyan economy accounts for 24% of the jobs available. The informal sector and small scale (subsistence level) farming account for 75% of the jobs.

An interesting phenomenon that evolved in the Africa is that of the informal economy. Large numbers of craftsman and women and professional workers have started their own business, but are not part of the formal economy. In Kenya e.g. these businesses are known as Jua Kali (King 1996; UNESCO/UNEVOC 1997). To be able to survive these businesses rely on the government to no harass them and occasionally even issue permits and allocate land to set up businesses. Consequently the Jua Kali are not the fiercest transformers of society as they benefit from the status quo.

3.6. Measuring development

The development discussion benefits from the efforts to capture development in measurable indicators. The use of indicators is relevant as far as it provides a comprehensive image of the growth of the economy of a country, the level of education, life expectancy and other indicators relevant to monitor development. The ideal is to have an integrated indicator that summarizes the situation at a point in time in one figure. This approach has for several decades dominated the discussion featuring the GDP (Gross Domestic Product). Out of the necessity of war planning the USA administration developed this type of indicator out of the national statistics available in the 1940's on

[16] http://www.wbcsd.org/about.aspx, accessed on July 28, 2015

the US economy. Basically it comes down to the difference between the real and nominal price of commodities, depending on the cost to produce or acquire these commodities. The initial indicator developed was the GNP (Gross National Product). The GNP is standardized by Simon Kuznets (Fogel 2000; Goldthwaite & Abramovitz 1986), who contributed to the development of the empirical tradition in economics in general and national income accounting in particular. Kuznets worked on the national income accounting during World War II to set production targets for both the military and civilian sectors of the economy, and to guide the implementation of those targets (Fogel 2000). When the use of this type of indicator became more important and influential in government economic policies, a switch was made to the GDP, putting a focus on the production taking place within the national boundaries that could be controlled (e.g. tax-wise) by the authorities. Of interest for further discussion however is that Kuznets opposed to the use of GNP or GDP as a general indicator for welfare.

3.6.1. GDP and other indicators for development

Despite the warning issued by Simon Kuznets involved in the initial development of the GNP/GDP indicator (Fogel 2000; Kuznets 1934; Syrquin 2011), it became fashionable to use this indicator to measure the success of development policies. The assumption was that economic growth would lead to the growth in wellbeing. If growth of the GDP does not occur the index however is not detailed enough to explain developments in a country. As an example: Kenya joined the ranks of nation states in 1963. A national bureau of statistics was founded (KNBS 2012) that collects the data necessary to calculate the GDP annually. Figure 3-2 shows the GDP of 4 countries per head of its population for a period of 10 years calculated in USD corrected for inflation.
The countries are Brazil and China (2 of the BRIC countries), The Netherlands

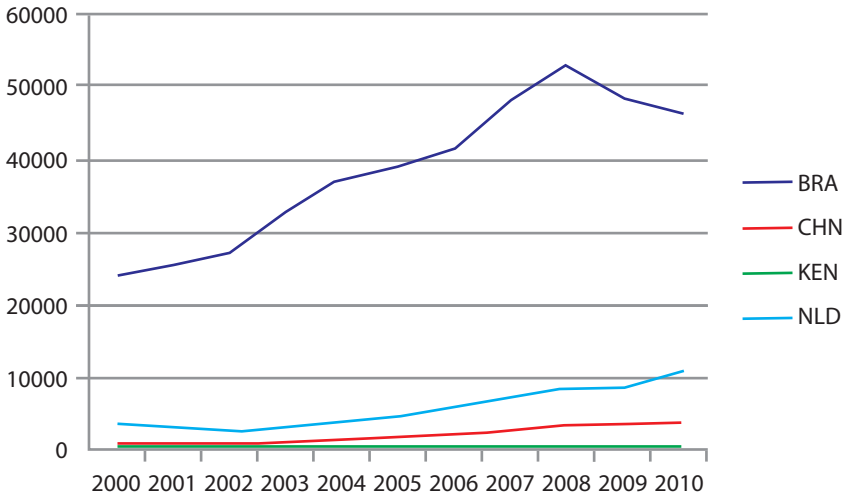


Figure 3-2: GDP per capita (current US$) 2000 – 2010. Source: World Bank

representing the top 10 GDP countries and Kenya. The table shows that for Kenya the indicator has hardly changed over the ten year period. Where China had a similar starting point in the year 2000, the GDP shows a steady growth. The growth in Brazil is strong and the effect of the global financial crisis is showing in the results for The Netherlands since 2008. The advantages of the use of an indicator as the GDP are obvious if countries are compared.

At the same time reports state that Kenya is amongst the fastest growing economies of the last five years (2011-2014) with a growth rate of 5% (Kenya National Bureau of Statistics 2014).

One of the pillars under the economic theories is the division of labour as introduced by Petty and Smith (see paragraph 3.2). Building on this theoretical basis it is argued that division of labour is more effective and has more opportunities in an industrialized economy. The options for division of labour in an economy based on agriculture are limited. For this reason in terms of development the notion of the 'Three sector economy' has been described by Colin Grant Clark (Meier & Seers 1984), one of the pioneers involved in the development of the Gross Domestic Product indicator (GDP). As an economy industrialises the options for division of labour increase. Therefore the shift from an agricultural economy through mechanisation of this agriculture to an industrial economy is seen as a positive development as it leads to a potentially larger GDP. The ultimate step in development in this hypothesis is that an industrialized economy will develop into a service based economy as the highest reachable level.

Looking at the situation in Kenya (Figure 3-3) it is inconclusive. A services sector is developing and is already employing five times the number of people in the industrial sector. But at the same time the agricultural sector still has not mechanised in such a way that large numbers of labourers have become available (and actually have found employment) in the industrial sector or the services sector (Overseas Development Institute 1986).

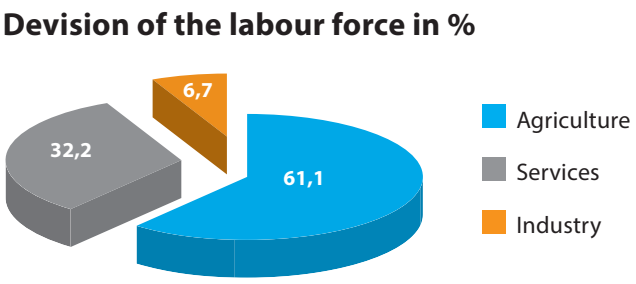


Figure 3-3: Division of labour over the three main sectors of the Kenyan economy in 2005. Source: World Bank.

Over the decades objections have been raised against the use of the GDP as the single indicator for the growth of wealth and development of a country (Stanton, Elizabeth 2007; Trabold-Nübler 1991; Sen 1992; Draper 1990; Hopkins 1991). One of the arguments put forward is that e.g. to have a full effect of the GDP all members of the potential labour force should be employed, one of the principles already introduced by Petty and Smith. In general the view on development has changed since the 1990's. On the UNDP website[17] on the Human Development Index (HDI) it says: '*Human development – or the human development approach – is about expanding the richness of human life, rather than simply the richness of the economy in which human beings live. It is an approach that is focused on people and their opportunities and choices.*"

It is now generally accepted that restricting the discussion on development to economic development (Meier & Seers 1984; Stiglitz 2000) is not sufficient. This also has its effect on the prime indicator in use. The usefulness of the GDP was challenged and alternatives have been introduced (Cracolici et al. 2010; Giovannini & Hall 2006). The UNDP introduced a new approach by launching the Human Development Index (HDI) in 2001 (Brown 2001). This new index was a response to the critique formulated against the use of the GDP as an index for development. Over the years also this indicator has met its critique, either on its assumptions or the inclusion or exclusion of certain factors (Costanza et al. 2009; McGillivray 1991; Stanton, Elizabeth 2007; UNDP 2012). Today a range of indices is used, depending on the purpose.

3.7. A modern view on development is required

After more than 70 years of development policy, supporting the so-called developing countries, the question can be raised what results can be shown as a direct outcome of all the money and attention invested by the international community. Is failure a just qualification (Haas 2007; Howard 2007; Kaufmann 2008) when the world still shows millions of refugees and people living below minimum standards? What can be concluded if it is found that the per capita income in Sub-Saharan Africa was lower in 1990 than it was in 1960? Many authors provide analyses on the mechanisms and politics involved. One major conclusion is that especially investment projects are very often politically driven, as they provide the financial means for politicians to redistribute money to gain support and influence (Robinson & Torvik 2005). The former minister for development cooperation in The Netherlands, Mr. Jan Pronk provided already in 2001 a readable overview of the history of development aid and concludes that development aid should be used as an incentive, a catalyst, to reward good development governance. Pronk also writes: '*Development 'means turning around well-established power structures which are not conducive to development'.* (Pronk, 2001, p. 627). Where the general picture of development is a situation where money flows

[17] http://hdr.undp.org/en/humandev, accessed on July 28, 2015

from the donor country to the recipient country, it was already argued that this has never been the case (Lange 2004). Even in colonial days a money flow from the mother country to the colony was existing. This counter flow has changed with development aid into 'tied-aid' and capital flight. The tied aid concept means that aid is given, provided that the money is spend in the donor country. Capital flight occurs when through bad governance aid money is redistributed away from the intended goals into foreign bank accounts of those being able to divert the money flow (Boyce 2002). An analysis of Sub-Saharan Africa in the 1970–96 period reveals that roughly 70 cents of every dollar that flowed into the region from foreign loans flowed back out as capital flight in the same year (Boyce & Ndikumana 1996; Boyce & Ndikumana 2012).

Many aid programs are being presented as programs where one country is sending aid to another country. In truth however it is never a country that sends or receives aid. It are always authorities, organisations, groups or individuals that are on the sending side or the receiving side (Boyce 2002). Therefore both on the donor side as on the recipient side personal, economic, political and institutional objectives shape the way the aid process runs (Stewart 2000). Where in the past 70 years the development aid was mostly serving the donor countries interest (Hook 1998) while more or less damaging the actual development in the receiving country, it is about time for a change in policy. In addition the political landscape has changed e.g. due to global crisis. The willingness of donor countries and their populations to spend money on development has been reduced. Under pressure of the global economic and financial crisis since 2008, donor countries, and international NGO's are revising their development policies in line with the shrinking budgets.

3.7.1. The way forward

Looking at recent developments a way forward is emerging. The distinction between developing countries and developed countries has become less relevant. Within all countries there are regions that are less developed than others. Due to global economic and financial crisis all countries suffer from economic problems. Because of the role of new large economies like that of India and China, the geopolitical power balance is shifting as well. The countries in Africa e.g. get more and more connected to the international economy. Some countries, like Kenya e.g. deliberately seek that connection by investing in export activities (Government of Kenya 2007). The way forward seems to be a search for a new balance, where the roles of governments, the private sector and civil society are repositioned. As the prime minister of The Netherlands Mr. Mark Rutte (2015) writes: '*Governments should provide smart, not overly burdensome regulation and a stable regulatory environment, as well as guarantee the rule of law and a level playing field. As the OECD's work has shown, there is plenty we can do to improve our policies, whether they concern the transition to a digital economy and clean energy, or assuring free trade and investment. The OECD calculates that its member*

countries could expand by up to 10% on average if they undertook a wide range of reforms, so the potential gains are significant. Once there is a stable policy environment, the private sector can pitch in while we make sure everybody contributes to public goals.' And: *'In addition, companies increasingly see the business case for sustainability. Nowadays, responsible business conduct must be front and centre if companies are to turn a profit. More and more business leaders are adopting this strategy.* Although Rutte is speaking for the OECD countries, the elements that are relevant are:

- The need for investment, especially in innovation: Every country should judge the level and intensity of investment needed. What is innovation on the local level? This judgement should be based on expectations of the highest effect in terms of jobs and income. E.g. investment in upgrading agricultural production might nog require heavy investments, but might have the highest impact. In addition this type of investment would not burden the countries treasury with debts and interests to be paid.
- The need for the government to create smart not overly burdensome regulation: Countries should address the efficiency of the public sector, fight corruption and take transparency and accountability serious, and therefore step away from tribalism, clientelism.
- Governments should guarantee the rule of law and a level playing field: Again this calls for a fight against corruption, and a focus on transparency and accountability.
- Public, private partnerships as a driver for investment and development: Replacing donor-recipient relationships by partnership agreements based on sound business principles.
- Attention for sustainability: development has to be future proof.

4 Education and Development

4.1. Prologue

In this thesis development is defined as a process instead of a fixed status in time. Development is also seen as a process that applies to all regions, all countries and all cities and rural areas as it is the response to a continuous search for a new balance between the needs of society and the opportunities provided by nature and human capacity. External factors being natural disasters or man made events (draughts, flooding, earthquakes, climate change, war, depletion of natural resources, economic growth or decline, population growth or other demographic changes, changes in the technological innovation, and globalization) create this need for a constant search for a better balance, for adaptation by human society to the changing opportunities. Therefore all societies are affected by the ongoing need for development. Development processes largely build on the human ability to develop knowledge and to apply this knowledge to meet new challenges. Education and especially Higher Education has a significant role in organizing the development of new knowledge and the dissemination of existing knowledge (UNESCO 1998). In a globalizing world where societies constantly position themselves in a globalized economy the participation of all citizens is more and more required to raise the human capacity needed for development. The need for knowledge creation, knowledge acquisition and knowledge application has its impact on the private life of individuals, working people and societies and all citizens should be able to participate (UNESCO 1998). Where society at large benefits from each individuals development, each individual can improve personal circumstances through education. The United Nations claim[18]: *'one extra year of schooling increases a person's earnings by up to 10%. 171 million people could be lifted out of poverty if all students in low-income countries left school with basic reading skills.'*

The distinctive difference between societies in their ability to develop is the level of control that these societies have to steer the process of their development and the way this control is exercised. Nations can use a combination of policies to control the process of development. One mechanism that a government in most cases takes control of is the way knowledge is acquired and disseminated through education in society. Traditionally education is one of the mechanisms to organize the accumulation and dissemination of knowledge. *'Education is one of the most powerful instruments for reducing poverty and inequality and lays a foundation for sustained economic growth.'*[19] In this thesis the focus is on education as an instrument to organize capacity building by the transfer of knowledge. The basis for creation of knowledge is in research.

[18] http://www.un.org/en/globalissues/briefingpapers/efa/, accessed August 3, 2015

[19] http://data.worldbank.org/topic/education, accessed 3 August, 2015

Research is a very important component in the creation of knowledge. Depending on the country and a country's state of development a system of research institutions (at universities or otherwise) provides the necessary new knowledge to deal with challenges in society.

The Human Development Index can provide insight in the effectiveness of efforts by country governments to utilize human capacity for development (see also paragraph 3.6). Table 4-1 provides an overview of the HDI of 6 countries that have very different development histories, as well as of Sub-Saharan Africa. Some main components of the HDI are highlighted: life expectancy, education, and the national income.

COUNTRY	RANKING	HDI	LIFE EXPECTANCY AT BIRTH	MEAN YEARS OF SCHOOLING 2012	GNI
NETHERLANDS	4	.915	81	11.9	42397
SWEDEN	12	.898	81.8	11.7	43201
KOREA	15	.891	81.5	11.8	30345
KENYA	147	.535	61.7	6.3	2158
TANZANIA	159	.488	61.5	5.1	1702
UGANDA	164	.484	59.2	5.4	1335
BOTSWANA	109	.683	64.4	8.8	14792
SOUTH AFRICA	118	.658	56.9	9.9	11788
SUB-SAHARAN AFRICA		.502	56.8	4.8	3152

Table 4-1. Human Development Index 2013 and some components for 6 countries and Sub-Saharan Africa. (Source: UNDP 2014)

Even within the Sub-Saharan region the differences are clear. Countries like Kenya, Tanzania and Uganda perform below the regional average on the HDI. This average is lifted by countries like Botswana and South Africa. The influence of the national income seems to be stronger on the educational agenda then on the health agenda of these countries. Although the need for development is universal and the role of education in the process of development is clear, on the regional level there are huge differences in the focus and direction of development. This chapter will address both the role of education for development and considerations for educational policies. Both at the start and at the end of this chapter there is special focus on Sub-Saharan Africa and Kenya in particular to understand the specific situation for this region which is relevant for the remaining part of this thesis. Examples and clarifications will be taken from Kenya, as this is most relevant for the following chapters.

The first section is dedicated to an analysis of the capability of the Sub-Saharan African educational systems to actually empower the people to contribute to the development of their countries. Although Africa is a large continent showing diversity and large differences, the focus is on some general features regarding the different educational systems, especially for Sub-Saharan Africa. In this region the relationship between education and development is very specific. Out of this specific relationship problems and challenges can be identified that are typical for the region. First of all, there is attention for the role of history and how it has influenced the capability of the nations to organize their own control on development. The historic perspective sheds a light on the ability of the educational system to disseminate or transfer knowledge and thus engage all the human potential available. Especially the relationship between the history of the region and how it influences access to and quality of education until today is of interest. It is typical for the region (but not exclusively) that those who want access to good quality education often find that they have no place to go to. This is very unlike the situation in Europe or Northern America. In the second place, I will consider the capacity to run the process of knowledge dissemination. Given the role of education in this process it is relevant to analyse the capacity of the educational system in terms of facilities and infrastructure as well as in human capacity. Teacher capacity and teacher quality are key elements in determining the capability of education to contribute to development through dissemination of knowledge. An analysis of the full educational column, from primary up to university education, is required to assess the overall potential development capacity that the educational sector can offer. Research activities and outcomes contribute to the knowledge base for development. As regional development requires regionally based research and at the same time a connection to more general theoretical models to work towards solutions it is relevant to assess the research potential or in other words the quality of the integral system for knowledge production and dissemination. Now I come to the third aspect which is the relationship between education and poverty. The availability of resources to finance the educational system differs between regions. This leads to different ways of building the educational systems that can have impact on the capability of these educational system to support development. Sub-Saharan African countries are low income countries. The budgets of governments for education are very limited and difficult choices have to be made to use the resources available efficiently and effectively. Here the example of Kenya will be used to illustrate how these choices influence development.

The second section is connecting the specific regional situation in Africa to a more general and globally applicable model of performance indicators for education in its role to support development. Understanding the basic problems in education in general that have to be solved in order to increase the capability of education to support development to the desired level is the first step to find solutions. The fundamental problems in education to push performance are discussed using generic performance indicators. Also it is discussed what should change in the educational systems to remove limitations for development.

4.2. The challenges for Sub-Saharan Africa's educational systems

The Sub-Saharan Africa region faces many challenges. There are economic challenges where fighting poverty has a high priority. Political instability causes conflicts and the need for peace. Climate change requires measures to secure access to drinking water and other vital resources. In the search for solutions education takes a prominent place. Because of regional differences it is necessary to understand how education can in theory contribute to solutions in the Sub-Saharan context. Sub-Saharan Africa as a region is very diverse in its specific circumstances. Natural resources, political stability, all these factors influencing the development of a country differ per nation (Clayson & Otchet 2011). Kenya will be dominant in terms of attention in this section, as this is the focus country in this study.

4.2.1. Historic perspective

Laws that made education compulsory for certain groups of children were passed in European countries as early as in the late Middle Ages (Education act 1496 in Scotland). *"Parliament passed an act making schooling compulsory from the age of eight for the sons of barons and wealthy landowners. The reasoning behind the act was to ensure that people who became sheriffs or judges would have a proper understanding of the law."* [20] Between 1850 and 1918 most of the now called industrialized developed world followed and basic education became compulsory for all children.

The traditional pre-colonial educational system in Africa was of an informal nature and not school based. The goals for indigenous education were to teach the individual how to fit into society; how to understand the concept of togetherness and how to exploit the physical environment. All these goals aimed to increase the chances of survival for the individual and the society at large (Sifuna 2008; Wosyanju 2009). During the ages of colonization, the colonizers had no interest to develop a full blown educational system in their colonies to educate the inhabitants that would mirror the European model. In fact the educational provisions that were put in place, only served the colonizer by educating those who could contribute to the administration of the colony. Basic reading and writing was taught by missionaries who wanted individuals to be able to read the bible and spread the gospel (Sifuna 2008). So, the focus was on education serving the need for administrators and skilled workers and for furthering evangelization. The local elite that was able to attend higher education institutions, mostly did so in the colonial mother country.

In the history of higher education in Sub-Saharan-Africa, the development of institutions for higher education emerged from colonial schools:

[20] http://www.scottish.parliament.uk/EducationandCommunityPartnershipsresources/SP_Timeline_English.pdf, accessed June 18, 2014.

"Makarere University, Uganda

Established in 1922 as a humble technical school, Makerere University is one of the oldest and most prestigious Universities in Africa. In January of that year, the school, which was later renamed Uganda Technical College, opened its doors to 14 day students who began studying Carpentry, Building and Mechanics.

The College soon began offering various other courses in Medical Care, Agriculture, Veterinary Sciences and Teacher Training. It expanded over the years to become a Center for Higher Education in East Africa in 1935. In 1937, the College started developing into an institution of higher education, offering post-school certificate courses.
In 1949, it became a University College affiliated to the University College of London, offering courses leading to the general degrees of its then mother institution.
With the establishment of the University of East Africa in June 29, 1963, the special relationship with the University of London came to a close and degrees of the University of East Africa were instituted.
See more at: http://mak.ac.ug/about-makerere/historical-background#sthash.N46lBkQS.dpuf*"*

Schools developed into colleges and colleges into universities with the growing demand for ever higher levels of education in the colonies. A demand that exploded after independence.

"University of Nairobi, Kenya

The inception of the University of Nairobi is traced back to 1956, with the establishment of the Royal Technical College which admitted its first lot of A-level graduates for technical courses in April the same year. The Royal Technical College was transformed into the second University College in East Africa on 25th June, 1961 under the name Royal College Nairobi and was admitted into a special relation with the University of London whereupon it immediately began preparing students in the faculties of Arts, Science and Engineering for award degrees of the University of London. Meanwhile, students in other faculties such as the Faculty of Special Professional Studies (later renamed Faculty of Commerce) and Faculty of Architecture continued to offer diplomas for qualifications of professional bodies/ institutions.

On 20th May 1964, the Royal College Nairobi was renamed University College Nairobi as a constituent college of inter-territorial, Federal University of East Africa, and henceforth the enrolled students were to study for degrees of the University of East Africa and not London as was the case before. In 1970, the University College Nairobi transformed into the first national university in Kenya and was renamed the University of Nairobi.
See more at: http://www.uonbi.ac.ke/about/profile".

After independence the educational systems were not up to the challenge to educate the people of the new nations. Local communities put pressure on national governments to provide access to education as a starting point for social mobility as was the case in Kenya (Buchmann 1999). Buchmann describes the development of the educational system in Kenya after independence (Buchmann 1999, p.2). *"Since independence Kenyans have expressed great faith in education. The Kenyan state promoted education as the key to social and economic development, while individuals looked to formal schooling as the means to social mobility and improved quality of life*." Due to this focus on access the participation rate went up especially in primary education. For secondary education, due to insufficient means, the result was an uncontrolled growth of locally initiated schools that charged high fees and offered low quality, and a fierce competition for access to the government schools (Buchmann 1999).

The building of a national university was part of the nation building process. The national universities were shaped after the existing examples, mostly in the former colonial motherland. In East Africa the University of East Africa (established in 1963) had a transition position between colleges franchising programs from UK based institutions (University of London; University College of London) and fully independent national universities that emerged when the University of East Africa was split. University of Nairobi in Kenya; Makerere University in Uganda and University of Dar es Salaam in Tanzania became independent universities in 1970. Given this background and given the long process towards independency, these universities for a long time were the only access point for university education in the country, but were not capable nor positioned to cope with the growing demand for access. Not only did these universities provide only limited numbers of student seats, the topics taught as well as the research themes were based on the examples from the European universities and did not necessarily match the needs of the new countries.

In the new countries the general lack of access to education created opportunities for non-public educational organisations, mostly of foreign origin to fill in the needs in the market. Private colleges and universities still play a large role in servicing those who want a degree as a starting point of their career. Especially religious organisations have played an important role in building the higher educational systems in the region. Governments have struggled with this mismatch between the educational system and the needs in society. This has resulted in a continuous series of educational reforms over the last decades (Muricho & Changách Koskey 2013; Government of Kenya 2012; Amutabi 2003).

International support has been available to help the countries to establish an educational infrastructure. Especially in primary education UNESCO's EFA (Education For All) program has made a significant contribution (UNESCO 2002a). In Sub-Saharan-Africa still not all who should have access to education actually go to school. Although

there are successes to be reported on the primary school level, access still requires full attention. The focus of the EFA program was on primary education, a focus that has been strengthened by the Millennium Development Goals (MDG-2) effort. School enrolment in Kenya e.g. shows promising improvement as far as data are available. Of the age group that should enrol in primary education between 15 % and 20 % is still outside school (Gubbins & Omolo 2013, p.15). On the one hand access to primary education is still an issue, especially for girls and children who are physically or mentally disabled. There are still differences in participants' rates between rural and urban areas and between ethnical/cultural groups in the same countries. On the other hand, with the success of the EFA program, it becomes clear that the demand for access is now moving up the educational column. Access to secondary education, to professional education and to higher education is the new challenge.

Sub-Saharan-African nations developed policies to stimulate the growth of the national higher education sector. E.g. in Kenya from independency the development of the University of Nairobi can be seen as the first stage. Then new universities were added in Nairobi and other cities, e.g. Moi University in Eldoret as the second public university in 1984. According to the Kenya Commission for University Education[21] the university system has advanced to a total of 22 fully accredited public universities; 9 public university constituent colleges; 17 chartered private universities and 5 private university colleges. In addition another 12 universities are in the process of development towards accreditation. This can be appreciated as a strong effort to develop a mature higher education sector in the country. However reality shows a population of over 40 million people of which over 60% is younger than 25 (Central Intelligence Agency 2014). No matter how fast the number of study places grows, developing a knowledge based economy as stated in the Kenya 2030 program for the nation is a huge challenge (Government of Kenya 2007).

4.2.2. Capacity and quality

Most African countries started independency with an insufficient educational structure not capable to respond to the demand for educational opportunities from society, and especially a shortage in university graduates to replace the former European administrators. This was certainly the case for Kenya. The capacity to cater for the numbers that needed access was way beyond the capacity of the educational sector. In 1971 the number of schools for primary education was 6372 and that had more than doubled in 1988. The enrolment in universities grew from 573 in 1963 to 45572 in 1990 (Amutabi 2003; Government of Kenya 2012; Clayson & Otchet 2011). The limited access to university education due to the limited number of available institutions and study places has had several effects. It opened up the educational market for private and for profit initiatives creating serious quality issues (Muricho & Changách Koskey

[21] http://www.cue.or.ke/services/accreditation/status-of-universities, accessed on May 21, 2014

2013; Amutabi 2003). It also started a stream of students looking for opportunities to study abroad (Amutabi & Oketch 2003; Government of Kenya 2012), many times not to return (Africa's Brain Gain Inc. 2005). In 2005 the number of Africans living outside Africa as a result of the brain drain had reached 200 Million of which at least 500.000 were Kenyan. At that time 30.000 Kenyans left the country on an annual bases for studies abroad and only 10.000 of them returned on completion (Africa's Brain Gain Inc. 2005). Like in most African countries a complex situation existed in Kenya where the need for qualified educational staff exceeded the available number of qualified people. The budget was stretched to the limit and beyond laying a basis for a national debt crisis in the 1980's (Martin 2013; Buchmann 1999; Clayson & Otchet 2011). Some argue that the young nations did not have the stability in government nor the capacity to control and regulate a growth of available study places of good quality and in line with the needs of the country's development (Amutabi 2003). Political interest in the educational sector did not always lead to positive developments, although a positive effect was intended. E.g. the introduction of free primary education for all (at least up to grade 4) by a presidential decree in Kenya in 1973, led to an explosion of enrolments that disrupted the long term planning of controlled growth of the ministry of education (Amutabi 2003), although it was in the planning for almost 10 years. The 2003 Free Primary Education policy sparked another raise of the numbers registered in primary education. Again the side effects raise questions. The growth in enrolment was in the private schools (doubled) while there was hardly any effect in public schools (Bold et al. 2013).The principle of Harambee (self-help) that was practiced in communities in parts of Kenya became symbolic for the development of secondary education in Kenya. This development based on local interest and self-help was supported by local politicians, but it had serious negative side-effects. First of all the uncontrolled growth pushed by politicians who used the fundraising activities around Harambee schools to attract votes drained the budged of the ministry of education. As the growth was uncontrolled, both in numbers and in quality, many schools were badly managed and the graduates barely qualified for further (university) education (Amutabi 2003). The budget was spent on building schools and there was not much left for materials, other infrastructural needs and good quality teachers. As a side effect the ethnic basis for this development did not support the nation building process and is partly responsible for the strong ethnic lines in Kenyan society (Amutabi 2003).

Because of the experiences from the past there is a call for serious reform of the educational system to improve quality and efficiency (Abagi & Odipo 1997; Muricho & Changách Koskey 2013) but a reform not like the reforms in the past that have been criticized for their side effects and bad implementation (Amutabi 2003). Teachers play an important role in the school and class-based system of education (Opanda 2014). The quality of teachers and for that matter the quality of teacher trainers is therefore crucial to boost the quality of education. In Kenya a number of teacher training colleges was established around the country, up to a total of 238 colleges in 2010 (Government

of Kenya 2012). In 2014 a total of 139 courses in primary teacher education are on offer throughout Kenya according to the Kenya Universities and Colleges Central Placement Service[22]. Of all teachers in Kenyan primary education now 98% is qualified and has at least the basic certificate for primary education (Clayson & Otchet 2011). However there still remain serious issues related to the quality of teaching based on teacher related problems and the monitoring of quality (Gubbins & Omolo 2013).

It was argued before that the universities were not set to meet the needs of society. Byerlee e.g. (2011) argues that most African nations are missing out on opportunities for development due to the global rise in demand for agricultural produce because of lack of investment in research. This has resulted in a mismatch between educational programs and the learning goals of these programs as well as research not directly supporting development and the needs of society. Ever since governments have tried to change this by educational reforms and dedicated research programs. As is mentioned by the Task force on the re-alignment of the education sector to the constitution of Kenya 2010: *'Quality assurance in universities is conducted internally without benchmarking with other universities. Enforcement of standards depends on strengths of individuals involved and therefore quality varies and cannot be guaranteed; Many universities conduct curriculum development without the involvement of employers and hence, the relevance of education and training they offer do not meet the needs of the labour market,'* (Government of Kenya 2012, pp.64, 84). For research that does support the most vital segments of the Kenyan economy Kenya is investing in research through national research institutions like the Tea Board of Kenya, Kenya being the largest tea exporter globally (Byerlee 2011). Noticeable is that the funding for this kind of commercial produce related research partly is provided by government and partly by commercial producers through a volume-based levy system (Byerlee 2011).

A first step to improve control on quality of education at the university level would be a restructuring of the Commission for Higher Education to be the national standards and quality agency for the education and training of all universities, public and private (Government of Kenya 2012). This recommendation resulted in the forming of the Commission for University Education in 2012[23]. It also resulted in a complete overhaul of the quality control and accreditation of all active and recognized universities and colleges when they all were brought under one new legal framework, the universities act 42 of 2012[24]. Under the new law establishment, governance and administration of universities is regulated. Since 2013 research for the economic top sectors of Kenya's economy is restructured. More public-private partnerships are stimulated. E.g. the Kenya Agricultural Research Institute now reports in its annual report for 2011 a total

[22] https://kuccps.uonbi.ac.ke/node/85 (accessed 5 August, 2014)
[23] http://www.cue.or.ke/about-us/vision-and-mission (accessed 6 August, 2014)
[24] http://www.cue.or.ke/services/accreditation/status-of-universities

income of 3.875 Billion KES of which 1,9 Billion is structural funding from government for operations and 535 Million is government funding for development. Of the total income 274.762 Million is coming from commercial activities, and 1.08 Billion is coming from external donors (KARI 2011).

4.2.3. Cost and benefits

In general governments take responsibility for the development of an adequate educational infrastructure. Governments mostly fund research through universities or dedicated research institutes but leave more and more space for public-private partnerships and expect industry to fund or co-fund research. Byerlee (2011) e.g. and Lairumbi et al. (2008) discuss the benefits of this approach for research as well as the ethical issues. Byerlee's main position is that the use of commercial funding for research is underutilized to support the transition in agriculture from home farming to commercial farming and agri-business. And Lairumbi et al (2008, p.735) argue that: *'It is now widely recognized that an important ethical aspect of research practice ought to be the consideration of its capacity for generating social value locally through the generation of knowledge that can lead to generalized health improvements'*.

Even if a government relies on e.g. businesses to partly co-finance the educational sector, it is the government that creates the framework for development of the system by writing policies and legislation. Especially in Sub-Saharan Africa governments are the most important supplier of education certainly in the lower levels (Clayson & Otchet 2011). The share of education expenditure in total government expenditure, in light of a country's GDP (Clayson & Otchet 2011, p.29) is a measure for commitment to the educational agenda. The Sub-Saharan African region devotes 5.0% of its total GDP to public education expenditure, which is the second highest percentage after North America and Europe (5.3%). Given the predominantly low income situation of most countries in the Sub-Saharan region, the budgets of the governments have not been sufficient. Within the given budget it is therefore up to the politicians to come up with a policy on how to spend the limited resources. In educational expenditure the salaries of teachers e.g. is a large proportion of the current expenditures next to other current expenditures like materials and school administration. For Kenya 60% of the expenditure in primary education in 2008 was on teacher salaries (Gubbins & Omolo 2013, p.17). The other main category is that of capital expenditures (buildings and equipment).

The demand for access and the belief that education is leading to individual welfare created opportunities for non-governmental initiatives. Originating from colonial times there has been a strong input from religious organisations in education. Under colonialism the churches catered for almost the complete educational provision, which was predominantly primary education at the time. After independency most governments worked with the churches to build the educational infrastructures they envisaged. Especially in Kenya the churches contributed to the building of the

secondary education infrastructure (Barasa & Misati 2012). As a consequence the churches' influence on the curriculum, although less than during colonial times, has remained strong. Between 1989 and 2012 the churches increasingly founded universities. In 1992 e.g. the Catholic University of Eastern Africa was accredited, which also established 5 constituent colleges. One of these colleges being Tangaza University College, started in 1997 (Barasa & Misati 2012).

On the individual level parents are mostly challenged to carry the cost of school fees, transport and food. For most parents this is an impossible task even in situations like in Kenya where access to primary education is free of tuition fee. The accessory cost for clothing (school uniform), transport and food are out of reach for a significant group of parents. A system of scholarships (privately funded and/or government funded) has emerged to ease the problem. An analysis of the Free Primary Education (FPE) policy initiated in 2003 and abolishing the non-salary related cost, shows that in fact the real situation is more complicated (Bold et al. 2013). '*Net enrolment in government primary schools remained unchanged over the ten-year period from 1997 to 2006, despite the abolition of fees, and fell significantly for wealthier groups. Meanwhile, both net enrolment and fee rates in private schools more than doubled*' (Bold et al. 2013, pp.2–3). This finding seems to correlate with the finding that: *'on average, private primary schools in Kenya dramatically outperform public primary schools on national standardized tests'* (Bold et al. 2013, p.7). The expectancy to finish primary education is slowly improving for Sub-Saharan Africa to almost 70%. For Kenya this figure is showing a decrease from 81 % in 2005 to 74.6 % in 2011 (Gubbins & Omolo 2013, p.18). Amutabi (2003) argued that next to the economic factors for the parents, the quality of the education offered is causing the drop-out rate, where the high pupil to teacher ratio causes problems for pupils who need special attention. The findings by Bold et al. (2013) seem to support this earlier observation.

Governments in Sub-Saharan Africa have a tendency to invest more in secondary and tertiary education (Clayson & Otchet 2011). The motivation for this policy is the need for quality that requires investments that bring a high return for society. This motivation is stronger in countries that have achieved or are close to achieving access to primary education for all. In society a university degree still is seen as an important milestone for a successful career and a way out of poverty. In the Kenyan long-term strategy the need for highly educated specialists is formulated as a requirement for the development of a knowledge-based economy (Government of Kenya 2007; Government of Kenya 2010). Consequence of this effort is e.g. that the countryside is losing education opportunities on the level of vocational training where colleges are being upgraded to university level as happened in Kenya in 2009 (Anadye 2009; Mukubwa 2012). Another consequence is that it becomes harder for those with a university degree to find a job. In 2013 the average time between graduation and finding a job requiring university qualification is 5 years (Isaacs 2013).

Where education is attracting most of the attention in the public debate, research and especially academic research is fundamental for the development of new knowledge. As African universities are developing so is their research and research output. Here quality discussions and discussions on relevance are ongoing as well as e.g. is argued by Lairumbi et al (2008, p.2). A specific feature of research concerning Africa is that most of the research is in the hands of foreign researchers. Western and nowadays more and more Asian universities run research programs with a focus on Africa. Most prominent are the examples in medical research, e.g. the Kenya Medical Research Institute reports international collaboration and the related funding in its annual report of 2012 up to 780 Million KES (Nduati 2012, p.64). Where the main portion of the funding is coming from international collaboration and donors, the position of the local researcher is under pressure because of lack of funding options and equal working conditions, equal to the conditions available to researchers in Western or Asian universities. As far as research is concerned there are general and locally specific problems to be faced by researchers. The Global Development Network[25] (GDNet) is a global network of researchers and is building research capacity in the 'global south'. In a survey amongst its members GDNet finds the following needs of and challenges for researchers in the 'global south':

1. Lack of funding
2. Access to journals and databases
3. Southern research crowded out
4. Interest in research communications
5. Getting closer to policy makers
6. Interaction with peers in the South
7. Research capacity and mentors

4.3. Performance indicators for education for development

'Education is a right, like the right to have proper food or a roof over your head. Article 26 of the 1948 Universal Declaration of Human Rights states that "everyone has the right to education". Education is not only a right but a passport to human development. It opens doors and expands opportunities and freedoms. It contributes to fostering peace, democracy and economic growth as well as improving health and reducing poverty. The ultimate aim of Education for All (EFA) is sustainable development.' (UNESCO, Education for All program).[26]

Development is an ongoing process, as was argued in the previous chapter, where society in all its aspects adapts to its changing surroundings and its ambitions. Education supports this ongoing process of renewal and development by creating and transferring (new) knowledge. For education this means that what is considered good or even excellent education today, might not be really adequate to face the

[25] http://www.gdn.int/html/page8.php?MID=12&SID=35
[26] http://www.un.org/en/globalissues/briefingpapers/efa/, accessed August 3, 2015

changing situation of tomorrow. To be able to analyse where education is not or no longer supporting society in its search for solutions, and to be able to identify how education will have to change to fulfil its supportive role, it is important to have an appropriate set of performance indicators. These indicators need to be valid in an international comparison of the performances of different educational systems and yet at the same time allow for the diversity in solutions needed on the regional and local level. In other words, these indicators need to be general to allow comparison, but also need to allow for local diversity. It is not the ambition of this thesis to develop new indicators but to identify what is available. The focus is on indicators that are directly related to educational performance and as generic as e.g. the HDI (partly consisting of educational performance indicators).

Knowledge is a dominant factor in development and all regions in the world are affected, including Africa (Schemm 2013). Through the mobility opportunities available no place in the world is really far away or isolated from developments elsewhere. Because of ICT developments and especially the explosion of numbers of mobile phones in use people are more and more connected (Aker & Mbiti 2010). More than ever before access to knowledge and the way knowledge is spread over a population dictates how this population is able to develop (Rickson et al. 1990). For the education sector in any country this means a growing demand for educational programmes of all kind, be it initial education throughout the educational column or further education or lifelong education. The growing demand, the growing number of learners is a challenge for the traditional school-teacher-pupil based model (the brick-and-mortar type of institution). Despite expansion of facilities and investments in the system in many regions the numbers grow faster than the facilities (UNESCO Institute for Statistics 2011). E.g. John Daniel (1996, p.4) calculated that one new brick and mortar university every week would be needed to meet the growing demand. Also in the discussion on quality in education the use of technology in and next to classroom teaching is under discussion (Draycott 2012; Slavin 2012; Atchoarena 2011). Where the traditional school model is not up to the challenge, the question arises what additional measures can be taken and who should be taking them. With the emergence of the nation states in the 18th and 19th century in many parts of the world education has become a concern of the national or regional government. Governments are issuing policies and writing legislation to regulate the mechanism of knowledge distribution through education. Although other stakeholders engage in the educational agenda, the focus will be on government policies to improve the impact of education on development. With these policies comes the need for indicators. These indicators can be used to build policies. They can also be used to measure performance (and thus the effectivity of policies). Looking for a more generic starting point in the discussion the policy recommendations issued by the World Bank (Gubbins & Omolo 2013) are of interest. These policy recommendations are built on three components: (1) Access; (2) Quality; and (3) Efficiency. The recommendations per component are:

(1) Access

- Improve access at ECD (Early Childhood Development) level by integrating ECD into Free Primary Education policy.
- Adopt a more targeted 'no child left behind' strategy for children, particularly girls in arid areas. The strategies should address the cultural, social and economic barriers to children entering school in counties that are lagging behind.
- At secondary level, address the current low enrolments by scaling up the current Free Day Secondary Education program, including alleviating the cost burden on students from poor households through bursaries and other targeted forms of financial support. This will increase the current low secondary enrolment rates.
- At TIVET and university, encourage more private sector participation.

(2) Quality

- Improve ECD implementation through possible public-private partnerships which can focus better on physical, cognitive, linguistic and socio-emotional development (4-5 year olds); and school health and nutrition programs.
- At primary and secondary levels, focus on core service delivery activities to retain students and increase learning. These are the top school related areas to be focused on for raising student learning levels:
  - Review curriculum learning outcomes for relevancy and sequencing across grade levels and cycles (primary and secondary).
  - Ensure there are sufficient books which focus on age-appropriate learning tasks, including early grade reading.
  - Maintain regular classroom attendance by teachers, and train teachers on how to use books and how to teach (especially core fundamental early reading and mathematics skills).
  - Ensure that learners spend sufficient time on learning tasks.
  - Strengthen school leadership for overall school management as well as instructional support to teachers, working more closely with parents and community, and mobilizing resources.
- Ensure life skills are incorporated in the curriculum and that teachers are trained on how to teach these skills.
- Introduce interactive e-learning, moving beyond physical books, while ensuring there is infrastructure to support this.
- At University and TIVET, focus on quality of teaching and relevance of curriculum, and this includes:
  - Develop a quality assurance framework for multiple service providers to deliver relevant skills and ethical training in needed areas.
  - Mainstream public private partnerships in curriculum development and in financing of higher education.
  - With the upsurge in university enrolments, evaluate and adopt methods of delivery that foster high quality teaching and effective learning.

– Establish strong linkages with business, industry and community needs (and contributions).

(3) Efficiency

- Address the current unequal teacher distribution across counties by ensuring that additional teacher recruitment is based on current distribution, which in turn may require relocating teachers from over-supplied to under-supplied counties.
- Ensure infrastructure school expansion addresses over-crowding instead of creating small under-utilized schools to be achieved through coordination between the central government, county government, CDF committees and communities.
- Ensure service delivery by integrating performance management, through performance contracting and appraisals.

These recommendation are given under the assumption that the financial management, the monitoring and the accountability in the educational sector is brought up to standard. To be able to judge whether a measure or policy is effective it is necessary to agree on objective performance indicators for the educational sector in the light of the demand for knowledge through education. These indicators need to be measurable as transparent as possible and the number of indicators should be limited to those that are key in explaining a significant portion of the performance of the educational system. In reference to the World Bank policy recommendations (Gubbins & Omolo 2013) three indicators to monitor and steer government policies for education are considered: accessibility; quality and efficiency. I prefer to use accessibility here instead of access. Where access is widely used in the policy discussion, accessibility has a broader meaning that includes practical issues. E.g. when there is access to the internet, due to connectivity issues the accessibility might be low.

4.3.1. Accessibility

A nation's educational system is the main mechanism for knowledge creation and dissemination. The accessibility of knowledge therefore in many cases equals access to education. Through education information and the skills to understand and use information are taught. Education also is about developing skills to find and filter information and knowledge. This explains the UNESCO focus on Education for All (EFA). In the past e.g. Millennium Development Goal 2 was dedicated to accessibility to education as is now the new Sustainable Development Goal (SDG) 4. This also explains the importance governments and society attach to accessibility to primary education. Regardless of the specifics of an educational system, most countries use targets in terms of participation rates. E.g. EFA targets a 100% participation in primary education. To conclude the success of policies it is therefore important to collect reliable data on the educational system and of those that need access. UNESCO has addressed this problem partially, by developing an educational classification system. For evaluation purposes the basic variables like a country's investment in its educational system,

a description of the educational systems and the output of the educational systems should be standardized. This can be done by applying the International Standard Classification of Education (ISCED), developed by UNESCO (UNESCO 2012b, p.iii). The ISCED is developed by the UNESCO Institute for statistics in the 1970's and periodically upgraded. The current version dates from 2011. Cross-national comparison is not the only way to assess efficiency of policies. National comparisons over time are also relevant e.g. to measure improvement.

The OECD (2012) uses the Age Participation Rate (APR) to analyse trends in education. The APR indicates the ratio between those that should participate in a certain ISCED level of education given their age, and those that actually do. The age group definitions are set by the national legislation. The use of the APR enables a comparison between countries educational systems, it allows for evaluation of policies and it allows for national or regional comparisons over time. Gorard (2005) e.g. uses the APR to analyse the assumed inequality of access to higher education for people with different social backgrounds. He finds that the problem is not access. The APR for each social group shows that the representation in higher education is according to the ratio of qualified potentials for the age group, irrespective of the social background. He therefore concludes that the real problem is not access, but the opportunity to qualify through secondary education.

The APR is a useful indicator to measure accessibility and the success of related policies. Formal education, however, is not the only source of learning and knowledge. Two main movements have initiated what is now called non-formal education. One movement was where the lack of government provided formal learning opportunities was complemented by community or society initiatives. The other movement was were the notion of life-long learning caused new forms of learning to emerge, also outside the school. In fact three categories are in use. The third category is informal learning, which is about ubiquitous learning of the individual through interaction with his/her environment. The distinction between the different categories is not very clear. Simkins (1977) provides an overview of the ideal models for formal and non-formal education (Table 4-2).

	FORMAL	NON-FORMAL
PURPOSES	Long-term & general Credential-based	Short-term & specific Non-credential-based
TIMING	long cycle / preparatory / full-time	short cycle / recurrent / part-time
CONTENT	standardized / input centred academic entry requirements determine clientele	individualized / output centred practical clientele determine entry requirements
DELIVERY SYSTEM	institution-based, isolated from environment, rigidly structured, teacher-centred and resource intensive	environment-based, community related, flexible, learner-centred and resource saving
CONTROL	external / hierarchical	self-governing / democratic

Table 4-2. Ideal models for formal and non-formal education (Adapted from Simkins (1977, pp. 12–15)

For the indicator discussion the focus is on formal education.

4.3.2. Quality

Equally important for knowledge distribution as access to education, is the quality of education. Quality contains ideological, cultural and religious components that are judged differently in different countries or in different cultures. The quality of education is determined by the quality of the teaching staff, the curriculum design, the learning materials, the teaching process, the learning services, and the educational facilities. All these different components of quality make measuring quality of education in an objective way at a point in time very complex. Additionally the definition of what is good quality education also changes over time.

Daniel et al. (2009) pointed out that the traditional Oxford/ Cambridge university model originally was built on the excellent quality of the entering student and therefore on exclusivity. In this model teaching was a marginal activity as peer students were educating each other. Later the model expanded with the notion that once students had been selected, it was worthwhile to spend serious money on each individual (meaning hiring lecturers and tutors and organise classes and exams) to maximise success rates.

Kis (2005) provides an overview of the current approach to quality assurance in (higher) education (Figure 4-1). In the overview it is shown that the purpose for evaluation is either accreditation or quality improvement. To come to conclusions different methods of evaluation are in place targeting different levels (the institutional level or the program level). Key instrument in evaluation procedures is the self-evaluation report. In such a report not only the curriculum is described but also the

Major elements of quality assurance systems in tertiary education

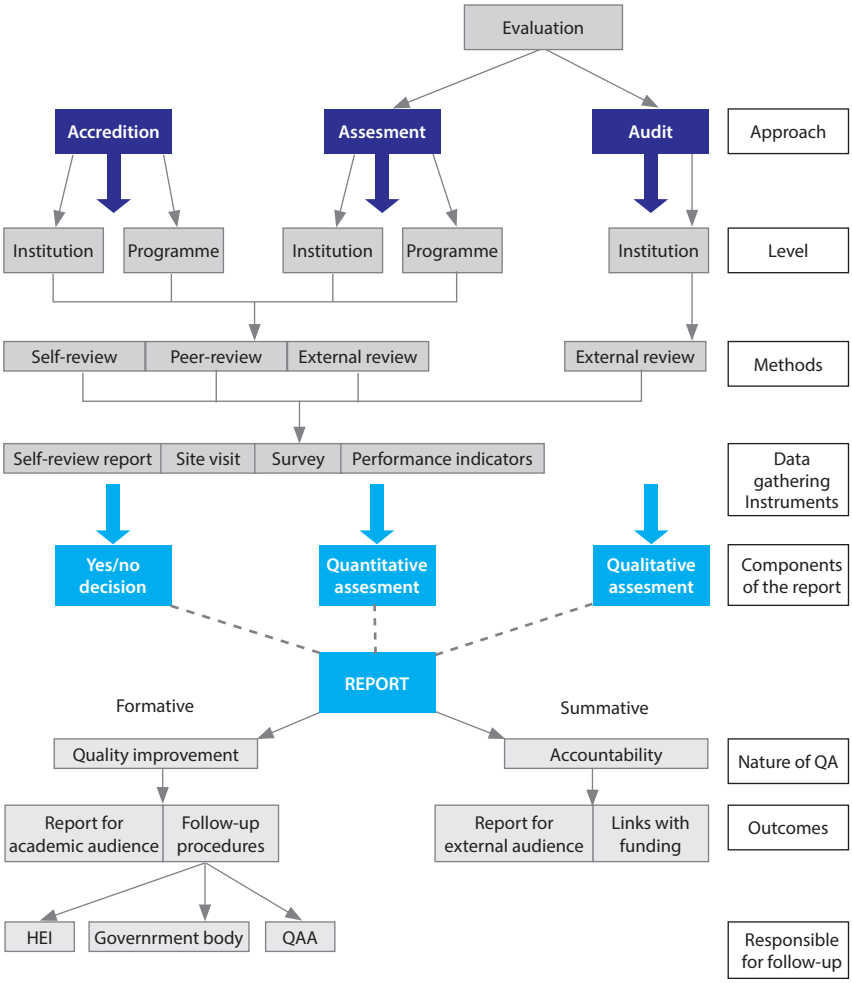


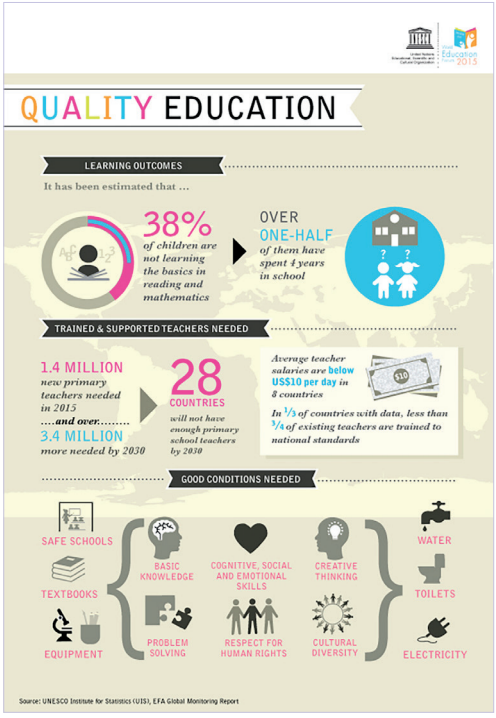
Figure 4-1: Quality assurance systems in tertiary education. Source: Kis, 2005

infrastructure in place to meet the learning goals. In Europe quality assurance is the responsibility of the higher education sector supervised by the national governments. There is a tendency to create a European Higher Education Area[27], where quality systems, educational programs, diplomas and certificates are standardized in such a way that they become comparable between European countries. This enables students and graduates to move around Europe freely for study and to participate in the European labour market. The European Higher Education Area is the most

[27] http://www.ehea.info/, accessed February, 2016.

important objective for the process of harmonisation in quality assurance in Europe, known as the Bologna Process[28]. The European Association for Quality Assurance in Higher Education (ENQA 2015) develops guidelines for Higher Education institutions in Europe since 2005. Additionally the European Association of Distance Teaching Universities (EADTU) has developed a special program for Quality Assurance in e-learning. The E-xcellence initiative[29] aims to develop a benchmark for e-learning to enable the participating HE organisations to improve accessibility, flexibility, interactiveness and personalization of their education.

In the USA the influence of the federal government on the educational systems regarding accreditation and quality assurance is limited. The role of the federal government is limited to acknowledging independent organisations that can accredit institutions and programs. The federal government does not have the legal tools to influence harmonisation of the USA educational area[30]. The author is not aware of any harmonisation initiative of African countries to create an African Higher Education Area.



In 2015 (19-22 May) the World Education Forum (WEF) was organised by UNESCO and taking place in Incheon, Republic of Korea[31].The forum's ambition was to redefine the UNESCO definitions on education, aligning them with the Sustainable Development Goals (SDG's)[32] as successors of the Millennium Development Goals (MDG's). The WEF issued the Incheon Declaration. In the declaration education is reaffirmed as a fundamental human right. Amongst the five key themes is quality of education (the other four being: Right to Education; Equity in

Figure 4-2: Definition of Quality Education. Source: WEF 2015.

[27] http://www.ehea.info/, accessed February, 2016.
[28] http://www.ehea.info/article-details.aspx?ArticleId=3, accessed February 9, 2016.
[29] http://e-xcellencelabel.eadtu.eu/e-xcellence/associates-label, accessed February 9, 2016.
[30] http://www2.ed.gov/about/offices/list/ous/international/usnei/us/edlite-accreditation.html, accessed February 9, 2016.
[31] http://en.unesco.org/world-education-forum-2015/, accessed July 11, 2016
[32] http://www.un.org/millenniumgoals/, accessed July 11, 2016

Education; Inclusive Education and Lifelong Learning). According to UNESCO and the Forum quality is expressed in terms of needs (Figure 4-2). What a learner learns in terms of knowledge and skills should be complemented with values and attitudes responding to the needs and expectations of individuals and other stakeholders. This means that next to the basic skills, for example critical thinking and capacity for lifelong learning should be covered in the curriculum.

4.3.3. Efficiency

Most educational systems are at least partly financed by the government while private sector financing and tuition fees might also play a role. A diversity of systems is thinkable and in place which all have in common that education first costs money and the benefits follow later. The ambitions regarding education in a country are limited by the available budget. Where demand is growing because of population growth or a larger participation rate (APR) or both, the budget is probably not growing at the same speed. A common indicator for the budget available for education is expressed in the per capita expenditure (OECD 2013). Accommodating more learners within the same budget therefore results in solutions like larger numbers of students in classes or other consequences that might influence the quality of education in a negative way. Identifying a sole indicator for the cost of education that allows international comparison is a problem not yet solved. The OECD uses 7 indicators to compare cost of education amongst its member states (OECD 2013, p.162). These indicators are:

- How much is spent per student?
- What proportion of national wealth is spent on education
- How much public and private investment in education is there?
- What is the total public spending on education?
- How much do tertiary students pay and what public support do they receive?
- On what resources and services is education funding spent?
- Which factors influence the level of expenditure?

In the OECD countries in general expenditures on education are on average USD 9487 per student per year. Primary education is receiving USD 8296 per student, secondary education is receiving USD 9280 per student, and the highest investment in average is in tertiary education to a sum of USD 13958 per student. In primary and secondary education 94 % of the expenditure is on the teaching effort (OECD 2014). For tertiary education the picture is more complicated as 32% goes to research and development. Another comparison that is relevant is the percentage of the national wealth that is invested in education. This indicator is expressed in the gross domestic product (GDP) at purchasing power parity (PPP: standardizing cost based on a market basket of goods) per capita. This comparison is most valid for primary education because in all OECD member states the APR for primary education is almost 100% and primary education is almost always compulsory. For the other levels of education this comparison is more complicated because of the differences in systems and in APR.

For 2014 the figures for the OECD countries show an expenditure per student of 23% of GDP per capita at the primary level, 26% at the secondary level, and 41% at the tertiary level. Between 1995 and 2011 this percentage has risen with 60% on average (OECD 2014, p.210). In relationship to the cost discussion the first two OECD indicators are most relevant. The figures show a steep rise of both. In East-Africa, however, in the time period between 2000 and 2010 a country like Kenya shows a fluctuating percentage of 5.19 in the year 2000, 7.34 in 2005 and 6.67 in 2010 of the GDP spend on education[33]. Although the statistics provided for 2010 differ depending on the source used, UNESCO[34] e.g. reports 5.51% in 2010. The data on the expenditure as a percentage of the GDP per capita on students in primary, secondary and tertiary education are not available for Kenya after 2006. For the 2000-2006 period the raise of the percentage is from 21.38% to 22.37% for primary education. For secondary education the raise is from 14.38% to 21.17%. The expenditure per student in tertiary education grew from 208% to 274.43% over the period 2000-2004. One can only assume that in the years after 2004/2006 the trends are maintained and a slow rise of the expenditure is effectuated. Unfortunately Kenya is amongst the countries that do not report the full set of basic statistics that enable an objective assessment of the national policies regarding expenditure on education. And the quality of the data provided sometimes should be questioned as well.

Although the data for Kenya are not available for the years after 2004/2006 these figures lead to the conclusion that the gap between the OECD countries and most African nations in investment in education (and therefore in knowledge distribution in the population) is growing. If African nations truly have the ambition to develop their economies into a knowledge-based economy they either have to find ways to increase the investment level substantially, or look for alternative ways to increase the return on investment.

4.4. Reflections on this chapter

African countries are considered developing countries. In order to support development it has been considered valuable to establish an educational system to produce highly qualified workforce. The view on development has changed however. The freedom to develop, to make independent decisions about one's own individual life has become the focus of development. Economic prosperity is seen as a result of this modern view on development. Where does that leave the educational system? Is it contributing to development or blocking development? Therefore in order to address development it is essential to understand the educational systems on the continent. The African continent is a large and diverse region. A simple overview of the educational systems is too ambitious, at least within the scope of this thesis. The discussion in this chapter is limited to Eastern Africa and especially Kenya is used as

[33] http://www.theglobaleconomy.com/Kenya/Education_spending/, accessed February 9, 2016.
[34] http://data.uis.unesco.org/?queryid=181, accessed February 10, 2016

an example. Furthermore, the overview of the educational system is limited to the elements considered to influence development. It is argued that the educational system in Kenya has roots in colonial times and is shaped by the nation building process that started in the early 1960's. Because of this history, there are issues in the educational system that do not fall in line with the mission to support national development. The maturation of an educational sector supporting the development of the country is still an ongoing process that only started some six decades ago. Compared to Europe and even the USA and Asian countries, that is a really short period.

In order to review where African nations stand in terms of development of their educational systems it is important to identify the factors that influence the growth and improvement of the system. It appears that three factors are key to address the educational agenda. These factors are: accessibility, quality and efficiency. It is possible to identify indicators to measure the three factors on the national level and to compare these with the results on the international level. The international comparison is mostly with the OECD countries. This clearly shows that the educational system is struggling to meet the demands from Kenyan society. It would therefore be very helpful to explore approaches to in a way break out of the problematic circumstances the system is facing. This is what the next chapter will do by addressing various transformation roads for education.

5 Innovations in Education

5.1. Prologue

Measuring where countries stand in terms of development of their educational systems is important as it provides a basis for policy development. But what if the system itself is part of the problem? In the previous chapter it has been shown that the existing educational systems based on the teacher centred classroom model are not able to deal with the problems that governments face, especially in the Sub-Saharan context. While the value of the existing educational institutions and the way they contribute to the needs of the country is under discussion, still many learners receive this traditional way of teaching. Therefore the search for solutions is not a search for systems that can replace the existing systems, but for approaches that can enhance the current systems. There is a need for diversity in solutions because there are large differences in situations and demands in different regions of the world and within these regions (e.g. differences between rural and urban areas and between the well-off and the poor). Based on the assumption that the current educational systems need to change it is important to understand the underlying problems and look for possible solutions that can be complementary to what is already available.

In this chapter I continue with a different form of desktop research. I will introduce a new approach to assess innovations in education that can transform the educational systems. This chapter reports the desktop research results. First the underlying problem is reframed. In the search for solutions a way to evaluate new developments in education for their potential to innovate the systems is presented and discussed. Some of the most promising 'innovations' in education are introduced and in succession scanned using the Iron Triangle Scan presented.

For African nations it is interesting to at least see where they stand, looking at the developments in education around the world. For the African policy maker it is important to know the potential impact of innovations in education that can help them work on solutions for the problems in education in their countries. Not because solutions that work elsewhere will definitely also work for the African nations, but more so because experience can be helpful to design African solutions for the African problems. It will be discussed whether there is evidence that what is happening in education in the African region is in line with the more general trends and developments on the global level.

5.2. Reframing the problem and introducing the Iron Triangle Scan

Discussing the dilemma of many ministers of education Daniel et al. (2009) have introduced the 'Iron Triangle'. The meaning of the 'Iron Triangle' metaphor is to say that a policy to improve or raise one of the three performance indicators for education (access, quality or cost) will automatically result in a decrease in performance of the other two performance indicators, at least if there is no change in budget. One could conclude that a transformation of education is needed to break out of the 'Iron Triangle'. Daniel et al. (2009) focussed on the use of ICT as a strategy to do so. Mulder (2013) has proposed an upgrading of the 'Iron Triangle' metaphor. The powerful message is maintained but the approach has been adapted in order to properly represent the dynamics in the model. He has argued that the two-dimensional model (the planar triangle) is to be replaced by a three-dimensional model in order to let the three performance indicators indeed be adequately mapped. Additionally, the performance indicator 'access' was substituted by 'accessibility', being a broader concept. And 'cost' was replaced by 'efficiency' with the advantage that then for all three performance indicators the target will be to achieve a high value: high accessibility, high quality, and high efficiency (instead of low cost). Mulder (2013, p.100) rephrases the term 'Iron Triangle' as the 'Three-dimensional performance deadlock' and provides several examples to explain the adapted model. Figure 5-1 shows the status of an educational system at a certain point in time. The three dimensions are connected over a triangular plane. The points on the three axes represent the performance levels for the three indicators.

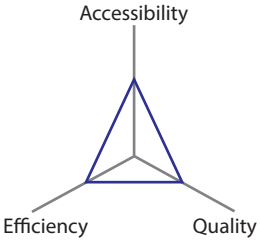


Figure 5-1: Initial situation

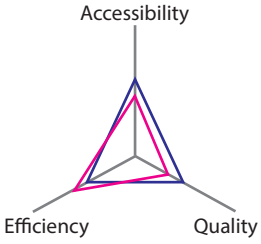


Figure 5-2: Improved Efficiency with reduced Quality and Accessibility.

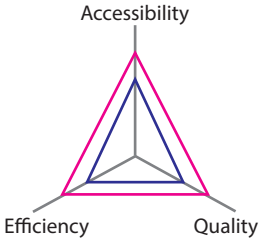


Figure 5-3: Deadlock broken with system intervention.

Figure 5-2 represents a situation where through a policy intervention the efficiency of the educational system is improved. Given the rigidity of the Iron Triangle this automatically means that one or both of the other indicators (accessibility and/or quality) will show a decrease in value. E.g. one could increase efficiency by raising the entry requirements for students. Next to the A-levels an entry test could be introduced. This automatically means that the accessibility is reduced, because A-levels are not sufficient anymore. Or, if efficiency is raised by reducing the money spent per student,

this might result in lower budgets for counselling, replacing study materials or other budgetary measures. This type of budgetary measures will influence the quality of education in a negative way.

Figure 5-3 represents a situation where through some intervention the deadlock is broken. By breaking the deadlock it has become possible to improve the educational system on its three most important indicators at the same time. Daniel et al. (2009, p.32) suggest to break the 'Iron Triangle' first of all by the use of technology. Another intervention suggested by Daniel et al. (2009) is unbundling, where academic education and examination are activities no longer taking place at the same institution. By unbundling different parties are allowed to join in and offer the service. Both intervention examples are, however, subject to dispute and seem to be not as plausible as the one suggested by Mulder (2013) who has claimed on pretty solid arguments that the deadlock can be broken with the introduction of Open Educational Resources[35].

The idea of expanding the iron triangle into a three dimensional model was discussed by the author with Sir John Daniel at a meeting at the Korean National Open University in September 2012. A discussion he thought worthwhile to mention on his blog[36]. The power of the model as such, stating that the three performance indicators are firmly connected and improving one, automatically causes a decline for one or both of the others remains valid. In a more recent publication Daniel (2016) applies the Iron Triangle metaphor to online learning. His first conclusion is that online learning has become mainstream. He argues that flexibility is a defining element of online learning which has been decisive for the uptake into educational systems in general. Daniel (2016, p.5) notes that while there is evidence of online learning being used by over a quarter of the students in the USA educational system it is more difficult to collect reliable data on the spread of online learning. It is straightforward to measure the number of students at open universities (being 100% online). But the progress is also in blended learning (defined as a combination of online and face-to-face) where it is much harder to measure, because definition issues have raised with the diversity of uses of online learning. Daniel argues that this creates a problem for government policy makers and other stakeholders who need reliable data. While further exploring the opportunities and challenges of flexibility in online learning, Daniel discusses the three dimensions access, quality and cost. On the three dimensions he concludes that the access dimension has gained from the flexibility of online learning, because new opportunities have become available. But Daniel questions cost and quality since it is not evident that online learning can increase quality and reduce cost independently.

[35] UNESCO definition of OER: OER are teaching, learning and research materials in any medium, digital or otherwise, that reside in the public domain or have been released under an open license that permits no-cost access, use, adaptation and redistribution by others with no or limited restrictions.

[36] http://sirjohn.ca/wordpress/?page_id=116, accessed October 5, 2015.

As a contribution to the discourse on innovations in education the idea is introduced that in order to be able to judge every single intervention (ICT in education, online learning or Open Educational Resources) for its innovative power, a quick scan would be useful to start with. Building on the discussions introduced by Daniel and Mulder around the Iron Triangle, the idea arose that the Iron Triangle metaphor has the potential to be used in a more general sense to assess or review various interventions. With such a scan one should be able to identify arguments that speak in favour of an innovation raising each of the three performance indicators of the Iron Triangle without a negative influence on the other indicators. The scan is to be used for a first face value evaluation of the innovative power of any intervention in education for its ability to break the deadlock. This is what I will further explore in the sequel and I will refer to it as 'The Iron Triangle Scan for Interventions in Education' (in short the Iron Triangle Scan). An intervention that turns out 'positive' from the scan is an intervention that is breaking the deadlock between the three performance indicators in a favourable way.

More resources, more infrastructure, quality enhancement projects, teacher training programs, ICT projects, new pedagogical approaches, MOOCs, are all examples of interventions in education that target at least a more flexible relationship between the three performance indicators of the Iron Triangle. But how would the 'Iron Triangle Scan' work out for them? It can be fairly assumed that the described deadlock among the three performance indicators is pretty general and persistent. From medicine or from software engineering it is learned that the search for a so-called magic (Thorburn 1983) or silver bullet[37](Brooks 1986) continuously fails. This could lead to the conclusion that most innovations will probably have a positive effect on one or at the most two of the three dimensions. For the scan to be useful and decisive only those innovations that increase performance along all three dimensions simultaneously will turn out 'positive' in the 'Iron Triangle Scan'.

In the following sub-sections I will evaluate three major developments/innovations in education through the 'Iron Triangle Scan'. Two of these are of a more conceptual nature (Open Education and Education for Sustainable Development) and one is more instrumental (online learning and MOOCs in particular).

5.3. Introducing the innovations reviewed

5.3.1. Open education

The first (conceptual level) development is the one towards open education. As for many terms in use, this term may refer to different definitions. These may stem

[37] http://www.merriam-webster.com/dictionary/silver bullet: something that acts as a magical weapon; especially: one that instantly solves a long-standing problem, retrieved June 12, 2014.

from different backgrounds, and can change over time. Open education definitions certainly have changed over time and slowly these definitions seem to merge into a more refined new definition. Basically the definition can be built from the two words 'open' and 'education'. When looking for definitions of education, one can conclude that the process of knowledge transfer taking place at a certain location is agreed as the core of what education means. The Oxford dictionaries define education as: *'The process of receiving or giving systematic instruction, especially at a school or university'*. In the Merriam-Webster it says: *'the action or process of teaching someone especially in a school, college, or university'*[37].

The reference to a location, physically a school or institution, might be included to refer to formal education, meaning that the education received at this location is accredited with a certificate or a diploma awarded by a recognized authority, being the same institution. Education as defined in the dictionaries is the existing default system where educational institutions define educational programs that are offered to students in a given period of time. After going through the program with success the student will receive a certificate or diploma. The system as described here is – let's say – 'closed' in almost all its aspects. Only certain institutions are allowed to offer recognized programs to a limited number of students who have to pass an intake procedure, follow a fixed schedule, and at the end sit an exam.

Adding 'open' to 'education' would mean that barriers that normally hinder the process or activity of education are removed as much as possible. Given the previous discussion on the Iron Triangle, these barriers may refer to the accessibility, the quality, and the efficiency of education. One way of removing barriers is to disconnect the student from the classroom and the teacher as was introduced on the university level by the University of London in 1858 (Daniel et al. 2009). Correspondence education and the print-based distance education as introduced by the open universities in the 1970's are delivery models that target to solve the facilitation of larger numbers of students than possible in a teacher-classroom combination. Developments in technology enabled the diversification of delivery of education and opened up new avenues for educational material production. The open universities benefitted from these developments and were able to improve their distance education model (McAndrew 2010).

Benefitting from the introduction of information and communication technology (ICT) in education open universities transformed from print-based institutions to e-learning institutions. In this way open universities have challenged the closed system. A diversity of 'open' attributes has been introduced. Mulder (Mulder & Janssen

[38] http://www.oxforddictionaries.com/definition/english/education; http://www.merriam-webster.com/dictionary/education, retrieved June 12, 2014.

2013; Mulder 2010) calls these the attributes of classical openness. For this classical openness the following six degrees or dimensions can be distinguished (Mulder 2010; Mulder & Janssen 2013):

- Open entry: Anyone can basically participate regardless of his/her prior education. Strictly speaking, no diplomas are required for entry.
- Freedom of time: Students can begin a course or programme at any point during the year and study at any time.
- Freedom of pace: The student can basically determine his/her own pace and schedule.
- Freedom of place: The student can study using course books and with online learning resources and services; he/she can do so at home, at work (assuming permission has been granted), at a library, in a virtual classroom, on the train or on a plane, abroad, on a boat, in prison, etc.
- Open programming: The programmes involve certain freedoms as regards their content and order; the student can take and if necessary combine modules/courses as he/she wishes; there are partial programmes and complete open programmes.
- Open to target groups: The population is very varied, comprises all ages, and has a wide range of contexts, with the common feature being that the student is combining his/her (part-time) studies with work, care duties, or other activities: a wide variety of lifelong learners.

Mulder & Janssen (2013; Mulder 2010) claim that when categorized on these 6 dimensions open universities will in general score higher than conventional universities but no open university will be completely open on all dimensions. It might be added that no campus based university will be completely 'closed' on all dimensions. Differences between open universities and conventional universities are starting to blur as conventional[39] universities are using more and more technology e.g. to raise the lecturer/student ratio, which leads to blending of the two models.

In general universities will take different positions on the 6 dimensions depending on the technology used and/or the institutional missions. This development is e.g. reflected in the history of the Open University in the UK. The initial scenario for the Open Universiteit was referred to as the "Lighthouse Keeper" scenario (McAndrew 2010) where the student (in the lighthouse) would be isolated from materials, fellow students and the educational institution. Therefore the learning materials should follow an "all-in-one" concept that colleagues at the Open Universiteit refer to as "canned student support". With the advancement of technology the scenarios for the Open University transformed to that of the "Connected Student" and later into the "Open Learner" (McAndrew 2010). By the time open universities started to use

[37] Conventional here refers to non-open universities: meaning institutions following the campus-based / classroom and teacher-centred model for the delivery of education.

internet and social media, they found however that conventional universities had a different interest to enter the world of open education on a parallel route and using a different definition. When MIT in 2001 launched the open courseware concept a new definition of open education was introduced. As Professor Dick K.P. Yue, MIT School of Engineering explained[40]: "The idea is simple: to publish all of our course materials online and make them widely available to everyone."

*To understand the different motivation for this development it is recommended to watch the video recording of a discussion on how MIT started the open courseware initiative. The discussion referred to took place at the 10th annual Open CourseWare Consortium conference and was between the original managers responsible at MIT at the time of the decision. The OCW Consortium has become the leading global network for institutions involved in the use of open courseware and open educational resources. The recording is available on YouTube (*http://youtu.be/gXJa7YutKfM*).*

During its annual conference in 2014 the Open Courseware Consortium has changed its name into Open Education Consortium to emphasize the conceptual change over the instrumental change.

Next to the classical openness a new openness has emerged: the digital openness (Mulder, 2010). Open source software is a well-known occurrence in the family of digital openness like open access which applies to scientific publishing[41]. Starting in 2001 with MIT, open courseware was introduced as a new form of digital openness. And other forms of digital openness emerged: e.g. open data; open science; open practices; and open policies. UNESCO recognized the potential of open courseware and in 2002 at its Forum on the Impact of Open Courseware for Higher Education in Developing Countries coined the term Open Educational Resources (OER), with the accompanying definition: *'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 2002b).

For the Education for All program, UNESCO's core educational program, OER can be of great importance as an instrument to achieve the EFA goals. The availability of high quality content for free that can be used, shared and adapted is a game changer where the "developing world" is no longer depending on donations of materials not created for their context. Materials can be acquired and then adapted to the local situation at little effort and without paying tribute to publishers. Even more important is that groups of experts, teachers and educators within any country can join forces and develop materials together to share and re-use. Since its inception OER has become an

[40] http://ocw.mit.edu/about/, accessed August 4, 2015
[41] http://www.openaccess.nl/en, accessed December 7, 2016

important driver for change in education. Significant milestones in the OER movement since 2002 are the Cape Town Open Education Declaration (2007)[42] and the Paris OER Declaration (UNESCO, 2012). The Cape Town Open Education Declaration calls upon the educators of the world to participate in the creation of Open Educational Resources and Open Education Practices; to release these resources for sharing and re-use; and urges governments and institutions to develop and implement an open education policy.

In the **Cape Town Open Education Declaration** the following strategies are suggested to promote open education in general and to increase the reach and impact of open educational resources in particular:

1. Educators and learners: First, we encourage educators and learners to actively participate in the emerging open education movement. Participating includes: creating, using, adapting and improving open educational resources; embracing educational practices built around collaboration, discovery and the creation of knowledge; and inviting peers and colleagues to get involved. Creating and using open resources should be considered integral to education and should be supported and rewarded accordingly.

2. Open educational resources: Second, we call on educators, authors, publishers and institutions to release their resources openly. These open educational resources should be freely shared through open licences which facilitate use, revision, translation, improvement and sharing by anyone. Resources should be published in formats that facilitate both use and editing, and that accommodate a diversity of technical platforms. Whenever possible, they should also be available in formats that are accessible to people with disabilities and people who do not yet have access to the Internet.

3. Open education policy: Third, governments, school boards, colleges and universities should make open education a high priority. Ideally, taxpayer-funded educational resources should be open educational resources. Accreditation and adoption processes should give preference to open educational resources. Educational resource repositories should actively include and highlight open educational resources within their collections.

The **2012 Paris OER Declaration** specifies ten recommendations for its member states, within their capacities and authority, that is to:

a. Foster awareness and use of OER. Promote and use OER to widen access to education at all levels, both formal and non-formal, in a perspective of lifelong learning, thus contributing to social inclusion, gender equity and special needs education. Improve both cost-efficiency and quality of teaching and learning outcomes through greater use of OER.

[42] http://www.capetowndeclaration.org/read-the-declaration, accessed August 4, 2014

b. Facilitate enabling environments for use of Information and Communications Technologies (ICT). Bridge the digital divide by developing adequate infrastructure, in particular, affordable broadband connectivity, widespread mobile technology and reliable electrical power supply. Improve media and information literacy and encourage the development and use of OER in open standard digital formats.
c. Reinforce the development of strategies and policies on OER. Promote the development of specific policies for the production and use of OER within wider strategies for advancing education.
d. Promote the understanding and use of open licensing frameworks. Facilitate the re-use, revision, remixing and redistribution of educational materials across the world through open licensing, which refers to a range of frameworks that allow different kinds of uses, while respecting the rights of any copyright holder.
e. Support capacity building for the sustainable development of quality learning materials. Support institutions, train and motivate teachers and other personnel to produce and share high-quality, accessible educational resources, taking into account local needs and the full diversity of learners. Promote quality assurance and peer review of OER. Encourage the development of mechanisms for the assessment and certification of learning outcomes achieved through OER.
f. Foster strategic alliances for OER. Take advantage of evolving technology to create opportunities for sharing materials which have been released under an open license in diverse media and ensure sustainability through new strategic partnerships within and among the education, industry, library, media and telecommunications sectors.
g. Encourage the development and adaptation of OER in a variety of languages and cultural contexts. Favour the production and use of OER in local languages and diverse cultural contexts to ensure their relevance and accessibility. Intergovernmental organisations should encourage the sharing of OER across languages and cultures, respecting indigenous knowledge and rights.
h. Encourage research on OER. Foster research on the development, use, evaluation and re-contextualisation of OER as well as on the opportunities and challenges they present, and their impact on the quality and cost-efficiency of teaching and learning in order to strengthen the evidence base for public investment in OER.
i. Facilitate finding, retrieving and sharing of OER. Encourage the development of user-friendly tools to locate and retrieve OER that are specific and relevant to particular needs. Adopt appropriate open standards to ensure interoperability and to facilitate the use of OER in diverse media.
j. Encourage the open licensing of educational materials produced with public funds. Governments/competent authorities can create substantial benefits for their citizens by ensuring that educational materials developed with public funds be made available under open licenses (with any restrictions they deem necessary) in order to maximize the impact of the investment.

After UNESCO adopted OER as a key concept it rapidly was included in the policies of other (international) organisations and gained support from strategic funding organisations. OECD (Hylén & Schuller 2007) embraced the OER concept when it published the report 'Giving knowledge for free'. The William and Flora Hewlett Foundation launched a sponsor program on OER, sponsoring awareness raising projects, development projects and research projects on OER globally[43]. The growing awareness about and the use of OER has led to an update of the definition since 2002. The William and Flora Hewlett Foundation uses the following definition: *"OER are teaching, learning, and research resources that reside in the public domain or have been released under an intellectual property license that permits their free use and 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."*

OECD uses the following definition: *"Digitised materials offered freely and openly for educators, students, and self-learners to use and reuse for teaching, learning, and research. OER includes learning content, software tools to develop, use, and distribute content, and implementation resources such as open licences."*

UNESCO has adapted its original definition, thereby accounting for the global discourse that has taken place since 2002: *"Teaching, learning and research materials in any medium, digital or otherwise, that reside in the public domain or have been released under an open license that permits no-cost access, use, adaptation and redistribution by others with no or limited restrictions."* Note that this definition is not only referring to digital materials in order to take on board also situations in regions where connectivity and therefore online provision is problematic or even not available. The three definitions have different wordings but the crucial ingredients are included in each of them, and indeed there is a fair global agreement on what OER should stand for.

It's interesting to mention here that, parallel to UNESCO's process towards the 2012 Paris OER Declaration, OECD made attempts to prepare for an OECD OER Recommendation. This was accompanied by an OER survey among the OECD country membership (Hylén et al. 2012) but it turned out to be a bridge too far at that time. However, since the Paris declaration in 2012, various countries, including OECD member states, have stepped up to adopt OER or Open policies to support the use of OER. And OECD continued its efforts in OER with a new report (Orr et al. 2015) providing an overview of the developments on the policy level. This report focuses on the contribution of OER to six key educational challenges that concern education systems today.

The six key challenges listed in the OECD report:

[43] http://www.hewlett.org/programs/education, accessed August 18, 2016

1. Fostering the use of new forms of learning for the 21st century
New forms of learning are required to provide learners with a learning experience that better facilitates personal development and success in a knowledge society. These include the use of approaches to learning, which involve learners as a community in the development of their own learning materials and the support of other learners. The possibility to easily adapt and share OER supports this objective.

2. Fostering teachers' professional development and engagement
Teacher development and engagement has been shown to be key to effective learning. The adaptability of OER allows teachers to revise and tailor their educational resources to provide a better fit to the educational environment in which they are teaching. It is also expected that this opportunity can lead to a higher level of collaboration between teachers.

3. Containing public and private costs of education
Higher levels of participation in education systems across the world lead to a challenge for cost sharing between public budgets and private households to cover the costs of high-quality learning materials. OER offer the possibility of reducing these costs through developing, sharing and updating resources more cost effectively.

4. Continually improving the quality of educational resources
The dynamics of a knowledge society lead to three challenges for educational resources: they must reflect new developments in the subject area they cover, they must reflect new learning theories in order to better support high-quality learning, and they must be fit for purpose for the expected learning outcomes and the heterogeneous group of learners who are using them. The adaptability of OER offers the possibility for keeping educational resources at pace with these dynamics.

5. Widening the distribution of high-quality educational resources
High-quality resources for education are being produced and used in some educational institutions, for some groups of learners and in some countries. The ability to share OER offers the possibility of breaking down boundaries to high-quality provision by ensuring a more even distribution of high-quality educational resources. This can build bridges between countries, between informal learning and formal education and facilitate lifelong learning.

6. Reducing barriers to learning opportunities
Many learners are excluded from high-quality learning opportunities because of the requirements of place, time and pace of learning. OER offered as digital resources enable the extension of educational resources beyond a set place and time of provision, and allow provision at an appropriate pace for the learners.

These issues discussed in the OECD report relate directly to the Iron Triangle model and provide some basis for policy development to break the Iron Triangle. The focus is on OER in particular but also touches the teacher's effort and the learning support. E.g. the report states that learners benefit from access to high quality OER. For this to happen however new services need to be developed, which will influence the role of the teacher (Orr et al. 2015, p.128).

To fully understand open education a framework in which open education can be represented is needed. Several models have been developed recently to fill this gap. The first is the 5COE model which stands for 'Five Components for Open Education' (Mulder 2010, 2012; Rikers & Mulder 2012b; Mulder & Janssen 2013; Mulder 2015). This model contains three components on the supply side and two components on the demand side of education, which are required to fully specify Open Education in a broad scope. Recently the model has been revised (Mulder 2017). Amongst the changes is a new name: The Open Education Pentagon. Furthermore, one of the components on the demand side has been renamed to (Open to) Societal Needs, and the graphical presentation is new and different (Figure 5-4).

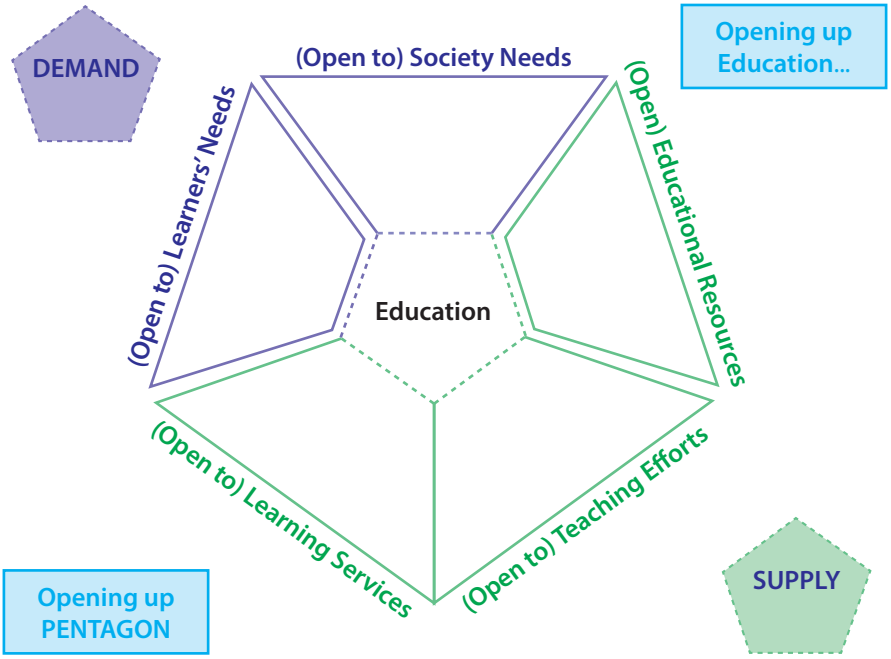


Figure 5-4: The Open Education Pentagon

Where all components span openness, the model allows for diversity in choosing the degree of openness for each component. This flexibility leaves the opportunity for institutions to profile themselves in terms of openness for each separate component. It also gives the flexibility to governments to develop policies towards openness in each of those five components in order to influence accessibility, quality and efficiency.

Mulder (2017) writes:

The first supply side component of the OE pentagon is educational resources. With the qualifier "open" added to it, this stands for OER. There is a fair amount of agreement globally on the definition of OER, although different organizations, such as UNESCO, the Organisation for Economic Co-operation and Development (OECD), and the Hewlett Foundation, use slightly different wording. The UNESCO definition (UNESCO/COL, 2012, p. 1) is as follows:

OER are teaching, learning and research materials in any medium, digital or otherwise, that reside in the public domain or have been released under an open license that permits no-cost access, use, adaptation and redistribution by others with no or limited restrictions.

Educational resources by themselves do not fully comprise education. Along these same lines, OER do not comprise all aspects of OE, and complementary components are required.

The second supply side component in the OE pentagon is learning services. With the qualifier "open" added to "learning services," this term can be abbreviated to OLS. OLS stands for a wide range of online and virtual services meant for purposes such as tutoring, advice, meetings, feedback, communities, teamwork, presentations, consultation of sources, navigating the Internet, testing, or examining. In contrast to OER, OLS may be available free of charge or at a cost.

The third component on the supply side is teaching efforts. With the qualifier "open" added, the term becomes "open teaching efforts" or OTE. The concept of OTE relates to the human contribution to the educational content or experience being provided (and which generally has to be paid for). This contribution includes the efforts of teachers, instructors, trainers, developers, and support staff in their various roles, in a professional, open, and flexible learning environment and culture.

It is not sufficient to view education solely from the supply side. There needs to be a match with the requirements on the demand side. The first component on the demand side is learners' needs. When we add "open to," this term becomes "open to learners' needs," which is abbreviated to OLN. This component of the OE pentagon refers to the wish of learners for education that is affordable, manageable, interesting, of good quality, and that also generates benefits for them. Furthermore, learners' desire for openness may relate to the "classical" openness (open entry; freedom of time, place, and pace; open programming; and open to people and target groups) as well as to facilitating lifelong learning (e.g., recognition of prior learning or practical experience, credentialing, bridging between informal learning and formal education).

Finally, the second demand side component is societal needs. When we add "open to" to this term, it can be abbreviated as OSN. In effect, OSN implies that education can be expected to suit the changing society, to prepare individuals for the labor market, and to be effective in the pronounced role of knowledge, innovation, and globalization. Moreover, education should offer scope for new (21st-century) skills, critical thinking, creativity, ethics, and responsibility, as well as for personal growth and citizenship. (Note that in the 5COE model this component was called "open to employability & capabilities development" or OEC.)

The Open Education Pentagon defines open education as a status in time, as a single ideal model for education does not exist. By colouring the outer sectors of each of the five components from 0 to 100%, an educational institution or organisation can indicate the level of openness it has reached or wants to reach. A situation where all five components would be open at 100% could be identified as full open education. This, by the way, is a more hypothetical than realistic situation, as has been argued by Mulder (2012; Mulder 2015).

Figure 5-5: IPTS Model to support Higher Education Institutions Policy Development

I would like to refer to another very recently proposed model (Figure 5-5) based on studies performed by IPTS, the EU joint research centre in Seville, Spain (Dos Santos et.al., 2016)[44]. This model specifically addresses higher education and seeks to support that higher education institutions can monitor and influence open education with their policies. The basic assumption is that the 10 dimensions of the model are all interrelated and it is necessary to maintain an overview over all 10 dimensions to reach maximum impact of policies affecting one of the dimensions. In this dissertation I prefer to use the OE Pentagon rather than the IPTS model because it is less complicated, it merely decomposes education in its constituting contributions, and it is better aligned with the three performance indicators of the Iron Triangle. Moreover, where the IPTS model focuses on higher education only, the OE Pentagon has a wider scope including all educational sectors and levels. On the other hand, the IPTS model has a broader orientation than the OE Pentagon by including core dimensions like research and collaboration, and transversal dimensions like strategy and leadership. These extra dimensions do, however, not offer added value in the further analysis and evaluation in this PhD thesis.

5.3.2. Education for Sustainable Development

Education for Sustainable Development (ESD) is a conceptual innovation in education targeting the inclusion of all, offering equal opportunities to learn and looking for a future oriented improvement of the quality of education (Ubuntu Allience 2002; UNESCO 2004; Otieno 2005; COPERNICUS 2001; Van Ginkel 2010). The introduction of ESD, through the United Nations Conference on Environment and Development (UNCED), also known as the Rio de Janeiro Earth Summit, in June 1992[45] and based

[44] https://ec.europa.eu/jrc/en/about/jrc-site/seville, accessed August 19, 2016

on the Brundtland Report (Brundtland 1987) targets a rethinking of the purpose of education. Where most of the world's educational systems are PISA[46] based or oriented, ESD poses the conviction that people in general are more than workforce contributing to the economy and chasing careers (Hopkins 2012a). ESD sets a different set of quality criteria. Based on the Millennium Development Goals (MDG's)[47] and their successors: the Sustainable Development Goals[48], ESD stands for an education that addresses the well-being of the individual, the society and the planet.

In the Agenda 21 document resulting from the RIO Summit, Promoting Education, Public Awareness and Training (Article 36)[49], lies the formal basis for ESD. The first decade after Rio, ESD did not catch much attention. The focus was on the environment and environmental education. This agenda was pushed by NGO's orienting on environmental problems on the one hand and ministries of the environment on the other hand. Especially institutions for higher education and ministries of education ignored ESD (Hopkins 2012b). Towards the Johannesburg Summit in 2002 experts in higher education started to mobilise the sector to ensure a more prominent stand at the Johannesburg Summit compared to the Rio Summit (van Dam-Mieras 2003). In their efforts a collaboration with UN agencies like UNESCO and United Nations University resulted in some tangible results. The most remarkable being the instalment of the Decade Education for Sustainable Development DESD (UNESCO 2005). It was UNESCO's decision not to position ESD along with e.g. environmental education, but as a goal to be achieved and an overarching concept for education. Another result was the instalment of the regional centres for ESD, RCEs (Figure 5-6), coordinated by United Nations University (Fadeeva & Mochizuki 2005; van Dam-Mieras & Rikers 2007; Rikers & Hermans 2008), bringing regional stakeholders together to learn in collaboration how to work towards a sustainable future.

Regional Centers of Expertise on ESD

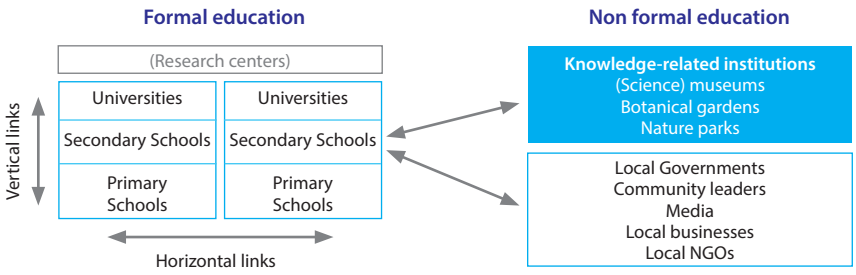


Figure 5-6: Basic RCE structure.

[45] http://www.unep.org/Documents.multilingual/Default.asp?DocumentID=78&ArticleID=1163, accessed July 12, 2016
[46] https://www.oecd.org/pisa/, accessed July 12, 2016
[47] http://www.un.org/millenniumgoals/, accessed July 12, 2016
[48] https://sustainabledevelopment.un.org/sdgs, accessed July 12, 2016
[49] http://www.unep.org/documents.multilingual/default.asp?DocumentID=52&ArticleID=4415&l=en, accessed July 12, 2016

A Regional Centre of Expertise on ESD (RCE) is seen as a mechanism to introduce actual knowledge transfer between stakeholders in a region (including educational institutions). This mechanism was introduced at the World Summit on Sustainable Development in Johannesburg, South Africa in 2002 and has developed into a global network of regionally organised RCEs, with a central support unit at United Nations University (Fadeeva & Mochizuki 2005; Glasser 2008; Aipanjiguly et al. 2010) towards the end of the decade for ESD in 2015.

When different sectors in society are from their own perspective showing interest in sustainable development another aspect of Education *for* Sustainable Development becomes apparent: what can the different sectors learn from each other and maybe do collectively to support sustainable development? United Nations University promoted the idea of creating a global learning space for sustainability based on regional centres where different stakeholders would meet on the regional level. The idea was first mentioned in the Lüneburg Declaration[50] as part of the preparations for the World Summit on Sustainable Development, in Johannesburg, in 2002. At the summit this idea was strongly promoted by United Nations University (UNU). These centres were named Regional Centres of Expertise (RCEs) on Education *for* Sustainable development. These centres became known as RCEs in connection to their home region (RCE Barcelona; RCE Greater Sendai; RCE Curitiba e.g.). The proposed RCE formula was flexible and allowed for each region to develop an RCE structure that would maximise the possibilities for that region (van Dam-Mieras & Rikers 2007; Glasser 2008; Rikers et al. 2010). Guidelines were developed and a recognition procedure was put in place (Fadeeva & Mochizuki 2005; Glasser 2008). Basically a RCE is seen as a regional platform where regional stakeholders in sustainable development meet and develop regional activities where participants learn from each other and teachers, school boards and students are amongst the learners.

It took however until the Bonn summit in 2009, marking the mid-term point for the decade, that the ministers of education got involved in ESD. The Bonn Declaration renewed the concept of ESD as a goal or overarching purpose of the world's education systems (Hopkins 2014). From this point onwards ESD starts to become mainstream and catches the attention of educators, leaders in education, but also the public, the press and the industry. In higher education suggestions are raised to dedicate research more to ESD principles, amongst others a call for more interdisciplinary research (Rikers et al. 2012). One of the most inspiring outcomes of the DESD is the discussion on the very purpose of education, and a different view on quality education (Hopkins 2012a; Hopkins 2012b). Based on the agreement that ESD was education *for*

[50] In October 2001, the conference on "Higher Education for Sustainability: Towards the World Summit on Sustainable Development 2002", at the university of Lüneburg, Germany produced the Lüneburg declaration.

sustainable development and not about sustainable development, got the educators involved as ESD offered the alternative for an education that was organised and geared towards national and regional economic growth and competitiveness.

To position ESD in the discussion on the contribution of education to development it is necessary to define ESD in a way that clarifies the contribution of ESD to this discussion. Before providing a definition it is important to identify what it's not. The abbreviation used (ESD) can be confusing. It does not stand for Environment and Sustainable Development and it is not a synonym for sustainable development education. The key word is "for" and therefore van Ginkel prefers the abbreviation E*f*SD (Van Ginkel 2011). Tilbury (2011, p.104) concludes that: "*Learning for ESD refers to what has been learnt and is learned by those engaged in ESD, including learners, facilitators, coordinators as well as funders. Often learning is interpreted as the gaining of knowledge, values and theories related to sustainable development but, as this review indicates, that ESD learning also refers to:*
1. learning to ask critical questions;
2. learning to clarify one's own values;
3. learning to envision more positive and sustainable futures;
4. learning to think systemically;
5. learning to respond through applied learning; and,
6. learning to explore the dialectic between tradition and innovation."

These indicators are in line with what defines competence-based education and the need for dedicated competences related to sustainable development (de Kraker et al. 2007; Pérez Salgado 2012; Lansu 2013). And as stated in the definition of sustainable development it should be future-oriented (Brundtland 1987).

In terms of globalization the world is shrinking, connections stretch over continents, and people's activities have effects across the globe. Preparing individuals to play a role in a globalizing world, requires an educational model that takes this world as a starting point to explore and understand and to find ways to adapt human behaviour to secure a future. The complexity of our society is profound and our individual relationship with society has become manifold (Van Ginkel 2011). If education is to prepare learners for this world, the fragmented, knowledge domain based model should at least be enhanced with future-oriented guidelines that help pick the best solution. But maybe this should go further and if this is the case a new model is required.

If ESD was to be the new goal, this would inevitably lead to changes in education. An example of such a change on the policy level is provided by Hopkins (2014) when he cites the new educational policy for the Canadian state of Manitoba: 'To ensure that all Manitoba's children and youth have access to an array of educational

opportunities such that every learner experiences success through relevant, engaging and high quality education that prepares them for lifelong learning and citizenship in a democratic, socially just and sustainable society. (http://www.edu.gov.mb.ca/edu/mandate.html)'.

If education is to drive development it should focus on the kind of development that supports the continuous search for balance between economic needs, societal and individual needs and the potential of the environment. This is what Education for Sustainable Development is about (Van Ginkel 2011).

Next to the innovations in education that challenge the existing systems (like Open Education), it is ESD that provides an innovation in the content of education. In paragraphs 4.2.1 and 4.2.2. it was argued that the curriculum of the few existing higher education institutions in the newly established African nations in the 1960's was not serving the need for nation building and development. In other regions of the world the discussion on the curriculum is focussing on 21st century skills and competences. Where there is a need for changing the curriculum to fit the needs of society, it might well be ESD filling this need.

5.3.3. Online learning

The development of online learning is based on the spectacular innovations in the field of information and communication technology and especially the internet (Mcintosh & Varoglu 2005; Kinuthia 2009; Badarch 2010; Kozma 2009; Atchoarena 2011; Kozma 2008). ICT-based online education is discussed as an instrumental innovation that can help alter the relationship between the main performance indicators. Mulder (2015) has linked the two developments, towards open education and online education, in an analysis and description of the roots of Massive Open Online Courses (MOOCs). Online learning is not a synonym for open education and open education is not restricted to online learning. Online learning is based on information and communication technology and offers digitized solutions for various aspects of education. Many new technologies introduced in education innovation were originally developed for use in a sector of the economy outside education. The computer (mainframe or PC, laptop or tablet) was not developed to make all problems in education go away. The same goes for beamers, video equipment, the smart board and the internet. However, the ICT industry is always looking for markets to open or to extend (Adkins 2013). And if the introduction of a new technology can be connected to a problem in education a new market is found. Most of the technologies are adopted into the existing systems as useful add-ons. Educators and others involved in solving problems in education will also look at technology-based solutions. It is expected by experts like Sir John Daniel that technology based solutions have a positive effect on the accessibility to education or on the quality of education, or they think it is an effective use of limited resources. In addition to these effects related to

the functioning of the educational systems, experts also expect effects of technology based innovations related to pedagogical issues, like motivation, authentic learning or learning complex skills (Kozma 2008; Conole 2012; Draycott 2012; Blakemore 2013; Majumdar 2013; Kirschner & Clark 2006; Kirschner 2004).

Introducing a new technology, however, requires a balanced implementation plan that includes funding, not just for the initial stage, but also for maintenance or replacement or training schemes for the users like teachers (Voogt 2012; Farrel et al. 2007; Basaza et al. 2010; Van Rosmalen et al. 2008; Petegem et al. 1999; Miao et al. 2009). After the initial enthusiasm for the new technology has faded, embedding the technology in the pedagogic model and the didactic design of the education provided is the only way that education can really benefit from such an innovation. Ideally it should be the other way around, where educational problems can be solved using technology that can be integrated in the educational model.

This is what Daniel (2009) was referring to when writing about breaking the 'Iron Triangle' in education. This then is the key relevance of online learning as a technological innovation in education, facilitating and supporting the change in the teacher-student ratio while at the same time contributing to the quality of education in two ways. One way is by offering access to multi-media based content that provides a richer learning experience, and the second way is by offering materials that are designed and produced by a team of experts, not just one teacher. Using the technology, learners can explore reality (videos, simulations, games) from a secure classroom environment without the need to leave that environment. These developments were utilized especially by open universities thereby managing to thrive and claim their own position in the educational arena. When open universities and other organizations (universities or associations) offering distance education started to apply multimedia concepts in the design of their course materials and courses, the use of technology was actually serving educational ambitions. Desired learning outcomes started to dictate the use of technology.

With the introduction of internet technology a completely new and – one might say – transformative dimension was added to the range of technological instruments that could innovate education. The internet introduced two-way communication at a distance, be it synchronic or a-synchronic. Interactions (student/teacher; student/student; teacher/teacher) that are crucial to education were made possible in situations where the participants did not share the same space. Especially the community aspect attracted attention, as it could offer a way out of the 'lighthouse' for the student without leaving the island. The overwhelming and conclusive embracing of the internet in educational practice clearly shows that the educational sector is keen on technology as an instrument that really responds to needs within the framework of an educational concept.

MOOCs

Since 2011[51] we are witnessing a booming global worldwide development in the online learning world with the entry, initiated in the US, and subsequent enormous expansion of the so-called Massive Open Online Courses (MOOCs). Mulder (2015) has described the emergence of this new phenomenon within the context of the two developments which have been and still are decisive for a significant transformation of education, the one towards open education and the other one towards online education. He argues to be clear on the specifics, the benefits, the drawbacks, and the challenges of both distinct but connected developments.

There is criticism on the MOOCs offered through the major platforms like Coursera, edX, or FutureLearn, regarding their lack of rooting in the well-documented pedagogy of and research in open education (Daniel 2012) and their limitations with respect to truly opening up education (Mulder & Jansen 2015). Many MOOCs are not always as open as the name suggests, as registration is required and the course is on offer 'as is' and on a fixed schedule, where a learner can participate, and there is no offering outside the schedule. Although many courses provide a form of certificate, most of them are associated with participation only and are not for credit. Student support is not given without cost, if done at all. Open licensing of MOOCs is an exception which is blocking the attractiveness and high potential of re-use and repurposing of the learning materials. Nevertheless, MOOCs are a welcome addition to the options for those who have internet access, but no higher education offering nearby that they can afford to turn to or for those who enjoy to learn directly from well-known universities. Because one of the fascinating elements of the MOOCs movement is that courses can be taken from renowned faculty staff from internationally reputed universities (Liyanagunawardena et al. 2013). A most valuable contribution that MOOCs can make therefore is to convince people that in open (and online) education quality of the materials need not be the issue and open education thus is not inferior to the classical (closed) model.

The originally US-based MOOCs initiatives have led to global responses of various kind. One of those responses is the pan-European OpenupEd initiative, launched in 2013 by the European Open Universities and their association (EADTU[52]), together with the European Commission. The OpenupEd initiative is built on 8 common features for MOOCs to be offered through the OpenupEd portal: openness to learners; digital openness; learner-centred approach; independent learning; media-supported interaction; recognition options; quality focus and a spectrum of diversity. Each MOOC on the portal satisfies these features to some degree[53]. The portal itself is an entry

[51] In 2008 the first than called cMOOC was introduced by Stephen Downes and George Siemens: http://www.downes.ca/post/64556, accessed 13 December 2016

[52] http://www.eadtu.eu, accessed 13 December 2016

[53] http://www.openuped.eu/mooc-features/our-framework, accessed 13 December 2016

point and a point of information only. Each MOOC provider can host his MOOCs on its institutional platform, with the advantage that there is no need to convert to one accepted technology or to one central delivery platform. OpenupEd has partners in many European countries (and also outside Europe) where these partners deliver their MOOCs mostly in their home language, thereby serving linguistic diversity (Mulder & Jansen 2015).

MOOCs have attracted a lot of attention and many people engage in the development. The variety is large, there is no single kind of MOOC, and also new acronyms are introduced for new categories of MOOC-alikes. Clearly, MOOCs are an important new kid on the block providing opportunities to play a role in increasing accessibility, quality and efficiency of higher education.

5.4. The 'Iron Triangle Scan' applied

Which of the three educational innovations described in the previous sub-section will pass the 'Iron Triangle Scan' favourably? In other words, in which case will there be a simultaneous increase of performance along all three dimensions: accessibility, quality and efficiency?

Before processing the 'Iron Triangle Scan' successively for Open Educaton (OE), Education for Sustainable Development (ESD), and Online Learning I start with a kind of disclaimer. This scan is not an objective measurement based on firm and indisputable evidence but more a screening mechanism using sensible reasoning which nevertheless can be questioned. It is more than merely speculation but less than a solid proof. One could say that it derives its significance from hypothesizing on fair grounds which of course is open to verification/falsification.

When applying the 'Iron Triangle Scan' I will use two key discriminating factors on top of the argumentations presented with respect to the three performance indicators. The first one is 'diversity', which should be cherished and maintained as a fundamental value of education and the educational system. Indeed, learners have their own wishes and preferences, and so do teachers. Educational demands depend on different target groups, and educational supply may vary according to different learning philosophies and educational settings. As I realise by heart as well as by reason, supported by educational practice in the past, there is no single ideal model for or road through education. This observation will not be changed by whatever educational innovation. Therefore, if diversity is – for whatever reason – at stake, this may undo otherwise identified benefits or advantages of educational innovations, partly or fully.
The second key discriminating factor in this PhD study is of course 'Africa'. The African – and more generally the Global South – context may counteract or weaken favourable developments that might possibly occur through educational innovations as positioned predominantly in the Global North.

The 'Iron Triangle scan' is not an exact scan. Therefore in the summary I take into account that some conclusions cannot simply be pass of fail. Some components of some innovations can be beneficial depending on the context. For that reason qualifications of components in the scan can be:

- 'no-regret': components that can be applied without restrictions.
- 'desirable': components that did not pass the scan. Still it can be considered to use these components in particular contexts.
- 'indifferent': components that are not considered relevant for the innovation that is scanned.
- '-': components that did not pass the scan.

5.4.1. Open education

I will first scan each of the five Open Education components constituting the OE-Pentagon: Open Educational Resources (OER), Open Learning Services (OLS), Open Teaching Efforts (OTE), Open to Learners' Needs (OLN), and Open to Societal Needs (OSN). I will explore their capacity to break the Iron Triangle after which conclusions can be drawn for the overall concept.

Open Educational Resources

With OER being available online access is guaranteed. This is not necessarily the case for the accessibility (our first performance indicator), especially where internet connectivity is a problem which indeed (still) applies to parts of Africa. But alternative solutions can then be used. OER can, for example, be distributed by using copies in print or on dvds, or by applying local mirror servers. Note that the UNESCO definition of OER does accommodate this situation by referring to *'materials in any medium, digital or otherwise'.* Note also that the connectivity problem will be reduced year-by-year. It can be concluded that OER will better serve accessibility than regular educational resources which are not openly available to anyone.

The sharing and re-using principle of OER will stimulate a quality increase of the learning materials due to peer review and collective improvement. Evaluation of and feedback on materials by the users, teachers as well as students, is part of the process of continuing development and maintenance (updating). Looking at Africa, the quality can be served by enabling a context specific re-use of available high-quality materials. This 'localization' opportunity that OER is offering is a new, attractive and affordable way of stepping away from the cultural domination by the main producers of learning materials from the Global North. Generally it can be concluded that OER will contribute in a positive sense to the quality performance indicator.

A similar conclusion can be drawn for the third performance indicator, efficiency. Indeed efficiency in the development of learning materials can get a boost through – again – the sharing and re-using principle that goes with OER. Instead of a full development

of learning materials in multiple but yet rather similar versions by a large variety of academics, focus can shift towards use and re-use of existing materials, complemented – if necessary – with some new parts to be shared again with the community.

Considering the first key discriminating factor, diversity, OER can be seen as a facilitator of maintaining diversity (even though efficiency is being served), in particular through the re-use and adaptation opportunities to regional, institutional or individual wishes or needs. One could say that OER is what all institutions and teaching staff could aim for (and learners could expect), since it is beneficial regardless of the diversity which is manifest in the institutional identity, learning philosophy, target groups, and educational sectors.

For the second key discriminating factor, the African context, I have identified one issue, the problematic internet connectivity in parts of the region that may weaken the beneficial conditions for OER. This problem can, however, be expected to be significantly reduced over time. And for the time being creative options can be exploited, even though these will not offer the full benefits.

In summary, OER can serve a simultaneous increase of performance along all three dimensions: accessibility, quality, and efficiency of education, and therefore passes the Iron Triangle Scan positively.

Open Learning Services

Open Learning Services are extending the flexibility in the delivery of learning opportunities by providing digital, online and virtual learning services as described earlier. This will increase the accessibility to education for those who prefer such a delivery mode and do have good quality access to the internet. Different from OER there is no real alternative for OLS if internet connectivity is problematic (as can apply to Africa). It can be concluded that there is no general gain in accessibility, not only because of the potential connectivity handicap but also because this kind of delivery is not very likely to be preferred by the majority of learners in all educational settings. This will make mainstreaming of OLS in order to generally raise accessibility no option.

A similar argumentation holds for the quality performance indicator. Certainly OLS can be of high quality and this is what institutions should aim for, but in practice quite often this is not the case. Moreover, and even more important, OLS can only partially contribute to a quality improvement of the full learning and teaching processes. Face-to-face, offline teaching and learning is still a dominant mode and probably will remain a distinctive value for institutions even though blending with OLS will further extend in the future. Therefore one may conclude that OLS is not a single decisive factor in maintaining and increasing the quality of education.

Added to this it is clear that developing high-quality OLS and maintaining their quality and the underlying infrastructure requires returning investments. This may be beneficial and therefore efficient for large target groups of learners as being served traditionally by open universities and more recently also by MOOCs. It remains to be seen whether new business models can be developed that can serve efficiency for mainstream educational delivery. More and more this will be a blended learning mode, being applied in a wide variety of educational settings, including small and medium scale provision. It can be concluded that the addition to and mixing of OLS with the regular offline educational mode not necessarily will contribute in a positive way to the overall efficiency performance indicator.

Is diversity, the first key discriminating factor, being served by OLS? Certainly the spectrum of diversity is extended when services are available from face-to-face to fully online. The point is – as explained above – that mainstreaming OLS and, for example aiming to completely replace regular modes of educational provision by OLS would do the opposite. It would significantly reduce the diversity spectrum and therefore undo many of the potential benefits of OLS.

For the African context, the second key discriminating factor, OLS is not a priority at this stage given the connectivity problem, and not being the single decisive factor in order to achieve overall higher quality and better efficiency in education. For the moment learners are best served with offline learning services offered nearby.
In summary, OLS does not favourably pass the Iron Triangle Scan. Yet an increasing use of OLS remains desirable but it's important that this should be aligned and balanced with the wide variety in educational settings.

Open Teaching Efforts
Open Teaching Efforts is – one could say – the reverse side of the medal that otherwise is linked to Open Learning Services. OTE and OLS are strongly interrelated and therefore the argumentation with respect to the Iron Triangle Scan is very similar.

More specifically I may add here that in many educational approaches teachers are still the experts who are transferring knowledge to the learners, but that OTE can open new avenues in education. Like with OLS this is extending the flexibility in the educational delivery while, however, it will not necessarily lead to a general gain in accessibility.

Regarding quality, teachers going online will expose them to situations outside the classroom. As they will be aware of this exposure, they will also feel more urged to go for quality. And they will become prepared to further increase quality by incorporating the feedback of learners on their performance that will come up. Nevertheless, as is the case with OLS, it can be concluded that OTE is not a single decisive factor in maintaining and increasing the quality of education.

The returning investments argument that makes a better performance in terms of efficiency questionable for OLS, also holds for OTE. New business models that are able to serve efficiency for a mainstreamed blended learning approach in various educational settings may point to a future solution. One may state that OTE per se not automatically will lead to more overall efficiency in education.
In terms of diversity, similar to OLS, the continuing availability of a full spectrum of educational provision is important. A generic use of OTE would ultimately give rise to the opposite that is much more unifying the spectrum of diversity and therefore outweighing many of the potential advantages of OTE.

In the African context the OTE option would be very welcome in the spectrum of diversity, given the shortage of qualified teachers. However, like with OLS, as long as connectivity is problematic and an adequate infrastructure is lacking, the potential of utilizing OTE cannot be fulfilled.

In summary, OTE does not pass the Iron Triangle Scan in a positive way, very similar to OLS. And also, nevertheless, utilization of OTE remains desirable under the condition that this should properly fit the wide variety in educational settings.

Open to Learners' Needs
Open to Learners' Needs can be identified as a call for diversity and flexibility through which as many learners as possible with a wide variety in their wishes and circumstances can be served. As has been noted earlier, OLN requires education that is affordable, doable, interesting, of good quality, and generating benefits for the learners. Furthermore OLN refers to providing an environment of classical openness (open entry, freedom of time, place and pace, etcetera) as well as to facilitating lifelong learning (including bridging between informal learning and formal education).
One could say: 'What else could support a maximum accessibility for the learners to the educational system as a whole better than this full spectrum of properties and learning opportunities of education to be offered?'

Meeting the learners' needs will require monitoring educational practice in terms of the appreciation by the learners of the learning processes and products. Institutional student evaluations and feedback as well as national student surveys are then relevant instruments in the quality assurance systems for education at the institutional and national level. It can be concluded that the OLN principle on the demand side of education with the instruments referred to will directly enhance the (perceived) quality of education.

Satisfying the learners' needs will lead to a better return on investment. Learners will be more motivated and committed to learn and as a consequence probably perform better in achieving the intended learning outcomes. They can also be expected to

be more persistent in working towards completing a degree. As a result there will be less disappointed unsuccessful learners, and instead more people schooled in different educational sectors who will participate in society through a meaningful job and as responsible citizens. Clearly, OLN will positively contribute to the efficiency performance indicator.

Opening up to the learner's needs obviously will accommodate broad diversity (the first key discriminating factor). One could state that actually any educational system should be open to the learners' needs.

In the African context (the second key discriminating factor) education is seen as a major driver for development. OLN requires educational systems to meet and satisfy the learners' needs. This also holds for African countries where of course the needs should be 'localized' and related to their supposed contribution to the development of that country.

In summary, OLN can serve a simultaneous increase of performance along all three dimensions: accessibility, quality, and efficiency of education, and therefore passes the Iron Triangle Scan positively.

Open to Societal Needs

Open to Societal Needs can be identified as a call for relevance and impact through which education can be expected to suit the changing society, to prepare for the labour market, and to be effective on the pronounced role of knowledge, innovation, and globalisation. Furthermore – as has been noted earlier – OSN will require education to offer scope for new (21st century) skills, critical thinking, creativity, ethics, and responsibility, as well as for personal growth and citizenship. OSN does not directly affect the entry accessibility into education and the educational system but it can offer a better road of accessibility into society at the exit from education. Indeed providing relevant education will have impact on each person's opportunities to adequately participate in society, be it economically or otherwise. With this shift in interpretation of accessibility I conclude that OSN has the potential to improve on the accessibility performance indicator.

Meeting the societal educational needs will create an incentive in society at large to aim for high quality education. When serving the educational needs of society is part of the definition of quality, OSN is a requirement in the national quality assurance system for education. This will better ensure the overall quality of educational practice. It can be stated that the OSN principle on the demand side of education, applied this way, indeed can contribute to higher quality education.

Satisfying the societal educational needs will optimize society's investment in education and the educational system. Society at large benefits from an efficient

educational system because there will be a balance between demand (e.g. for skilled workers or highly trained professionals) and supply. Moreover, society can reap the rewards of explicitly addressing in education personal growth and citizenship as well as the changing society, becoming more knowledge-driven and operating in a global environment. Society will observe a good return on investment. Yes, OSN can do well in terms of gaining efficiency.

Opening up to societal needs is very much in line with both key discriminating factors, diversity and the African context, quite similar to OLN. Actually, OSN is strongly articulating the second factor, since African countries badly need a better alignment of their education and educational system with their own localized societal needs, knowing how decisive education is for their development.

In summary, OSN can serve a simultaneous increase of performance along all three dimensions: accessibility, quality, and efficiency of education, and therefore passes the Iron Triangle Scan positively.

Conclusion

I conclude this sub-section with Table 5-1, collecting the results for the five OE-Pentagon components separately, as treated above, and combining them for the overall concept of Open Education.

	NO-REGRET	DESIRABLE
Open Educational Resources	+	
Open Learning Services		+
Open Teaching Effort		+
Open to Learners' Needs	+	
Open to Societal Needs	+	
Open Education		+

Table 5-1. Results of the Iron Triangle Scan for Open Education and its five components.

In case the Iron Triangle Scan has worked out positively, that is for three of the five components (OER, OLN and OSN) each of these is qualified as a no-regret option. This also applies to Africa. For the other two components (OLS and OTE) the Iron Triangle Scan is not passed favourably but they are nevertheless qualified as a desirable option, not in general but to be judged situation-based, accounting for the anticipated added value. This situation dependence holds a fortiori for Africa. Table 5-1 shows that 'no-regret' does not apply to Open Education since not all constituting components carry this qualification. But OE certainly can be qualified as 'desirable'.

5.4.2. Education for Sustainable Development

This sub-section can be considerably shorter than the previous one on Open Education. This is because I can properly build on the argumentations presented already. I can do so by simply mapping ESD on the OE-Pentagon and conclude that its real focus is on the two demand side components. The three supply side components are not characteristic in profiling ESD and therefore their level of openness is not distinctive for ESD. So, in the Iron Triangle Scan I can abstract from those three supply side components. Realizing that in ESD the openness in the demand side components is intended to be very large, I will consider them below as the two guiding principles: Open to Learners' Needs and Open to Societal Needs, just as I have done in the Open Education sub-section. In the discussion I will circumvent as much as possible to repeat arguments from that sub-section. Conversely I will primarily address additional aspects and arguments that are typical or essential for ESD.

Open to Learners' Needs

ESD has its own particular approach to accessibility by assuming participation of all stakeholders, an inclusive approach. Accessibility then is not a goal but a requirement. Furthermore, learning is not to be restricted to learning in a formal setting. Most of our lives we spend outside the formal educational systems while we learn on a daily basis how to build a sustainable future. Both ESD aspects reinforce the earlier argumentation that OLN certainly enhances the accessibility of education and a wide variety of learning opportunities.

Knowing and understanding the learners' needs is crucial for the quality of ESD. Working with stakeholders and with interdisciplinary teams increases the level of understanding of the learners' needs. In addition the input of different stakeholders in ESD will lead to an increase in quality. Again, an ESD strengthening of the earlier conclusion that the OLN principle will directly raise the (perceived) quality of education.

Working inside and outside the classroom with stakeholders in interdisciplinary teams can lead to a cost-sharing model. Moreover, there may be efficiency benefits in the teaching process involving other experts next to the academic staff. Once more, additional ESD arguments to state that OLN will positively contribute to the efficiency performance indicator.

ESD is very much in line with both key discriminating factors, diversity and the African context. In addition to what has been discussed already under Open Education, it is relevant to mention that in ESD the cultural dimension, leading to cultural diversity, is very important. Furthermore, actually ESD is strongly articulating the second factor, since serving the learners' needs is key for development in Africa. Unfortunately, where the need is so obvious and high there is still a long way to go before such a situation can be reached in Africa.

In summary, ESD/OLN can serve a simultaneous increase of performance along all three dimensions: accessibility, quality, and efficiency of education, and therefore passes the Iron Triangle Scan positively.

Open to Societal Needs

In ESD complex societal issues (like climate change, energy and water management) are made better accessible by including different stakeholders into the process. ESD adds this argument to further support the earlier conclusion that OSN has the potential to improve accessibility.

With ESD the quality discussion is taken to another level. It is translated into curriculum requirements. Involving experts in (authentic) learning will boost quality. Integrated learning approaches, systems thinking and interdisciplinary research are trademarks of ESD responding to the societal needs and directly related to the quality dimension. This ESD argumentation comes on top of the earlier reasoning, leading to the statement that the OSN principle indeed can contribute to higher quality education.

Involving the community and other stakeholders can lead to sharing of cost. Moreover, when learning takes place in an authentic setting (e.g. through site visits) with another purpose under a different economic cost regime, the learning can be seen as a bonus. These ESD properties are relevant to underline the earlier conclusion that OSN can do well in terms of gaining efficiency.

As discussed under Open to Learners' Needs, ESD is very much in line with both key discriminating factors, diversity and the African context. This equally holds for OSN. In summary, ESD/OSN can serve a simultaneous increase of performance along all three dimensions: accessibility, quality, and efficiency of education, and therefore passes the Iron Triangle Scan positively.

Conclusion

Table 5-2 concludes this sub-section, showing the results of the Iron Triangle Scan for Education for Sustainable Development and its major characteristics: Open to Learners' Needs and Open to Societal Needs. All three pass the Iron Triangle Scan positively and therefore are qualified as a no-regret option, which clearly also applies to Africa as has been explained. For completeness the three educational supply components from which I have abstracted in the scan (OER, OLS, and OTE) have also been referred to in the table with an indicator (-) that means they have been ignored.

	NO-REGRET	DESIRABLE
Open Educational Resources	-	-
Open Learning Services	-	-
Open Teaching Effort	-	-
Open to Learners' Needs	+	
Open to Societal Needs	+	
Education for Sustainable Development	+	

Table 5-2: Results of the Iron Triangle Scan for Education for Sustainable Development and its major characteristics (OLN and OSN).

Finally I note that ignoring OER in the case of ESD is legitimate but I could also argue to include OER as an important facilitator and contributor to ESD, also being aware that ESD and OER are based on similar philosophies.

As indicated before, ESD makes accessibility a requirement and embraces different learning settings (formal, non-formal and informal). Providing high quality learning materials for all these different configurations will be served by the free sharing and re-use features of OER. This is in particular calling upon the different stakeholders to contribute their share in terms of creating, adapting and repurposing learning materials. OER is a welcome concept to support this. It might be concluded that, where ESD and OER have different origins and so far are not really connected, it would be worthwhile to change that into a mutually beneficial setting. In that case Table 5-2 could show a 'no-regret' for OER as a third major characteristic next to OLN and OSN. As long as this is not yet practice OER could be qualified as 'desirable' with respect to ESD.

5.4.3. Online learning/MOOCs

Online learning includes a large variety of delivery models involving a range of pedagogies and technologies in very different settings. It is therefore questionable whether it will make sense, be it possible at all, to apply the Iron Triangle Scan to the full range of online learning. The diversity is likely to introduce problems in reaching general conclusions for the contribution of online learning to the three performance indicators and its relation to the two key discriminating factors. In line with the observations of John Daniel (2016, p.5) who concludes that MOOCs have contributed more to the mainstreaming of Open and Distance Learning than any other factor, I have chosen to limit the Iron Triangle Scan for online learning to MOOCs.

Similar to ESD MOOCs can be mapped on the OE-Pentagon and it can be concluded that they can be properly characterized by the three supply side components. Indeed MOOCs are generally supply-driven and therefore in the Iron Triangle Scan it is plausible to abstract from the two demand side components. Like with ESD, I will here build on the argumentations presented in the previous sub-section on Open Education.

Realizing that in MOOCs open and online learning are meant to be the leading approaches, I will discuss below the level of openness in the three supply side components (OER, OLS, and OTE), just as I have done for Open Education but now specifically applied to MOOCs. In the discussion I will try to avoid reiteration of arguments that have been presented already in the Open Education sub-section. So, I will confine ourselves mainly to additional aspects and arguments that are typical or essential for MOOCs.

Open Educational Resources

MOOCs generally do not adopt the sharing and re-using principle and are not subject to open licensing, as has been discussed in sub-section 5.3.3. In short, one can say that they are not OER-based and therefore are missing many of the OER benefits and advantages. Access to MOOCs normally is for free, which contributes to the accessibility. Most MOOCs, however, require registration and are offered only in a fixed schedule, not facilitating access outside the schedule, and not allowing free access to educational institutions. So, although the online access to MOOCs is a serious improvement over access to traditionally copyrighted courses, as compared to OER the accessibility of MOOCs is worse. This affects the accessibility performance indicator negatively.

The mechanism of quality improvement through the sharing and re-using principle does not work for MOOCs. Quality (especially in the early stages) was connected to the reputation of the MOOC developer as a researcher, not necessarily as a lecturer. With other parties joining the MOOC movement their reputation is not always clear and assuming quality is no longer an automatism (Daniel 2012) but is becoming a reason for concern. Moreover, ignoring expertise and experience that is existing for decades in open education at open universities has significantly reduced opportunities to fairly focus on quality. Like with accessibility, the impact on the quality performance indicator is unfavourable.

A similar conclusion can be drawn for the third performance indicator, efficiency, first of all and again because for MOOCs the sharing and re-using principle does not apply. And although MOOCs can be efficient if expensive course development goes hand-in-hand with a very big population participating in the course, meanwhile with the expanded number of MOOCs available, such a cost reduction is much less likely. In case the MOOC providers would make their MOOCs available to educational institutions for free, to be shared and re-used, to be included in their curricula, the efficiency of MOOCs would be undisputable. This is no practice today nor a foreseeable practice in the future.

In order to judge the contribution of MOOCs to the educational spectrum of diversity (the first key discriminating factor) it has to be considered that MOOCs generally are supply-driven and therefore attached to a specific context. Since MOOCs are not re-usable and materials are not shared, generating more diversity is obstructed. Even more

important, a large spread in preferences has to be accounted for where the provision of MOOCs, in competition with for example campus-based education, cannot be expected to be on top of the list of the majority of learners in all educational settings. Unifying education into providing just a set of well-appreciated MOOCs from reputed universities is no option for this reason of substantially reducing the diversity spectrum.

In Africa (the other key discriminating factor) the availability of MOOCs of African origin is very limited. Therefore almost all MOOCs that can be accessed are not dedicated to the African context and culture. I can conclude that MOOCs can only get serious impact in Africa if African MOOCs will be developed on a scale which is comparable to the major MOOC providers in the world.

In summary, MOOCs where the educational resources are not really open cannot serve an increase of performance in accessibility, quality, and efficiency of education, let alone that this could take place simultaneously, as is the case with OER. Regarding their educational resources MOOCs therefore obviously fail to pass the Iron Triangle Scan.

Open Learning Services and Open Teaching Efforts

Since the arguments to be made for Open Learning Services are similar to those for Open Teaching Efforts, the two components are combined and commented jointly.

Accessibility of MOOC related learning services and teaching efforts is limited to the period that the MOOC is scheduled. Moreover, it is up to the MOOC developer to decide what learning services will be offered, how the teaching efforts will be shaped, and what will be for free or rather to be paid for. These MOOC arguments strengthen the earlier conclusion drawn for OLS and OTE per se that these will not necessarily lead to a general gain in accessibility of education.

There is no guarantee that those who create MOOCs have the skills to design and develop high-quality online learning experiences. Only if the MOOC operation is institutionalised it can be expected that attention will be given to systemic quality assurance. This view on MOOCs reinforces the earlier argumentation that neither OLS nor OTE per se are overall factors in maintaining and increasing the quality of education.

The drop-out rate for MOOCs is very high and the completion rate very low. Improving this phenomenon in order to raise efficiency will require investments that are likely to influence, for example, accessibility. In practice access fees have already been introduced. Again, these MOOC aspects add to the earlier statement that both OLS and OTE per se not automatically will lead to more overall efficiency in education.

In terms of diversity one can conclude that MOOCs in their current appearance are primarily an addition to the mainstream educational provision. A generic use of

MOOCs would, like OLS and OTE, give rise to unwanted uniformity in the spectrum of diversity and therefore undo many of the associated potential advantages.

In the African context MOOCs can only have a limited effect, due to the still continuing connectivity problem and lack of an adequate infrastructure mentioned earlier also with respect to OLS and OTE. For the time being learners are best served with offline practices offered nearby.

In summary, MOOCs in terms of its components OLS and OTE fail to pass the Iron Triangle Scan. Nevertheless, an increasing use of MOOCs with its OLS and OTE remains desirable while this approach should be properly positioned in the wide variety of educational provisions including the mainstream road.

Conclusion

In Table 5-3 the results of the Iron Triangle Scan for MOOCs and its supposed major characteristics: Open Educational Resources, Open Learning Services, and Open Teaching Efforts, is summarised. None of these passes the Iron Triangle Scan but yet can be qualified as 'desirable', except for OER. This also applies to Africa as has been described. OER is a special case since MOOCs are lacking many of the OER principles and features as has been explained. In the table this has been indicated by referring to 'weak match' in the 'desirable' column. For completeness the two educational demand side components from which I have abstracted in the scan (OLN and OSN) have also been referred to in the table, with the indicator (-).

	NO-REGRET	DESIRABLE
Open Educational Resources		weak match
Open Learning Services		+
Open Teaching Effort		+
Open to Learners' Needs	-	-
Open to Societal Needs	-	-
MOOCs		+

Table 5-3: Results of the Iron Triangle Scan for MOOCs and its supposed major characteristics (OER, OLS, and OTE).

5.5. Educational innovation in Africa

To conclude this chapter I have looked for evidence to find links between global developments in education and learning with developments in Sub-Saharan African education. To be more precise I have looked how Africa and Kenya in particular is picking up developments in Open Education, in Education for Sustainable Development and in online learning with a focus on MOOCs.

Open Education

The awareness in Africa of global developments on Open Education is diverse. Only some countries are engaged in policy-making already. Governments which are aware are looking for ways to integrate these developments in their policies. Here I mainly focus on the developments in Kenya. Research, both from within Africa and outside Africa, is addressing these developments. Sources to study these developments are official government policy documents, examples from praxis as well as research literature.

A recent report by Adala (2016) shows that e.g. the Kenyan government has taken action to benefit from the global developments discussed before. Policy and strategy development in Kenya connected to the developments on Open Education are visible, but they focus on certain aspects and preconditions. E.g. where Open Education requires a solid ICT infrastructure a country like Kenya that lacks such an ICT infrastructure has to start there. The Kenyan government has launched an ICT Master Plan (Kenya ICT Authority 2014) to support the development of ICT in Kenya. The ambition is to make Kenya an ICT hub in Eastern Africa. This masterplan is aligned with the overall development plan the Kenyan Government has released under the title Kenya Vision 2030 (Government of Kenya 2007).

The ambitions of the Kenyan government include the development of a national OER policy. In collaboration with UNESCO initiatives in this respect are underway (Adala 2016). Kenya is one of the four countries participating in the UNESCO project "Implementing the OER declaration" which is one of the follow-up projects of the 2012 Paris OER Declaration. In countries around Africa and certainly in Kenya the potential of OER has drawn attention. Several initiatives have been taken to raise awareness and to stimulate collaboration in creating, sharing and re-using learning materials. The 2012 Paris OER Declaration (UNESCO 2012a) has stimulated the interest of governments as is the case in Kenya. Other initiatives come from the field of (mostly higher) education or from international collaboration. OER Africa e.g. is an initiative supporting the use of OER in African Higher Education that originated in South Africa. *'OER Africa focusses on Higher Education in the fields of agriculture education, teacher education, health education and academic skills for higher education.* Within the OER Africa initiative Agriculture OER is focussing on providing resources for education in the field of agriculture. This initiative is developed around the collaboration between higher education institutions and non-governmental organisations to submit and share resources. In this way OER Africa addresses the learners' needs as well as societal needs.

The National Open University of Nigeria (NOUN) has decided to convert all its courses into OER and a small share into OER-based MOOCs. Its preparation has been done with the support of UNESCO and the OUNL-based UNESCO Chair in OER. During a launch event in December 2015, the first 40 OER-based courses were presented as well as the first 3 OER-based MOOCs. This remarkable policy will be further implemented over a couple of years (Agbu et al. 2016).

The African Virtual University has adopted an OER policy and has developed courses and programs in three languages (English, French, and Portuguese) that can be used from the AVU portal directly or can be accessed through the partner universities throughout the continent.

Another example of a large project, focussing on teacher capacity building, using OER is 'The Teacher Education for Sub-Saharan-Africa project (TESSA). On the TESSA website it says: 'TESSA is a network of teachers and teacher educators working alongside The Open University, UK, to improve the quality of classroom practice and access to teacher education resources across sub-Saharan Africa. It does this through offering a range of Open Educational Resources (OER) in four languages to support school-based teacher education: English, French, Swahili (Tanzania) and Arabic (Sudan).'
The oldest distance teaching university on the African continent, UNISA (University of South Africa), has adopted an OER policy. In its OER strategy UNISA (2014, p.3) states that by accepting the role of ICT and OER in education, the university has decided to change its business model. In the new business model the focus is on student support and accreditation of learning achievements through assessment. UNISA's move is partly motivated by the South African national policy that embraces OER and open education (Unisa 2014, p.3).

A global initiative that has also landed in Kenya is the School of Open. Initiators and coordinators are Creative Commons and the Peer 2 Peer University (P2PU), two non-profit organisations very much connected with promoting Open Education. The initiative is dealing with the awareness raising amongst teachers and school administrators to understand the potential of OER and Open Education.

Most of the initiatives reported are targeting higher education and focus on OER, except the School of Open movement that addresses Open Education in general. One initiative in Kenya, the INVEST Africa program, focusses on professional education. It is a collaboration between the Commonwealth of Learning (COL) and a number of TVET (Technical and Vocational Education and Training) institutions in Kenya[57]. Course authors from the participating institutions are engaged in the development of non-formal community training courses published by COL through its Open Access Institutional Repository.

Education for Sustainable Development

ESD has found its way to Africa during the decade Education for Sustainable Development 2005-2014. Implementation of the UN Decade of ESD has been on the agenda since 2006. The implementation was linked to regional initiatives like the Second Decade on Education in Africa. In addition the implementation was aligned with the key policy

[57] For more information on INVEST Africa see: https://www.col.org/programmes/technical-and-vocational-skills-development/invest-africa, accessed, October 14, 2016.

initiatives such as the Millennium Development Goals, the United Nations Declaration on the New Partnership for African Development (NEPAD), and the Dakar Framework for Action aimed at achieving the Education for All goals formulated by UNESCO.

In Kenya the government has shown commitment to ESD by issuing an implementation strategy for ESD in 2008 (National Environment Management Authority 2008). The National Environment Management Authority (NEMA) has played an important role in the implementation of ESD in Kenya. In the ESD implementation strategy NEMA is the coordinating government agency. Positioning ESD in the field of environment protection and environmental education is understandable given the issues at hand, like deforestation, draughts, flooding, waste management problems, and depletion of natural resources. During the UN Decade on ESD the focus has been on awareness raising, and capacity building at the local level. The establishment of Regional Centres of Expertise on ESD has been a key instrument in the ESD implementation strategy (National Environment Management Authority 2008). At the end of the Decade on ESD Kenya counted 9 RCEs. Over the years and towards the end of the Decade on ESD it seems that a broader vision on ESD has been adopted in accordance with the developments on the global level. In the discussion on improvement of the quality of education, the policy on ESD includes a recommendation for a shift in education towards ESD (Ministry of Environment Water and Natural Resources 2013). Important to note, however, is that the Ministry of Environment is the 'owner' of this discussion and not the Ministry of Education. It remains to be seen to what degree ESD will be integrated in the policies of the Ministry of Education. The 2013 Draft National ESD policy document nevertheless includes some guiding principles for the shift towards ESD in education that are in line with the definition of ESD provided earlier in chapter 3 (Tilbury 2011).

The Decade on ESD has ended and continuation of the activities depend on the capability of the government to empower NEMA and the network of RCEs to continue their work. But it can be concluded that Education for Sustainable Development has become a factor in Kenyan education.

Online learning and MOOCs

In educational research in African universities investigations on the use of ICT in education have been reported for several decades. There are examples of projects with a focus on teacher capacity building (Aderinoye 2003; World Bank 2005b; Bose 2004). Most of the reported projects address the use of computers, not necessarily online education however.

The introduction of ICT in Sub-Saharan Africa is not without problems. Resources, infrastructure, capability of users are amongst the issues discussed (Mtebe et al. 2011; Farrel & Isaacs 2007; Adala 2016). Some research directly looks into the relationship between the use of ICT and distance education and development. Bailey et al (2011) present a series of case studies in Tanzania, Botswana and Kenya on the connection between universities

and economic development. Basaza (2010) and Butcher (2011) report research on the link between distance education and development. Most of the studies are based on restricted projects with limited impact. Other developments in education in Sub-Saharan Africa, however, have a larger impact. One of these is the establishment of open and distance teaching universities in different countries (e.g. South Africa in 1946, Tanzania in 1992, Nigeria in 2001, Uganda in 2013, Zimbabwe in 1999) and the establishment of the African Virtual University in 1997. The open universities develop from correspondence based universities to online learning institutions. This indicates that online learning has landed in Africa on a larger scale. Next to these dedicated distance learning institutions most universities have engaged in the introduction of online learning. Recent surveys from eLearning Africa (Isaacs & Hollow 2012; Isaacs 2013) provide a comprehensive overview of the increasing attention to and use of online learning. Zooming in on the Kenyan situation it is evident that most universities engage in online learning (Adala 2016). Public universities like University of Nairobi and Kenyatta University as well as private universities like Strathmore University or United States International University enrol their students in online courses as part of their degree programs. This type of blended offerings where online learning and on-campus learning are mixed, is becoming the standard for many institutions in Kenyan Higher Education.

In an environment where online learning is gaining importance it is also relevant for the smaller universities to engage. Where this engagement is beyond the university's capacity these institutions look for partnerships. So does Tangaza University College (TUC), The university is already experimenting with online learning and offering online programs (see Chapter 6).

From the overview presented it can be concluded that the link between local (regional) initiatives and global developments in online learning is manifest. Local authorities and the educational community are aware of the opportunities that online learning can offer. Initiatives are taken to explore and benefit from its potential for the local situation. It is also evident, however, that the main focus is on the potential of ICT in education in general, where moreover higher education is receiving most of the attention.

As mentioned earlier in this chapter, Africa is not at all an active player in the MOOCs world. MOOCs are in particular embraced as a special form of online learning, scaling up to mass education. The African Virtual University is one of the few institutions which has become engaged in developing and offering MOOCs with an African origin. Also worth reporting is that UNESCO and the Dutch UNESCO Chair in OER organized an Executive Workshop in 2014 with the leadership of the African open and distance teaching universities, in collaboration with ACDE (African Council for Distance Education)[58]. The idea was to inspire these African universities and their collective body ACDE to start

[58] News item on the African high-level Executive Workshop on MOOCs.
http://www.unesco.org/new/en/media-services/single-view/news/unesco_supports_open_moocs_in_africa/#.Vo6CHvnhDIU.

MOOCs initiatives similar to the European OpenupEd initiative but with their own flavour and profile. The most firm and concrete result is the NOUN case referred to above.

5.6. Reflections on this chapter

The assumed causal relationship between education and development has many aspects. This chapter has touched upon a number of these aspects, trying to put the situation in Eastern Africa and Kenya especially, in perspective.

Being aware of the status of the educational systems in Eastern Africa helps to understand why development in the region is not at a level that is comparable to other regions in the world. Solutions follow once the problem is properly understood. Based on a detailed problem analysis a way forward is explored where I certainly have no intention to present a solution for every problem. The focus is on the transformation mechanisms that allow countries to innovate their education and educational systems according to the needs and possibilities of these countries. In this chapter I have made an attempt to identify objective performance indicators to enable the discussion on transforming education to better serve the development agenda. It is concluded that three dimensions applying to education form an adequate set of indicators for educational performance: accessibility, quality and efficiency.

These three performance indicators span a triangle for which I have introduced the 'Iron Triangle Scan' in order to assess or review alleged innovations that potentially can transform education into education for development. Only if an educational innovation can be expected to improve education on all three performance indicators, and do so simultaneously, the Iron Triangle Scan is passed positively. Three educational innovations have been evaluated through the Iron Triangle Scan: Open Education (and its five constituting components according to the OE-Pentagon that has been discussed), Education for Sustainable Development, and MOOCs ('representing' Online Learning).

The results have been presented in three previous sub-sections each of which culminating in a table specific for the corresponding educational innovation. In Table 5-4 the results from those three tables have been merged, presenting an overall single glance picture.

	OPEN EDUCATION (COMPONENT-WISE)	EDUCATION FOR SUSTAINABLE DEVELOPMENT	MOOCS ('REPRESENTING' ONLINE LEARNING)
Open Educational Resources	No-regret	Desirable	Weak match
Open Learning Services (OLS)	Desirable	*(Indifferent)*	Desirable
Open Teaching Effort (OTE)	Desirable	*(Indifferent)*	Desirable
Open to Learners' Needs (OLN)	No-regret	No-regret	*(Indifferent)*
Open to Societal Needs (OSN)	No-regret	No-regret	*(Indifferent)*

Table 5-4: Results of the Iron Triangle Scan for three innovations in education.

Applying the Iron Triangle Scan to Open Education has revealed that three out of its five components are no-regret options: OER, OLN, and OSN. This means that these components all pass the Iron Triangle Scan by simultaneously favouring the three performance indicators accessibility, quality and efficiency. And that this attractive property holds for the full spectrum of diversity in education in terms of institutional identities, learning philosophies, learning and teaching preferences, educational settings, target groups, educational sectors, cultural contexts, and even political views. In addition I concluded that the 'no-regret' also applies to the African context.

The other two components, OLS and OTE, are indicated as 'desirable'. This reduces the scope from the full spectrum of diversity ('no-regret') to only those situations and conditions that are expected to be favoured by these components. This situation and condition dependence applies a fortiori to Africa. The desirable option also holds for the overall concept Open Education since not all constituting components carry the 'no-regret' qualification.

ESD has its real focus on the two demand side components of the OE-Pentagon: Open to Learners' Needs and Open to Societal Needs. The three supply side components (OER, OLS, and OTE) are not characteristic in profiling ESD which makes ESD – one could say – indifferent to them. Therefore in the Iron Triangle Scan I can abstract from those three supply side components. It has appeared that the no-regret option goes to both demand side components, OLN and OSN, and as a consequence also to ESD which indeed is identified by merely these two components. This equally applies to Africa. The three supply side components are referred to as 'indifferent' (in italic) except for OER which upon closer inspection could also add to ESD's profile and become its third identifier. Such a view is not yet owned by the ESD community but that could certainly happen and show to be beneficial. Thus I refer in the table to 'desirable' instead of 'indifferent' while it could even become a 'no-regret'.

Where ESD can be identified by the two demand side components of the OE-Pentagon, for MOOCs this is just the other way around, as has been argued before. They can be properly characterized by the three supply side components (OER, OLS, and OTE), since they generally are not really accounting for the demand side. So I can abstract from the two demand side components (OLN and OSN) in the Iron Triangle Scan and therefore they are referred to as 'indifferent' (in italic) in the table. Following the same argumentation as given under Open Education above, two of the supply side components, OLS and OTE, are qualified as 'desirable'. The associated situation and condition dependence applies – even more pronounced – to Africa as well. On a closer examination, the third supply side component OER has been qualified in the table as a 'weak match' rather than being a desirable option because generally MOOCs are pretty far away from many of the OER principles and features, as has been discussed before. Yet, it is fair to finally also qualify MOOCs as 'desirable', including the African context, be it with the earlier presented restricting comments.

When confronting the conclusions for the 'Iron Triangle Scan' exercise – and especially those for the African context – with the actual overview of developments in Africa presented in paragraph 5.5 I have come to some general conclusions. One is that in African countries there is a level of awareness of the global innovations in education. Open Education e.g. is not unknown. In policy making and in actual activities the focus is on OER. This focus is supported by the findings of the scan. OER is identified as a no-regret option for policy makers. For the remainder of the components there is no real evidence that African countries are pursuing an integration into their policies or activities. It will be a challenge for these countries to expand their efforts towards equally beneficial possibilities connected to other components of Open Education.

One way forward that might lead to 'African' solutions for Africa is to look at Education for Sustainable Development. ESD has no-regret components on the demand side that are very relevant to the African context. Where importing solutions from abroad has not lead to the desired educational landscape an integration of locally defined ESD components on the demand side might provide a basis for a future oriented policy. Again the OER component can play an important role as it could stimulate the availability of localized and freely available learning materials to be used in formal, non-formal and informal education, expanding the accessibility and changing the cost dimension.

For Online Learning and especially MOOCs it can be concluded from the 'Iron Triangle Scan' that in certain situations MOOCs can be very useful in the African context as well. If the learning required focusses on topics that are less sensitive to cultural settings even MOOCs developed outside the region can be used to educate large numbers. MOOCs developed for use in a certain cultural setting are certainly even more useful to educate large numbers. Embedding MOOCs in the curriculum of educational institutions is not a way forward that seems likely. For these situations African universities e.g. seem to opt for blended learning, where they can use OER and change them according to their needs. The findings of the scan support this policy. In line with the COL project in Kenya on vocational training it could well be that MOOCs are particular useful in professional training situations and in community training or non-formal learning settings.

For the future a widening of the awareness of the potential benefits of OE, ESD and MOOCs for the African context is relevant. The African continent and especially the educational systems like that of Kenya would benefit from an attempt to integrate these innovations into the national policies. While doing this it would be especially interesting to see solutions where OE and ESD are integrated.

6 From theory to praxis: the course on social entrepreneurship

6.1. Prologue

Knowledge accumulation and the development of theoretical models are the scientific basis for understanding society in its complexity. Understanding society and how people interact within their society is the basis for innovation. If education is to contribute to development it is necessary to understand the concept of development (covered in chapter 3) related to transformation of society, as well as the role of education and the role of innovation in education to support the process of transformation (covered in chapter 4 and 5). The test to find out the practical relevance of the knowledge and understanding accumulated is to set out and apply the knowledge. Years of collaboration and collective work have preceded the creation of a course on social entrepreneurship, offered to Bachelor students in their final year before graduation, delivered through a blended mode model. The partners involved are Tangaza University College, the Institute of Social Ministry (ISMM) and the Open University of the Netherlands. The purpose of the course being to enrich the students learning experience and competence development so that they are better equipped for a successful professional life. The course is also part of an experiment to find out how curriculum innovation targeting new learning approaches and new technologies works in praxis.

In this chapter the development of the course on social entrepreneurship is considered. As this development has a history of years, it is also relevant to report on the process that has pushed this course development. The development steps have been supported by research activities that will be described. Overall this chapter is a mix of reporting on the development stages of the project, supported by research results and a reflection on the most relevant steps in the process of curriculum innovation. The development and first run of the course on social entrepreneurship has five distinctive stages. Each stage has been marked by a stop-or-go decision.

The first stage marks the conception of a project to jointly develop a course on social entrepreneurship. In this stage the design principles, the context for the course and the planning have been detailed. A kick-off meeting marked the go decision at the end of this stage.

The second stage defines the didactical approach and the focus on the content for the course. In this stage alumni of the institution are involved when the first learning materials are produced. All materials produced for the course are licensed under a Creative Commons license and are developed as Open Educational Resources. Indepth interviews with alumni and the management of the institute provide a deeper understanding of the context for the course.

The third stage marks a change in strategy requested by the management of ISMM. From the development of a single course, at that stage to be programmed as an elective course for bachelor students, the plan changes to the development a diploma program of 15 month of study. During this stage the focus is on detailing the development principles. To communicate these developments a workshop is organized involving staff and students. The workshop ends with a survey for the participating students and in-depth interviews with staff members. At the end of this stage the full diploma program is available. The institute has to market and launch the program. This stage ends with the decision not to launch the program, because the number of students registered does not meet the threshold set in advance to make the program economically viable.

In the fourth stage the original plan to develop an elective course for students in different programs changes into replacing the existing (compulsory) course on social entrepreneurship in the bachelor program. Part of that decision is to develop the new course on social entrepreneurship in MOODLE. Most of the work in this stage relates to designing the course and selecting and modifying the materials already available from stage three. In this stage a small experiment is included. For the production of the new course the students finishing the existing course are invited to join the development process. The experiment is to find out the students' response to co-creation in course development. The response is collected in the student survey at the end of this stage. In the fifth stage students engaged in the new course on social entrepreneurship as part of their bachelor study are invited to provide their feedback on their experiences with the course.

This chapter concludes with an overall evaluation of the collaboration project.

6.2. Stage 1: Initiation of a collaboration project on curriculum innovation

The Open Universiteit is one of the co-founders of the RCE Rhine-Meuse in 2005. The RCE concept has been explained before. As United Nations University coordinates the development of RCEs globally, it relies on existing RCEs to support the newcomers. During the World Environmental Education Congress (4th WEEC2007), RCE Rhine-Meuse representatives (Mr Jos Hermans and myself) have participated in the workshops and discussions to support the founding of African RCEs. Following the conference we have been invited to Kenya to witness the launch of RCE Greater Nairobi. The launching event in Kibera, the largest slum in Kenya, coincided with the opening of the first Bio sanitation centre in Kibera (Photo 6-1) (Manula et al. 2015), providing public sanitation facilities combined with biogas production. It has been RCE policy to initiate RCE-RCE collaboration projects. As RCE Rhine-Meuse has been supportive in the process of building RCE Greater Nairobi, it has been decided that

Photo 6-1. Mr. Jos Hermans entering the Kibera Bio-Centre after the opening, June 2007. Photo Jos Rikers.

Photo 6-2. NFTE Certificates awarded to participants from Ghana, November 2008. Photo Jos Rikers.

both RCEs engage in further collaboration and contacts have been established accordingly. Through these contacts a collaboration between RCE Rhine-Meuse and Tangaza University College has emerged. In the period 2008-2009 the focus has been on student exchange projects. Part of the project program has been to train visiting African youth (as the program has involved Kenyan and Ghanaian students) in entrepreneurship skills. Dutch students have visited Kenya or Ghana to work with local students in selected projects. The entrepreneurship training for African students has been provided by NFTE Netherlands (NFTE: Network for Training Entrepreneurship [59]) (Photo 6-2). These projects have intensified the contacts between the partners and have established a firm basis for further collaboration. At the Open Universiteit a UNESCO Chair on Education for Sustainable development supported by ICTs has been established in October 2009. Continuation of the collaboration with the RCEs and related partners has been part of the Chair program. The good experience and trust established over the years of collaboration has been the basis for a new project between now Open Universiteit and Tangaza University College reported in this chapter.

During an email exchange with the then assistant director at ISMM, Mr. Aloys Ojore, quality issues in ISMM's main bachelor program have been discussed. At the same time ISMM has developed an ambition to engage in ELearning to build an outreach program for students in remote areas. After funding from the Dutch national program for the Decade on Education for Sustainable Development has been received the new project focussing on curriculum development and innovation, is launched May 31,

[59] http://NFTE.com, accessed July 22, 2016

Photo 6-3 Kick-off meeting, Heerlen June 2010. In the picture from right to left: Mr. Ojore, Mrs Pete, Ms Manwari, Mr. Goossens (NFTE trainer, Mr. Bovens (President OUNL), Mr. Slootmaker (EMERGO developer to the extreme right).

Photo Jos Rikers

2010, with a kick-off meeting in Heerlen, (OUNL main campus). Mr Ojore and two colleagues, Ms Louisa Manwari and Mrs Judith Pete, have participated in this meeting (Photo 63). The project team members in this stage of the project are:

- Mr. Aloys Ojore: assistant director at ISMM
- Mrs. Judith Pete: lecturer at ISMM
- Ms. Louisa Manwari: administrator at ISMM
- Mr. Henk van den Brink: educational technologist at OUNL
- Mr. Aad Slootmaker: EMERGO developer at OUNL
- Mr. Luc Goossens: NFTE trainer
- Mr. Joris Hoefakker: Audio/Video expert OUNL
- Mr. Mark Handels: Audio/Video expert OUNL
- Mr. Perry Pintar: Audio/Video expert OUNL
- Mr. Jos Rikers: project chair OUNL

During the kick-off meeting several decisions have been taken that describe the project:

- The project has to develop a course on social entrepreneurship.
- The course has to be developed as an online course, to be delivered through the OUNL developed EMERGO system.
- The course has to use a competence based learning approach.
- The course has to be developed based on the training developed by NFTE (Network for Training Entrepreneurship). The director of RCE Rhine-Meuse (Mr. Jos Eussen) at that time was also director of NFTE Netherlands and has arranged permission. To date NFTE Netherlands is no longer active. The digitised educational materials have to be developed as OER.
- As the NFTE training is designed as a group training this training has to be digitised. It has been decided that the digital materials are to be embedded in the local context. To accomplish this and to digitize the materials at the same time the training has to be given to ISMM alumni in Nairobi and this training has to be recorded on video to build the basis for the online course. Additional video materials have to be recorded while interviewing entrepreneurs in and around Nairobi.

- The course has to be offered as an elective course in the ISMM bachelor program and has also to be made available for non-formal training, to be used by ISMM graduates in the field.
- Preparations have been scheduled to start and a visit to Nairobi to record the video materials has been scheduled for June 2011.

6.3. Stage 2: Material development

6.3.1. The process

From the start of stage two the focus has been on material development, based on the NFTE training program. This training has been developed to target school drop-outs and street youth to help them develop their competences with a very straightforward approach. The aim of the program is to help each individual participant to start a small enterprise. The training is built around a model business plan and is enriched with games and physical exercises. The original training has been designed as a group training, where the group interaction is part of the training. The challenge has been to translate the group training to digital learning materials to be used in an online learning setting as part of an academic course. The 4C-ID design model (Merriënboer, Van 1997) has been used for guidance. The course has been built around a number of competences to be acquired by students by fulfilling tasks. The task order follows the outline of a business plan and each task has a number of activities. The activities have been developed according to the 4C-ID principle of building activities with increased student responsibility and just-in-time delivery of relevant learning materials (Figure 6-1).

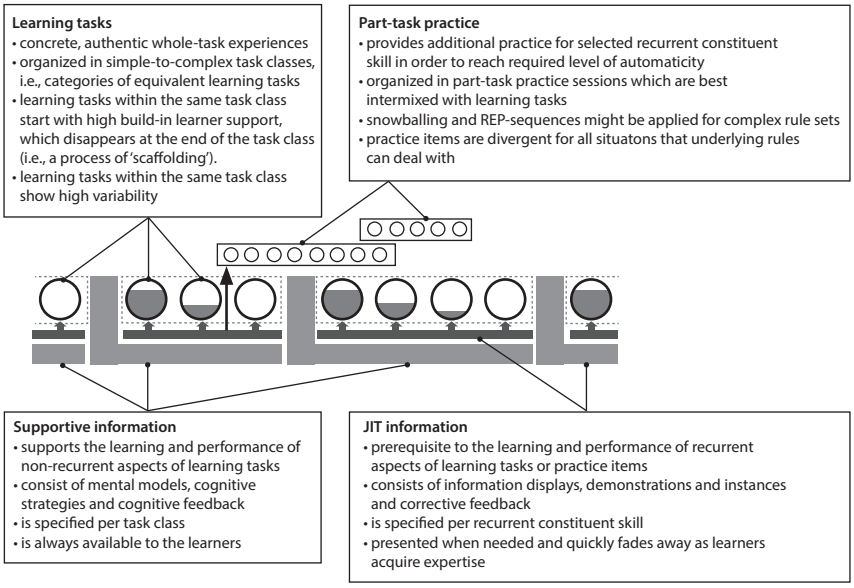


Figure 6-1: 4C-ID design model. (Merriënboer, Van 1997)

For the course design this has implied that following the outline of a business plan, it requires a series of tasks and activities for students to learn how to write the different chapters. The knowledge required to write the chapters has been taught in other courses in the bachelor program. This way the business plan writing has become an integrating activity. The theoretical knowledge from other curriculum modules (e.g. marketing, finance, accounting, HRM, sustainable regional development, conflict management) has been integrated in the practical assignment to write a business plan. The NFTE modules have been used to provide a task overview on the chapter level. Digitising the modules requires the set-up of a training sequence involving Kenyan students to create the required local setting. ISMM alumni have been chosen as the best possible participants in such a training. The alumni receive the training as an ISMM service as a train-the-trainer program. Therefore the alumni have participated on a voluntary basis. As most ISMM alumni are working in community development, they are also able to relate the training to their professional work experience. To further support these alumni and to make the digitised training available to other workers in communities, the material has been posted on YouTube under a Creative Commons license[60].

The EMERGO design principles are based on the EMERGO Case Development Approach (Figure 6-2) (Hummel et al. 2011). Implementing the task-activity sequence

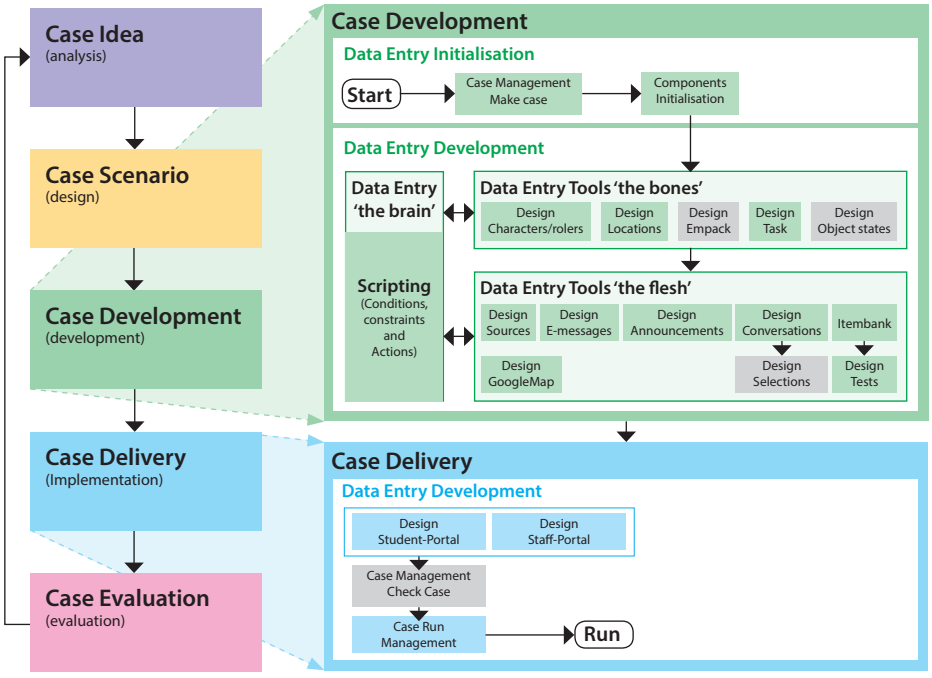


Figure 6-2: EMERGO Case Development Approach

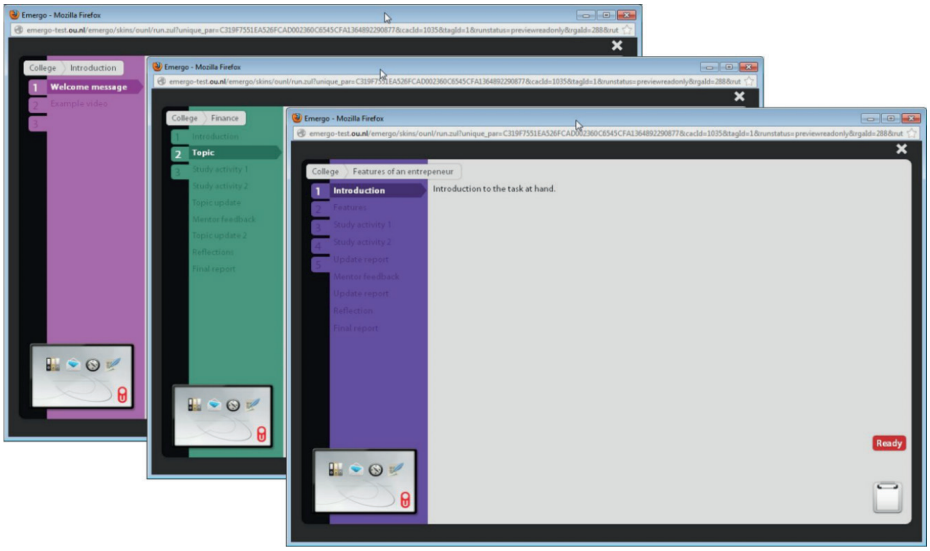


Figure 6-3: EMERGO interface showing task groups and activities

in EMERGO has required some additional programming. EMERGO originally has been designed to follow a space or room metaphor. Students while studying a serious game in EMERGO are instructed to go to different rooms or spaces to fulfil tasks and activities[61]. For the intended setup of the course the room metaphor is not valid. As the tasks and activities are related to a business plan consisting of chapters the software interface has to be adopted accordingly. The new interface allowes for grouping tasks on a tab.

On each tab a series of tasks can be offered, as shown in Figure 6-3. To help the student navigate between the tasks and activities, each task group (each tab) can be given a different colour. Tasks with the same colour are related to the same topic (in this case a chapter in the business plan). Additionally each screen shows a crumble path to enable quick navigation. The EMERGO interface further allows for showing a tablet like app in the left-hand corner. On this tablet additional apps or access to learning materials can be offered. In the right-hand corner a notepad is positioned. The notepad offers the student the option to take notes and save them for later use.

To video tape the training on location has required a professional audio/video team. I have been very fortunate to find the EMERGO production team at the Open Universiteit ready and willing to support the project. In addition my RCE colleague and NFTE trainer, Mr. Luc Goossen, has been willing to join the team and sign for the

[60] https://www.youtube.com/channel/UCdMYWOAVx_UAdfhMcfbl3Vw, accessed July 23, 2016
[61] http://emergo.ou.nl/emergo/community/EN/emergo.htm, accessed July 31, 2016

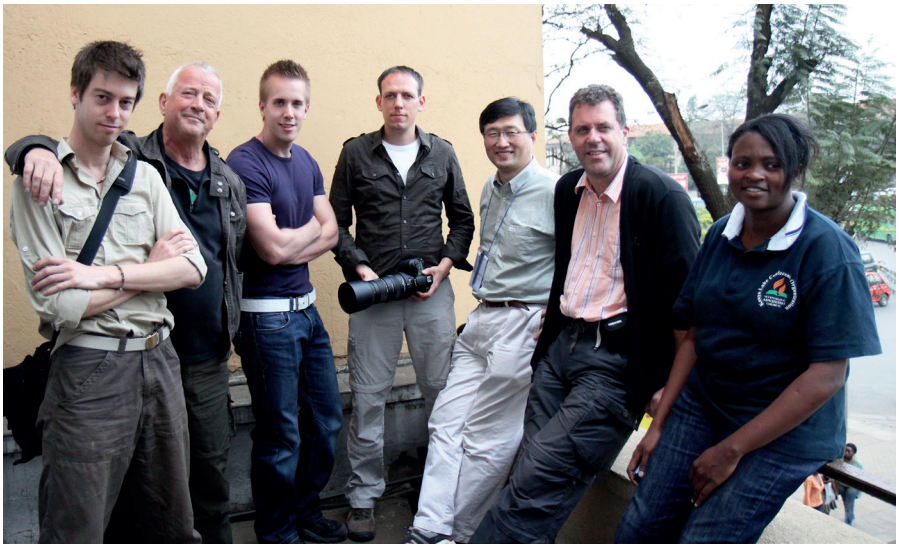


Photo 6-4. The project team in Nairobi. From left to right: Mr. Mark Handels, Mr. Henk van den Brink, Mr. Perry Pintar, Mr. Joris Hoefakker, Mr. Jinwon Ahn (a visitor from Korea), Mr. Jos Rikers and Ms Judith Pete. Mr. Luc Goossen (NFTE trainer) is missing on this photo.

training sessions. The complete team has volunteered to travel to Kenya and record the training. Based on this generous offer, it has been possible to plan the training into a sequence of sessions covering 5 days in a row (Photo 6-4).

Additionally the plan involves the recording of interviews with local entrepreneurs to collect authentic material that can be used in the course. Based on this plan the partners at Tangaza have selected and invited the training participants and have selected the community projects (lead by Tangaza alumni) to visit and document. To support the project interviews with ISMM staff and alumni have been planned. On June 26, 2011, the team has travelled to Kenya to meet with the ISMM team and work on the project. On July 16 the Dutch part of the team has left for home having gathered a terabyte in video materials. The direct reactions of the participants in the training are recorded on video and posted on the project YouTube Channel [62] along with all the other produced and edited video materials.

6.3.2. Feedback on the design principles

In this stage of the project the basic decisions have been taken within the project team. As it has been decided to have a stop-or-go decision at the end of each stage,

[62] https://www.youtube.com/channel/UCdMYWOAVx_UAdfhMcfbl3Vw, accessed July 31, 2016

information has been collected to support that decision. For this stage this information collection has been based on a number of interviews. The interviews have been held with two alumni of the bachelor program, differing in time since graduation (five and ten years). These alumni have been selected on the following criteria:

1. Alumnus of the ISMM bachelor on Social Ministry.
2. Professionally active in community development work for 5 years or more.
3. Able and willing to reflect on the impact of the bachelor program on their professional life.

The selection has been coordinated by Mrs. Pete, who is the ISMM coordinator of the alumni network. A third interview has been an in-depth interview with the assistant director, Mr. Ojore. Mr. Ojore has been interviewed after the training of alumni has been recorded. The interview therefore also includes a reflection on that training. The transcripts of the interviews are available on the project website.

6.3.2.1. Interview with the assistant director

In this subsection an overview of the interview with the assistant director of ISSM, Mr. Ojore is provided. The interview starts with an explanation of the profile of a typical ISMM graduate, contains information on the discussion on the curriculum and the envisaged way forward. The full text transcription of the interview is available on the project website.

- According to Mr. Ojore the profile of an ISMM graduate of the bachelor program shows the following features:
- Management knowledge.
- Organisational skills.
- Prepared to work with communities across Africa, cross culturally, with a global attitude.
- Feel comfortable with any group of people, children, adults, government, community and clergy.
- Capable of creating jobs and manage jobs.
- Open in the way they connect to others.

Mr. Ojore recalls the social ministry reflection workshop on occasion of the 10th anniversary of the curriculum, organised by ISMM. One of the activities in this workshop has been to collect alumni feedback on the curriculum. The alumni feedback has been of direct influence on the ISMM decision to renew the bachelor program. The first step has been to change the name of the program. As Social Ministry is confusing for people alumni engage with (it is interpreted as 'churchish'), the name of the program has been changed into Bachelor of Arts in Sustainable Human Development. The second step has been a change in focus of the curriculum itself. The Social Ministry curriculum has indeed included a number of courses, e.g. on church history, bible studies, theology and others that, according to the alumni, did

not really help them perform as professionals. Most alumni are engaged in organising jobs and set up and run business like activities in communities. At the workshop 75% of the alumni who have responded to the questionnaire have proposed to add courses in entrepreneurship and entrepreneurial skills. Even a full degree program in entrepreneurship has been proposed by the respondents.

Based on the alumni feedback collected by ISMM and following market research on the role of universities in promoting social entrepreneurship the institute now has two bachelor programs. The original Bachelor of Arts in Social Ministry is still offered to those who want a more church oriented degree. The new Bachelor of Arts in Sustainable Human Development is the second program now on offer. The ambition is now to start a third program, a Bachelor of Arts in Social Entrepreneurship. The need for entrepreneurial skills has been indicated by the alumni's feedback. The focus on social entrepreneurship has been inspired by a meeting organised by the Dutch UNESCO Chairs in Education for Sustainable Development in May 2010 in The Hague, called Crossing Boundaries and Expanding Horizons - Rethinking education and learning in an era of (un)sustainability. Three ISMM staff members attended the meeting on invitation by the Open Universiteit. Based on the new insights gathered ISMM has concluded that it should not create another curriculum in entrepreneurship, but should focus on a different approach: hence the focus on social entrepreneurship.

Mr. Ojore states that considering the difference in approach the new program is also a response to what is seen in practice. For a very long time development partners have been donating money to projects, and most of these projects fail. Mr. Ojore relates this to the fact that the social aspect of entrepreneurship is neglected. Money donated to projects in reality goes to school uniforms for the children, food for family, health care and not into the business it was meant to support. The social aspect of giving loans to poor people has never been considered.

According to Mr. Ojore it is necessary to innovate the curriculum. The notion, Mr. Ojore states, also learnt from contact with the Open Universiteit, that learning can be enhanced with technology, e.g. bringing in experts and people from outside through video conferencing. One innovation in line with this approach is the use of video recorded cases. These cases (projects run by ISMM alumni) are recorded on video and used in class.

The recorded videos intended to be used in class are also open to others from outside the institute. In this way the institute reaches out to people and communities and offers learning materials for free.

Mr. Ojore expects that critical questions will be posed by the ISMM staff, on using the innovative ideas in the new curriculum. But that is to be expected. On the other hand,

ISMM has a tradition of inviting alumni to reconnect to the institute and e.g. talk to the new students. The idea to actually invite alumni to step in and take the place of the teacher and base their teaching on their own experience, their own cases, might meet resistance. Mr. Ojore thinks this is a challenge to be solved in further designing and developing the program. Being asked to compare expectations before and after the actual training provided (and recorded), Mr. Ojore states that he has been aware (also from earlier alumni feedback), that alumni have been missing important knowledge and information. It has only been after the training that he has realized the nature of that knowledge. Realizing that the alumni were going to help to create the video materials, Mr. Ojore now reveals that he was sceptic about the effect of the training for the alumni themselves. When hearing their feedback after the training he has come to realize that the training has been very effective for the alumni.

6.3.2.2. Interviews with 2 alumni

Both alumni are graduates from ISMM's bachelor program, one has graduated in 2006 and one in 2002. Both alumni have earned a scholarship to gain a Master's degree (one in Italy, one in the USA). The degrees are in business administration and in conflict management and coexistence. Both alumni have started their own business as a social enterprise. One business is in agriculture and one in community development.

When reflecting on the question to describe the profile of an ISMM graduate the following elements have been mentioned:

- An ISMM graduate is a change maker. He or she is not a person who after graduation goes out to look for a job, but a person that goes out and creates jobs.
- ISMM graduates talk of change, and work towards transformation of society.

When touching the question of improving the curriculum the respondents have argued that after graduation personally they have never been employed, but have been self-employed. Their employment being embedded or connected to the initiatives for social transformation that they have started. At the same time both respondents see that as ISMM graduates they have not properly been prepared to manage change or were not taught management skills to the level needed in their professional life. As one respondent formulated: 'We were ready to work, we had the energy. We had a lot of fire burning in us to go and work in the community. Yet we were not prepared even for rejection from the very community that needs our help.'

Having an identity as a social minister has not really helped communities to understand what to expect from such a person. Social ministry is an unknown term. Additionally focus in the curriculum has been on the social aspects, not on management. The element of sustainability in relationship to the personal life of people has been lacking as well. Emphasis has not so much been on the economical aspect which translates to the economical sustainability of people.

The change in the curriculum should go hand-in-hand with a change in mind-set of the social minister. A social minister should not go into the field as a fundraiser looking for money to sustain projects. Social ministers should have the mentality of generating funds within the initiatives they are involved in. When projects rely on donor funding, the project will halt once the money is finished, and maybe continuous when new money is found. But when social entrepreneurship comes in any funder is treated as an investor. And like any investor these funders will expect and require a return on their investment. Looking at the courses this translates to courses to teach social ministers how to set up projects that sustain themselves. And these courses should teach how to train the beneficiary in the community to become self-reliant and no longer depending on the project. In short these are all elements of social entrepreneurship. Especially courses on innovation, creativity and sustainability of projects are needed, where the alumni learn how to develop such initiatives and hand them over to the community as economically viable activities. The alumni when responding to the training provided (and video recorded to create course material) have been very positive. Although they themselves have been discussing the issue of sustainability of activities and the need to step away from sponsor driven approaches, they have not had a clear view on how to do this. The training introducing social entrepreneurship actually has provided the knowledge and tools to make that step forward possible. The training in this sense has been perceived as very welcome and very timely. In comparison to business management classes the approach in the training has been straight forward and simple enough for people to understand and take ownership.

Next to the reflection on the training and the design of the course on social entrepreneurship, both respondents have stated that they especially value the fact that the training materials, once the videos have been edited, will be made available to the public. Both respondents are inclined to use these materials in their own activities while building new initiatives.

6.3.3. Conclusions for this stage

At the end of stage two the project team has had a meeting with the principle of Tangaza University College and a discussion with the Director of ISMM. Both meetings had the purpose to answer the stop-or-go question. In both meetings both the college management and the institutional management encouraged the project team to continue, supporting the direction of the project and the decisions taken.

Following the visit to Kenya, the Dutch members of the project team have edited the video materials and further developed the course in EMERGO. Editing the video materials has been included in the generous offer of my colleagues to contribute to the project without charging any cost. The amount of video materials collected during the trip to Kenya has required weeks of editing. Not all materials available have been

edited. Instead of leaning too much on the generosity of the team my colleague Henk van den Brink offered to continue editing in his own time to finish the materials that where crucial for the course development. Because of the limited availability of editing capacity, it has taken the remaining part of the year 2011 to edit the basic videos selected out of the raw materials. What complicated the editing process was the decision to shoot the videos using three high end photo cameras. Using these cameras resulted in a large sequence of short videos that needed to be synchronised in the editing process. What has been edited has been made available on YouTube through the dedicated project channel: Free Social Entrepreneurship in Africa.

Course development in EMERGO has been my responsibility with remote consultation of the two lecturers in Nairobi involved in the project (Ms. Judith Pete and Mr. David Cheboryot), who have been able to access the course under development over the internet. From September 2011 until May 2012 the EMERGO course has been developed on the EMERGO development server of the Open Universiteit. As EMERGO is open source software, and the development time has been my own time, there have been no further cost involved.
Nevertheless, this stage could not have been completed without the visit to Kenya that was paid for through the project sponsoring of the Dutch National Program for the Decade Education for Sustainable Development (LvDO). Travel and subsistence cost in total added up to close to 7000 Euro.

6.4. Stage 3: Scaling ambitions: from course to program

6.4.1. The process

In 2010 and in 2011 work has been done on the development of the course outline and the production of video materials on site (in Nairobi) to be included in the new course. It has been in this stage that the principles of OER have been introduced in the project. The course development has been based on the re-use of existing materials. Materials developed have been made available to the public.

Early 2012 ISMM has established a relationship with a Kenyan government agency addressing the education of small size business owners especially in entrepreneurship competencies. Mr. Alberto Parise, than Director of ISMM has proposed a change in the project to match the requirements of the new initiative. This new initiative included the development of a 2 year diploma program on social enterprise and development. The course that has originally been developed in the collaboration project has had to be integrated in this new diploma program. In agreement with Mr. Alberto Parise the further development of the diploma program has been based on the principles of competence based learning. For ISMM to engage in this initiative an accreditation procedure for the new diploma program needed to be followed. It has taken a larger part of 2012 to acquire the needed accreditation. During the remaining months of

2012 and early 2013 the ISMM team has worked on the content of the modules for the new diploma program. At the same time the Dutch team has continued their work on the materials already available and the design of the new diploma program to be implemented in EMERGO. The efforts of both sub teams have been put together in April 2013, during a project visit to Nairobi. During this visit, two workshops have been organised on April 17 and 18. The first workshop has been given to introduce the educational model based on competence based learning theory and its implications for the program at hand to the staff and management at ISMM. The second workshop has targetted students and alumni of ISMM including stakeholders in the development. In Figure 64 the overview of the curriculum design is shown. To the left the different theoretical modules are listed. These modules are offered based on self-study modules developed at ISMM, based on the Commonwealth of Learning model for developing online learning materials for adult learners. To the right the different EMERGO modules are shown. The EMERGO modules connect the theoretical learning to the writing of the business plan. In this approach the 4C-ID model (Merriënboer, Van 1997) is still the leading design model.

Following the workshops the full diploma program has been developed. Content has been written and the EMERGO development has been completed. In November 2013 an additional visit to ISMM has been agreed, enabling the project members to work on the final issues to complete the program. According to plan the launch of the program has been scheduled for early 2014. During this visit in November the concept of OER has been further introduced to the Tangaza University College community. A workshop and presentations on OER and the Creative Commons licensing model have been organised for Tangaza staff. The workshop was organised on request of the vice-principal Academic at Tangaza and in collaboration with Creative Commons East Africa.

Continuously efforts have been made to promote the project and to receive feedback from the scientific community to improve the quality where possible. Several conference presentations and promotion activities have been delivered. The project has been presented, amongst others, at the following conferences:

- 24th ICDE World Conference, Bali, 2-5 October 2011.
- Open Education Week, Webinar on March 8, 2012.
- World Open Educational Resources Congres, UNESCO, Paris, June 20-22, 2012.
- 1st International Conference of the African Virtual University, Nairobi, 20-22 November 2013.

In addition the project is described in a publication edited by the UNESCO Chairs in ESD (Perez Salgado & Rikers n.d.). At OUNL the contract between OUNL and UNESCO on the UNESCO Chair on Knowledge Transfer for Sustainable Development Supported by ICTs has been renewed. The project has continued to be included as one of the chairs activities.

These developments have taken place, however, against a background of change. Change in the law on higher education in Kenya, requiring all universities and colleges to re-register. Tangaza University College has again been accredited as a constituent college of the Catholic University of Eastern Africa. Under the new law, however, Tangaza has to aim for an independent university status within the coming 5 years. This has had several consequences. For the project directly it has meant that management has been occupied with the change process from college to university. For the college it means that it has had to reduce its number of franchised programs.

Various programs on offer have been franchised from European or American partner universities. The new law on higher education, however, has limited the number of franchised programs for the whole university.

6.4.2. Feedback on the project

The switch in the project from course development to the development of a diploma program has been a decision taken by the Director of ISMM and the project leader. To collect information on how staff and students would respond to the proposed diploma program has been considered vital for the project. Data collection has been organised in two ways. Senior staff has been invited for an interview, in total four staff members have been interviewed. Students have been asked to fill out a questionnaire. In total 16 students have filled out the questionnaire. As some of the details introduced in the diploma program would be new to both staff and students, a workshop has been organised to introduce some of the design principles and decisions and to build consensus and support for these decisions. The transcripts of the interviews, the

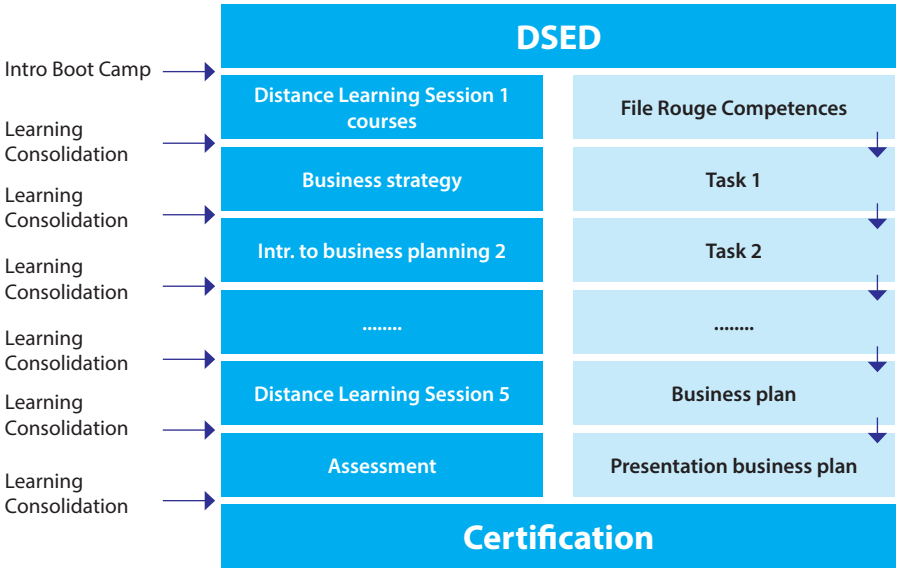


Figure 6-4: Overview of the design of the diploma program on social entrepreneurship

questionnaire and the students' response as well as the presentation used for the workshop are available on the project website.

Two workshops, one for staff and one for students have been organised in May 2013, at the Tangaza University College premises. To provide an impression of the feedback from students and staff, the information collected will be presented according to the main sections of the student questionnaire. These sections are: Competence Based Learning; curriculum design; the delivery mode; the learning materials and the Virtual Learning Environment (VLE). The information provided by the staff members will be used to provide more in-depth information.

Traditionally students at Tangaza University College follow classes, work on assignments and do assessments in a trimester based, classroom delivery system. For some years an alternative is explored. At ISMM this means that online courses and the use of MOODLE as the online delivery system has already been introduced. The workshop organised has not dealt with MOODLE, but EMERGO instead. EMERGO is an in house development of the Open Universiteit that can be used as a VLE to support serious games (Nadolski et al. 2007). EMERGO has been explained in detail during the workshop. On the next pages the feedback from the students and alumni on the workshop and the information provided is reported. The focus here is on a small group of students and mostly alumni involved in the project. The participants have not randomly been selected from the student population. The group of participants in the case study has been formed from the alumni network by invitation, complemented with students from the institute who have also been invited to participate. The response on the survey has been 100% out of 16 participants.

As the group has not randomly been selected from the students and or alumni of the institute, no assumption on the distribution of the responses can be made. Therefore the use of parametric tests in the statistical analysis of the responses is not possible. Nonparametric tests are used, although it is obvious that the small number of participants limits the validity of the results. In general the one sample binomial test was used to check the null hypothesis that the cell proportions were distributed equally for the frequencies and column proportions were distributed equally for tables. When the distributions are found to differ from the expected distribution the difference is accepted as significant when $p<0.05$ on the two sided test. When looking at the background variables of this group, two were picked for control purposes. One is gender. The group counts 4 male and 11 female. One of the 16 respondents has not answered the gender question nor some of the other background questions. This person has been excluded when using the gender variable or other background variables like occupation. All males have been employed, where 7 female have been fulltime students. This distribution was found significantly different from the expected distribution. In addition the Chi-square is 4.773; significance .029). This significant difference has to be taken into account when interpreting the survey results.

6.4.2.1. Support for Competence Based Learning

The institute of social ministry has adopted a learning model based on the handbook for curriculum design developed by the Commonwealth of Learning (Santosh 2008). This model focusses on principles for adult learning. Part of these principles are a student-centred approach and competence development. In other words, the institute has already been using a model for competence based learning. In practice, however, there is still a mix of classroom teacher-centred lecturing and group based assignments. In the workshop a larger part of the time has been dedicated to explain curriculum design for competence based learning using the 4C-ID model (Merriënboer, Van 1997). In the survey attention has been given to the general shift to competence based learning. The response is clear, all respondents support such a shift. They also are convinced that students can be active learners and therefore can take control in a student centred approach. On both questions the score is 100% (Table 6-1).

			GENDER		OCCUPATION	
		TOTAL	MALE	FEMALE	STUDENT	WORKING
Support for shift to competence based learning	Yes	100	100	100	100	100
	No	0	0	0	0	0

Table 6-1. Cross tabs: Support to the shift to competence based learning by Gender and by Occupation (%).
The table gives a combined representation of the results. Under the column 'Total' the frequencies are presented for the research variable. Under the columns Gender and Occupation the crosstab results are presented. The scores presented are the scores for each category within each background variable.

When mastering competences students work on tasks and activities, following the complexity of the situation. It is common to position that situation in a case based approach. This offers the opportunity to introduce virtual cases (developed by content developers or the lecturer) or it allows students to bring their own authentic situation to class and work on it as a case. When asked which of the options they prefer students respond that they think that authentic cases support competence based learning (93.3%). The one sample binomial test is significant ($p<0.001$).

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Checking this response against gender and occupation, reveals that the distributions differ significantly from the even distribution based on chance on the .05 level (Table 6-2).

			GENDER		OCCUPATION	
		TOTAL	MALE	FEMALE	STUDENT	WORKING
Do authentic cases support competence based learning	Yes	93.3	100	90.9	100	87.5
	No	6.7	0	9.1	0	12.5

Table 6-2: Cross tabs: Do authentic cases support competence based learning by Gender and by Occupation (%), significant at .05.
The table gives a combined representation of the results. Under the column 'Total' the frequencies are presented for the research variable. Under the columns Gender and Occupation the crosstab results are presented. The scores presented are the scores for each category within each background variable.

When asked if they prefer authentic cases over virtual cases, the response is 66.7% over 33.3% in favour of individual authentic cases. When checked against background variables no significant difference is found.

The interpretation of these survey results have their limitations. The sample is so small that it barely allows for any statistical analysis. But even more important is the consideration that the respondents have been exposed to a workshop advocating competence based learning, just before answering the survey. Therefore the survey outcomes are only considered valid for this group and should not be generalised to a broader population. Nevertheless the strong support from the students for the intended curriculum design was contributing to the decision to continue the project.

6.4.2.3. Support for the curriculum design

The survey includes one question referring to the translation of the educational theories to the curriculum design and one question referring to the curriculum design itself. The respondents unanimously support the curriculum design and the way educational theory is implemented in the design. This means strong support for the suggested solutions for the curriculum design.

6.4.2.3. The delivery mode

Respondents are very positive when asked about the potential of online learning. In general students see ODL as a full alternative for classroom teaching (93.8%). This result is significant (significance 0.001). The response is spread equally over those favouring full-time learning or part-time learning (46.7% against 53.3%). When asked to name the advantages of Open and Distance Learning, respondents refer to the classical open education components time (35.6%), place (15.3%), and pace (8.5%). Ease of access is mentioned also including lower cost (10.2%). The time component score is significant (significance 0.001), making the time factor the most

relevant component. A larger number of the respondents is very confident with the quality of learning in ODL, 30.5% (Table 63). This score however is not significant. The disadvantages of ODL in the eyes of the responding students mostly relate to the quality of learning attracting 40% of the scores. Access to facilities (internet and computer) are also mentioned (Table 6-3). Interpretation however is difficult as none of these components shows a significant result.

ADVANTAGES ODL	RESPONSES	DISADVANTAGES ODL	RESPONSES
Time	35.6	Quality of learning	40
Place	15.3	Completion rate	10
Pace	8.5	Accessibility	30
Access	10.2	Digital ability	8
Quality of learning	30.5	Cost	12

Table 6-3: Multiple response distribution of Advantages of ODL (in %) and Disadvantages of ODL in (in %). Presented is the percentage of the total of scores for each category.

The distribution of the variable gender (Table 6-4) in the sample is uneven showing a significant difference at .05. The distribution between respondents with an occupation or those still studying is more balanced. There is no significant difference in this distribution in the sample.

GENDER	COUNT	%	OCCUPATION	COUNT	%
Male	4	26.7	Studying	7	46.7
Female	11	73.3	Working	8	53.3
Total	15*	100	Total	15*	100

*Table 6-4: Distribution of respondents on Gender and Occupation, *1 missing response.*

In Table 6-5 a possible influence on the responses to the Advantages and Disadvantages question on ODL, caused by this uneven distribution of the gender variable is shown. For the advantages of ODL male respondents mention Time, Access and Quality of learning more than female. Female respondents mention Pace more often than male respondents. The frequencies of the scores on the disadvantages of ODL differ between males and females. Digital ability and cost are more an issue for females. Completion rate is not an issue mentioned very often by females. The different response patterns for males and females indicate that the overall results reported in Table 6-3 are covering up these differences.

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		GENDER	
		MALE	FEMALE
Advantages of ODL	Time	100	90.9
	Place	50.0	54.5
	Pace	25.0	36.4
	Access	50.0	27.3
	Quality of Learning	100	63.6
Disadvantages of ODL	Quality of Learning	75.0	63.6
	Completion rate	75.0	18.2
	Accessibility	75.0	81.8
	Digital ability	0.0	27.3
	Cost	25.0	45.5

Table 6-5. Advantages and Disadvantages of ODL by Gender in %. Significant at 0.05
Presented is the percentage of each gender category that has mentioned the option.

For occupation the distribution of respondents working or studying is almost equally spread. It shows that working respondents think differently from respondents who are studying (Table 6-6). In general the respondents who are working are more positive on ODL, except for the access factor that scores lower than with the respondents studying. Looking at the disadvantages of ODL it seems that the respondents who are working are more negative on the quality of learning and the completion rate.

		OCCUPATION	
		STUDYING	WORKING
Advantages of ODL	Time	85.7	100
	Place	42.9	56.7
	Pace	14.3	46.7
	Access	42.9	26.7
	Quality of Learning	74.1	73.3
Disadvantages of ODL	Quality of Learning	57.1	73.3
	Completion rate	14.3	53.3
	Accessibility	85.7	80.0
	Digital ability	28.6	10.0
	Cost	42.9	30.0

Table 6-6. Advantages and Disadvantages of ODL by Occupation in %. Significant at 0.05
Presented is the percentage of each occupation category that has mentioned the option.

One of the elements in ODL is that ICT and Multimedia can be used to enrich the learning experience. When asked if ISMM should make more use of ICT and Multimedia in its learning offer, both times 100% of the respondents reply positive. When asked whether ICT or Multimedia improve the learning or make learning more interesting the result is more inconclusive. The spread is even. When checking for occupation or gender there is no significant difference.

An issue to be solved in ODL is how to handle internships. When replacing internships with ODL based solutions the question is whether the students accept such a solution. The response is inconclusive, as the response is spread even over the options (Table 6-7). When tested against gender, it shows that male think more negative than female (significant at .05) and students think more positive than respondents working (Table 6-7).

			GENDER		OCCUPATION	
		TOTAL	MALE	FEMALE	STUDYING	WORKING
Can technology partly replace internships	Yes	50.0	25.0	60.0	66.7	37.5
	No	50.0	75.0	40.0	33.3	62.5

Table 6-7. Cross tabs: Can technology replace internships by Gender (%) and by Occupation (%), significant at .05
The table gives a combined representation of the results. Under the column 'Total' the frequencies are presented for the research variable. Under the columns Gender and Occupation the crosstab results are presented. The scores presented are the scores for each category within each background variable.

From these results it can be concluded that ODL is seen as a potential alternative for classroom teaching and that respondents are very interested in more offerings from the university in this mode. The most striking component for this positive attitude is the time component. On the other hand, respondents are less confident that using ICT and ODL based solutions can replace the internship experience.

			GENDER		OCCUPATION	
		TOTAL	MALE	FEMALE	STUDYING	WORKING
Is an ODL based diploma valued less by employers	Yes	60.0	75.0	54.5	57.1	62.5
	No	40.0	25.0	45.5	42.9	37.5

Table 6-8. Cross tabs: Is an ODL based diploma valued less by employers by Gender (%) and by Occupation (%), significant at .05
The table gives a combined representation of the results. Under the column 'Total' the frequencies are presented for the research variable. Under the columns Gender and Occupation the crosstab results are presented. The scores presented are the scores for each category within each background variable.

Especially working respondents are less positive on the value of an ODL based diploma or certificate on the labour market (Table 68). The interpretation for the support for competence based learning is presented with caution. One might argue that respondents are more familiar with the value of educational diplomas and certificates on the labour market. This might imply that the conclusions in this paragraph can be presented more firmly.

6.4.2.4. Support for Open Educational Resources

For most students Open Educational Resources is a new concept. It has been introduced and explained during the workshop. When asked whether they expect any quality difference between traditional learning materials and OER, the response is inconclusive. Of the respondents 60% answered yes, expecting a difference in quality in favour of OER.

When asked to motivate their expectation 62.5% answered to expect a positive effect on the quality of the materials (Table 6-9). Arguments used are mostly related to the ability to contextualize the learning materials. This response is in line with the preference the students showed for the use of authentic learning situations.

MOTIVATION	RESPONSES (%)
Less diversity in materials	6.3
Materials do not change teaching	18.8
Suitability in context	25.0
Quality can be checked and source is known	12.5
Shift from theory to praxis	12.5
No difference	25.0
Total	100.0

Table 6-9. Motivation for an expected positive effect on the quality of OER based materials (%).

Again the responses are checked for an influence of gender or occupation. Both tests of equality of column proportions show a significant difference at .05. Males are more positive than females. Working respondents were more positive than those still studying.

When asked whether an OER based certificate or diploma is valued less on the labour market the respondents answer negative (66.7%). This difference is significant at .05 (Table 610). When checked against gender and occupation it shows that males are significantly more positive. Students are less positive on the value of such a certificate. Both tests are significant at .05.

			GENDER		OCCUPATION	
		TOTAL	MALE	FEMALE	STUDENT	WORKING
Is a diploma based on OER of lesser value	Yes	33.3	25.0	36.4	42.9	25.0
	No	66.7	75.0	63.6	57.1	75.0

Table 6-10. Cross tabs: Expectation on diploma value using OER by Gender (%) and by Occupation (%), significant at .05
The table gives a combined representation of the results. Under the column 'Total' the frequencies are presented for the research variable. Under the columns Gender and Occupation the crosstab results are presented. The scores presented are the scores for each category within each background variable.

In conclusion it is clear that respondents are positive about the use of OER. They are not expecting a drop in quality of the materials. In general they feel confident, that when OER is offered within the setting of the university, the quality of the materials will be affected in a positive way. Similar to what is added to the conclusion on the support for competence based learning, this conclusion should be read while being aware that OER is a new concept and responses might be influenced by the workshop.

6.4.2.5. Support for the Virtual Learning Environment

In this stage of the project the respondents have been informed about EMERGO and how the course would be implemented. A demonstration of EMERGO is part of the workshop that the respondents participated in. The last part of the survey is dedicated to find out the level of support for EMERGO and the choices made regarding the implementation of the course in this virtual learning environment. The most important choices focus on the task organisation on tabs and activity sequences grouped on tabs under a task. The graphics lay-out main features are the decision to colour a group of tasks belonging to the same competence with the same colour. The idea is that this helps the student to maintain an overview over the different tasks belonging together. Additionally a crumble path is available to support easy navigation between task groups. The graphics lay-out is supported by 92.7% of the respondents (significance at 0.002). The task and activity grouping on tabs is supported by all respondents (100%). In conclusion it seems that respondents are very positive about the EMERGO solutions presented. This conclusion can be drawn more firmly, as the students have seen a demonstration of the software package.

Overlooking all five sectors of the survey it is concluded that the development and design decisions taken by the project team are not voted down by the respondents. As the survey needs to be interpreted with care, as has been mentioned on several occasions during this section, this is the strongest formulation of a conclusion that takes the limited scope of the survey into account. Together with the judgement of the management and staff involved, this conclusion supports the decision to continue the project.

6.4.2.6. Feedback from ISMM management

Next to the view of students and alumni, the position of staff and management is crucial in this project and for the development of ISMM in general. To collect more information four interviews have been taken during the May 2013 visit. The information gathered from the interviews is in line with the results of the student questionnaire. The interviews provide some insight in the strategic plan of the institute. The position of ISMM, an institute in a young university college working towards independent university status, on the educational market needs strengthening. From a strong tradition of educating students from religious congregations mainly, the institute is now targeting the general need for higher education in the country. From the interviews it is learned that the development of the civil society in Kenya has increased the demand for higher education. In the past decade ISMM is trying to step into the position of provider, because it sees a new opportunity to deliver its message of transformation of society towards poverty reduction and a better life for all. To establish a position the institute needs to connect to the civil society as well as to the public sector and private sector, based on a solid reputation. Part of the reputation is based on established relationships with American and European universities. The connection to the sectors in society is necessary to develop the educational programs that fit the needs of those sectors, while keeping the message of transformation intact. ISMM has found that this message of transformation connects to the more general need to reduce poverty by creating jobs. In the interviews it is made clear that in Kenya creating jobs means creating small and medium sized enterprises. Therefore entrepreneurship is a concept that is embraced in Kenya. ISMM acts from the assumption that delivering the message of transformation to society can go hand-in-hand with building competencies in entrepreneurship, as long as the transformation message is included. Hence the use of the term social entrepreneurship. This is what makes ISMM different from business schools and other institutions offering similar programs.

To be able to deliver programs in the future, ISMM staff has been aware that the classical classroom model is no longer sufficient. Innovations are already discussed and introduced. Competence based learning is selected as the leading teaching model and the introduction of ICT is necessary to enable the institute to reach out to their students in the field. Another strong advantage ISMM is proud of is the close contact with the alumni network. The institute has engaged in an intense contact with alumni, involving them in their programs and reaching out to them, with supportive activities, while active as professionals. The involvement of alumni in the project (for the video recordings) is an example of how to involve alumni. Looking at the project the interviewed management agrees with most of the decisions. Competence based learning, a more student centred and student active approach supported by the virtual learning environment are all in line with the decisions on the strategic level. The use of alumni to engage as experts in authentic cases for study, the use of live cases brought in by students are all part of what ISMM is working for.

From the interviewed staff some concerns have also been heard. It requires strong management to stay on course, and it requires transparency for the position of staff to gain and keep their support. The introduction of new technology needs planning and effort. Both staff and students need to be trained adequately to benefit from the advantages of the innovations. More question marks have been placed when discussing OER. Writing course material is part of the income of most staff in Africa. Academic staff in a university college like Tangaza is employed on a part-time basis. The income is based on the number of teaching hours per week and the paid work for material production. Although OER as a model is seen as an opportunity for African universities, the income related issues need to be solved to make OER mainstream.

A separate discussion in the interviews is the development of the research agenda of the institute. 2015-2016 marks the start of a PhD program. Staff members themselves are stimulated to get a PhD to raise supervising capacity. For now, due to the shortage of PhDs in general in Kenya (and Africa), senior teaching staff holding a Master Diploma, and working on their PhD, is allowed to supervise PhD students. Management is well aware of the quality issues related to building a research position and is stimulating staff to professionalise. All these efforts are against the background of a limited availability of resources to fund research. Again, the collaboration with foreign universities in research is expected to be a way forward to not only attract additional funding, but also to raise the quality level of the research and researchers.

6.5. Stage 4: Back to square one: the course on social entrepreneurship

6.5.1. The process

Tangaza University College is a private university. A decision to launch a new program is also based on economic principles. When marketing the diploma program on social entrepreneurship ISMM has encountered the limitations of its reputation as a young university college. Its network in the business sector and other sectors of society have not provided a sufficient number of potentially interested students. It has not been clear whether the fact that the program would be offered partly on-line, did cause potential students to hesitate to register. The attitude towards online learning is positive in general, but maybe ISMM for now lacks the reputation of an on-line provider for business people. This has forced management to decide not to launch the program. This decision has been taken in January 2014. For ISMM this period also has included a change in management. The contract period of the sitting director ended December 2013. The new director (Mr. Jonas Dzinekou) already started in 2013 to gradually take over the responsibilities as a director. In November 2013 long conversations with both the incoming director and the founder of ISMM, dr. Pierli, who is still active for the institute, revealed an ongoing interest to continue the collaboration. Based on the experience with the diploma program, ISMM director

Mr. Dzinekou has suggested to lower the ambition level. To build experience and reputation, it has been suggested to return to the original plan to develop a course on social entrepreneurship. The difference with the original plan being that the course has been positioned in the Bachelor program of the institute to replace the existing course on entrepreneurship. In developing the course the decisions taken earlier on design and delivery of the course could be maintained as much as possible. While the course has been redesigned using the diploma program design and materials, it has been decided to re-use the readers developed for the diploma program and offer them as additional reading materials in the course. The video materials available have been re-used to introduce the different tasks in the course. Additionally new materials had to be collected based on the OER principles and fitted into the course.

The intended delivery mechanism for the course has been EMERGO. The institute has indicated that it prefers to run the system on their own server. To build experience in using EMERGO the institute prefers to install EMERGO on its own IT infrastructure. During the installation process, however, it has been concluded that the IT infrastructure at Tangaza is not compatible with the requirements of EMERGO. Instead of falling back to the hosting option, it has been decided to redesign the course in MOODLE, already available at Tangaza and supported by the local IT staff. For the project this decision has had some consequences. The EMERGO functionality is very suited for the course, but it is possible to implement a similar approach in MOODLE. The only real issue has been that the university has been using an older version of the MOODLE software and upgrading is not an option in the middle of a running academic year. As the course is originally developed on a privately hosted MOODLE instance[63] to avoid connectivity issues during development, it has to be converted to the older MOODLE version at Tangaza before offering to the students. The Tangaza version is meant for ISMM students, the privately hosted MOODLE version has been made freely available, including the readers and video materials. The freely available version is offered as is, meaning without student support and assessment options.

The discussion on how to proceed with the project, the technical issues around the implementation of EMERGO and the decision to switch to MOODLE all have taken considerable time. Actually it has taken the larger part of 2014 to finish the discussions and to agree to an adapted plan. As the new course was to be part of the running Bachelor program, it was necessary to postpone the introduction to the next academic year. A complicating factor in finding a moment of introduction has been that the existing course on social entrepreneurship is offered to day class students and evening class students. As both groups follow the same program, changing the program affects the interests of different lecturers and two student groups. Due to the lengthy discussion and the planning issues the course introduction has been postponed to the 2015-2016 academic year. When the course has finally been introduced, it has been in the second trimester (February-May 2016) to the evening class students only.

[63] http://courses.rikers.eu, accessed August 10, 2016

Postponing the introduction has offered an opportunity to involve students in the innovation discussion. In April 2015 an extra visit has been arranged to Tangaza to engage with the evening class students who were at that time in the middle of the existing course on social entrepreneurship. The students have been invited to participate in some experimental activities. These activities replaced some assignments in the existing course, especially on the part where the students work on their business plan. After an introduction into the course development so far (very similar to the 2013 workshop) the students have been engaged in co-designing some of the tasks targeting the writing of different chapters of the business plan. For staff and students involved this has been the first time they have been engaged in a process of co-production. Engaging the students in co-production introduces them to this concept. After graduation students benefit from this experience once they move into jobs as trainers. It helps them to select existing (OER) materials and adapt them to their own needs. At the end of their activities the students have been asked to fill out a questionnaire. This questionnaire is based on the one used in 2013, with some additional questions to collect feedback on the experience as a co-producer.

6.5.2. Feedback on the project

The feedback formally collected at this stage of the project is based on the student questionnaire offered to the third year students engaged in the course on social entrepreneurship. The questionnaire and the student responses are available on the project website. The group of students involved is a class of 24. The response on the survey has been 17 (= 70.8%). Again, as the respondents have not been randomly sampled from any population, no assumptions are made of the distribution of their responses. The responses are not expected to follow a normal distribution. To test for effects the two sided one sample test (a nonparametric test) is used. In addition column proportions are tested for equal distribution at $p<0.05$ on a two sided test. Again two variables (gender and occupation) have been used to check for influences of the characteristics of the respondents. When looking at the gender and occupation variables in the sample, it shows that there are 5 males in the sample and 11 females. This is consistent with the previous (2013) sample. In this group however 68.8% is still studying. Of the males a higher percentage is still studying (80%) than of the females (63.6%). The difference in column proportions is significant at .05 (Table 6-11).

	GENDER					
	MALE		FEMALE		TOTAL	
Occupation	COUNT	COLUMN N %	COUNT	COLUMN N %	COUNT	COLUMN N %
Studying	4	80.0	7	63.6	11	68.8
Working	1	20.0	4	36.4	5	31.3

Table 6-11: Cross tab: respondents by Gender and Occupation in count and %, significant at .05.

6.5.2.1. Support for Competence Based Learning

In this group of respondents the support for competence based learning is high (94.1%). Gender nor occupation influence this extremely high score. The distribution itself significant, at .001, differs from an expected equal distribution under the null hypothesis. When checked against gender and occupation, results show a significantly different distribution of proportions at .05 (Table 6-12). The Chi-square for support for CBL by occupation is 15 and significant at .002. Looking at the support for the use of authentic cases (brought to class by the students themselves), the results show the same high score of 94.1% (Table 6-13). Again the distribution differs significantly at .001.

			GENDER		OCCUPATION	
		TOTAL	MALE	FEMALE	STUDENT	WORKING
Support for shift towards competence based learning	Yes	94.1	100	90.9	100	75.0
	No	5.9	0.0	9.1	0.0	25.0

Table 6-12: Cross tabs: support for shift towards competence based learning by Gender (%) and Occupation (%) for valid counts, significant at .05
The table gives a combined representation of the results. Under the column 'Total' the frequencies are presented for the research variable. Under the columns Gender and Occupation the crosstab results are presented. The scores presented are the scores for each category within each background variable.

The check on authentic cases against the background variables gender and occupation returns a significant difference on both variables, significance at .05 (Table 6-13).

			GENDER		OCCUPATION	
		TOTAL	MALE	FEMALE	STUDENT	WORKING
Support for the use of authentic cases	Yes	94.1	100	90.9	90.9	100
	No	5.9	0.0	9.1	9.1	0.0

Table 6-13: Cross tabs: support for the use of authentic cases by Gender (%) and Occupation (%) for valid counts, significant at .05
The table gives a combined representation of the results. Under the column 'Total' the frequencies are presented for the research variable. Under the columns Gender and Occupation the crosstab results are presented. The scores presented are the scores for each category within each background variable.

When looking further to which cases should be used (individual student cases or cases introduced by the lecturer), the female respondents are more in favour of the use of their own cases (significant at .05). Overall the support to use the student's own case is 71.4%. The results support the conclusion that in this group of respondents the

support for CBL is considerable and that these respondents favour the introduction of their own case into the course.

The results in this survey resemble the results of the first survey, reported in the previous section. The support for CBL is very high. When a result like this is repeated using a similar survey but a different group setting, the conclusions might be emphasised a bit stronger, knowing that each sample for each individual survey was very small. One can argue that strong results that are repeated, point to another explanation than pure chance.

6.5.2.2. Support for the course design

The respondents at the time of the survey have been finishing the course on social entrepreneurship. At that time the course consisted of a series of lectures and the assignment to write a business plan. The students have compared this situation with the proposed new course model.

The results show a significant preference of the new model (significance at .013) as well as for the proposed task and activity based guidance for the students (significance at .001). When checked against gender, it shows that males are less in favour of the new model than females. This result is also significant at .05 (Table 6-14).

			GENDER		OCCUPATION	
		TOTAL	MALE	FEMALE	STUDENT	WORKING
Support for the new course model	Yes	81.2	60.0	90.9	72.7	100
	No	18.8	40.0	9.1	27.3	0.0

Table 6-14 Cross tabs: support for the new course model by Gender (%) and Occupation (%) for valid counts, significant at .05.
The table gives a combined representation of the results. Under the column 'Total' the frequencies are presented for the research variable. Under the columns Gender and Occupation the crosstab results are presented. The scores presented are the scores for each category within each background variable.

For the proposed task and activity based guidance for students no influence for gender or occupation is found. The conclusion to continue the development of the course as proposed so far is supported by the survey findings.

6.5.2.3. Support for the delivery model

When in the situation where an existing classroom based course is replaced by a course partially delivered using ODL mechanisms, it is interesting to see what students think of this blended mode of learning. When asked to speak out between classroom based lectures or blended mode learning, the spread over both options is equal, showing no significant favour for one of them. When checking for gender it shows that

males are more in favour of the classroom model and females more in favour of the blended model (significant at .05). When checked against occupation no significant effect is found (Table 6-15).

			GENDER		OCCUPATION	
		TOTAL	MALE	FEMALE	STUDENT	WORKING
Class mode or blended mode	Class mode	50.0	80.0	33.3	44.4	50.0
	Blended mode	50.0	20.0	66.7	45.6	50.0

Table 6-15: Cross tabs: class mode or blended mode by Gender (%) and Occupation (%) for valid counts, significant at .05 for gender only.
The table gives a combined representation of the results. Under the column 'Total' the frequencies are presented for the research variable. Under the columns Gender and Occupation the crosstab results are presented. The scores presented are the scores for each category within each background variable.

When asked whether ODL is an alternative for classroom teaching, the response has been positive (94%), and this result is significant at .001. Gender nor occupation has an influence on this result.

When asked about a difference in value on the labour market for an ODL based diploma, the responses have not shown a significant positive or negative result. When checked for gender, it shows that females are more positive on this question (not believing in a lesser value of an ODL based diploma) than males (significant at $p<0.05$). Occupation has no influence on the opinion. This result differs from the previous survey, where respondents indicate that an ODL based diploma would be valued less.

As internships are not part of the course, it is posed to the respondents as a more hypothetical question, to test their confidence in ODL and technology based solutions. The results show that respondents are not convinced. A minority of 41% has confidence in ODL for internships. Gender nor occupation have a significant influence on this opinion.

The negative result on the issue of technology solving internship issues in ODL, does not influence the positive opinion of respondents when looking at the use of technology or for that matter the use of multimedia in learning situations. The use of more technology and more multimedia is welcomed by all respondents. This result is significant at .001. This does however not necessarily mean that respondents believe that the use of technology or multimedia makes learning more interesting. The spread over the two response options is not significantly different from the expected even distribution.

6.5.2.4. Support for Open Educational Resources

OER has been introduced as a concept prior to the 2015 survey the same way it has been introduced before the previous (2013) survey, in a workshop. In addition the concept of co-creation has been introduced in the same workshop and the students have been involved in co-creation activities. They have defined tasks and activities related to writing different chapters of a business plan. In the survey dedicated questions have been included asking for the respondents opinion on the use of the co-creation concept in course development.

When asked whether the use of OER means a difference in quality of the learning materials (Table 6-16), compared to the traditional way of providing learning materials, response is extremely positive (92.3%, significant at .003).

			GENDER		OCCUPATION	
		TOTAL	MALE	FEMALE	STUDENT	WORKING
Difference in quality with OER	Yes	92.3	100	87.5	87.5	100
	No	7.7	0.0	12.5	12.5	0.0

Table 6-16: Cross tabs: difference in quality with OER by Gender (%) and Occupation (%) for valid counts, significant at .05.
The table gives a combined representation of the results. Under the column 'Total' the frequencies are presented for the research variable. Under the columns Gender and Occupation the crosstab results are presented. The scores presented are the scores for each category within each background variable.

It is not clear whether this change in quality is judged to be positive or negative. Respondents have been asked to motivate their opinion and on the negative side arguments that have been used point to the fact that OER and co-creation are relatively new concepts and need introduction, training and time to get used to, both for staff and students. On the positive side arguments that have been used are referring to the input of several experts improving the quality. No difference is found when these results are checked for gender or occupation bias.

When asked about the influence of co-creation on the quality of the learning materials, respondents have indicated that they believe that co-creation of materials will positively influence the quality. This result is significant at .002. The arguments used show a very interesting result. Respondents argue that with co-creation:

- The opinion of the student is considered, it is student focussed.
- Students take ownership when putting their effort in.
- By participating in the process students will master the competence.

No difference has been found accounted for by gender or occupation.

Students have been very much in favour of the co-creation concept. When asked if the institute should use this concept more in course development students are positive (94%, significant at .001) and students would certainly volunteer to participate (88%, significant at .004). The main reason for this positive attitude is that students feel that when participating in co-creation activities students will deepen their understanding of what they are learning (94%, significant at .001).

Is an OER based certificate judged differently by employers on the labour market? Male students think it makes a difference, where female students do not think so (Table 6-17). This difference is significant at .05. A Chi-Square test on the value of an OER based certificate by gender shows a significant result (Chi-square 4.7, significance .029). When checked for occupation the distribution is also significantly unequal for students (at $p<0.05$). For working respondents the distribution is even over the two options.

			GENDER		OCCUPATION	
		TOTAL	MALE	FEMALE	STUDENT	WORKING
Is a certificate based on OER of lesser value	Yes	25.0	60.0	9.1	18.2	50.0
	No	75.0	40.0	90.9	81.8	50.0

Table 6-17. Cross tabs: value of OER based certificate by Gender (%) and Occupation (%) for valid counts, significant at .05.
The table gives a combined representation of the results. Under the column 'Total' the frequencies are presented for the research variable. Under the columns Gender and Occupation the crosstab results are presented. The scores presented are the scores for each category within each background variable.

6.5.2.5. Support for the VLE

A demonstration of the EMERGO development of the course at that point in time has been part of the workshop prior to the survey. As the course development was not completed at that stage only parts of the course could be shown. The demonstration has focussed on the interface, the task and activity set-up as a guidance mechanism and the graphics lay-out developed for this course. When asked, the students have given their full support to the EMERGO development as presented (94%, significant at .001). Gender nor occupation influences this opinion. The graphics lay-out is supported by the students (92.9%, significant at .05). Occupation and gender do not influence this opinion.

In the task and activity template developed for this course each task shows the same sequence of activities to solve the task. Large numbers of tasks offered to students will confuse them. It helps if all tasks follow the same sequence of activities. The majority

of the male students (60%) support this (Table 6-18), where the female respondents are even more positive (87.5%). This result is significant at .05. For occupation a similar pattern is shown, where the students (62.5%) support the fixed sequence of activities against working students 100%. Again this result is significant at .05.

		GENDER			OCCUPATION	
		TOTAL	MALE	FEMALE	STUDENT	WORKING
Does a fixed sequence of activities support students	Yes	76.9	60	87.5	62.5	100
	No	23.1	40	12.5	37.5	0.0

Table 6-18. Cross tabs support for a fixed sequence of activities by Gender (%) and Occupation (%) for valid counts, significant at .05.
The table gives a combined representation of the results. Under the column 'Total' the frequencies are presented for the research variable. Under the columns Gender and Occupation the crosstab results are presented. The scores presented are the scores for each category within each background variable.

6.6. Stage 5: Evaluation of the course on social entrepreneurship

6.6.1. The process

On request of the director of ISMM the complete course has been developed in the VLE, including the section that is delivered through lectures. Therefore the course includes the lecture notes, PowerPoint presentations used, list of referenced literature and all other information students need to actively participate in the course. At this stage the final decision to develop the course in MOODLE has been realised. To avoid possible connectivity problems to the Tangaza MOODLE and to avoid interference with other Tangaza courses running in MOODLE, a separate development environment has been used. This setup is hosted externally. It has been accepted that the externally hosted MOODLE is a higher software version than the one used by Tangaza. This implies that it is important to be aware of the differences in functionality between the two versions during the development stage. Another issue was that it has been known from the start that once the development is completed automatic transfer from the development environment to the Tangaza MOODLE would not be possible and has to be done manually. These additional issues have had repercussions for the planning. Finally the course has been offered to the evening class students in their 3rd year of the bachelor program on sustainable human development. It has been part of the February-June 2016 trimester. A full copy of the course is available on the project website.

During the course period (at the time when students start to write their business plans) a visit has been arranged to meet with the lecturer and students. The meetings

have been planned to make sure that issues that arise could be solved on the spot. Most issues that have risen have been related to connectivity and working in MOODLE. Although students at the institute have been used to work on their computer or laptop, they lack the level of skills to handle MOODLE as a VLE. Even creating an account or login has created problems for a larger part of the participants. Instead of having had access to the MOODLE course from lection one, also due to the issues of creating an account and getting access to the course, most students have not had access until the second part (the assignments to write the chapters of their business plan) was due. Tangaza's IT staff has assisted the students in creating an account and gain access to the course. A very revealing observation is that user statistics provided by MOODLE show that the lecturer has not even once accessed the course in MOODLE during the complete course period.

6.6.2. Feedback on the project so far

The third and last survey discussed has had a different background. The respondents have all been engaged in the new course (in total a group of 21 students). Of those students 15 finished the online questionnaire integrated in the course, giving a response of 71.4%. The students actually have had the opportunity to compare the new course to the more traditional way of teaching offered in other courses. Another change that maybe has influenced the students' response, is the use of MOODLE instead of EMERGO. Specific MOODLE issues occurred while the course was running, that probably have influenced the opinion of the students. General accessibility problems due to interruptions in the internet connection frequently have occurred.

The group of participating students has been an evening class group. This may have been of influence on the responses too. In terms of gender this group has been more balanced than the earlier groups, with 9 female respondents and 6 male respondents.

Based on the results of the previous surveys some changes have been made in the setup of the survey. The open-ended questions have been replaced by 5 options (Very much Agree, Agree, Agree nor Disagree, Disagree and Very much disagree) Likert scale items. These items are grouped according to an assumed underlying variable. The Likert scales are based on the results of the previous surveys. The tables used to present the outcomes have a legend to explain how to read the tables.

6.6.2.1. Support for Competence Based Learning

For the sake of the discussion on the use of CBL it is important to note that the students involved in this survey actually have used their own case (their own business idea) in class. This idea has been translated into a business plan at the end of the course. For this group it has been particularly interesting to get their opinion on authentic learning situations, where these situations have been introduced using ICT. A number of Likert items are grouped around the underlying theme of authentic

learning and defined as: favour authentic learning. The score on this underlying theme of favouring authentic learning is very positive, up to 89.3% (Table 6-19). The frequencies show that of the responses very much agree accumulated 61.3% of the scores and agree another 28.0%. On all the individual items the response is in favour of authentic learning. Especially the scores on the items linking authentic learning to mastering competences and authentic learning and bridging from theory to praxis show a significant difference (at .05) from the expected distribution under a null hypothesis of an equal spread.

STATEMENT	SCORE (%)				
	VERY MUCH AGREE	AGREE	AGREE NOR DISAGREE	DIS-AGREE	TOTAL
Authentic learning bridges between theory and praxis	66.7	33.3	0.0	0.0	100
Multimedia give better insight in future work environment	73.3	26.7	0.0	0.0	100
Authentic learning helps me prepare better for my professional life	73.3	20.0	6.7	0.0	100
Authentic learning situations help me prepare for an internship	53.3	40.0	6.7	0.0	100
Authentic learning situations are an alternative for an internship	40.0	20.0	26.7	13.3	100
Frequencies for the accumulated multiple response set, count based on responses					
Authentic learning multiple response set	61.3	28.0	8.0	2.7	0.0

Table 6-19. Frequencies of scores on statements on authentic learning (%), significant at .05
The upper part of the table presents the scores on the individual Likert items. The last row presents the frequencies of the combined scores for the underlying variable.

When asked whether authentic learning situations can be used as an alternative for an internship 60% of the respondents is positive (Table 6-19). The remaining 40% is either neutral or disagrees.

When asked about the use of cases and whether these cases should be their own individual case (as actually has been the situation for this group in the course) the response is positive, significant at 0.05. Respondents feel that the use of their own case has been more rewarding and more motivating. The suggestion that working on one (virtual) case as a group would be easier has been rejected by 60% of the respondents. When the opinion on authentic learning is checked against gender (Table 6-20), it shows that males have been more negative than females. The result is significant at .05. When checked against occupation it reveals that the working participants have been more hesitant or negative. This result is also significant at .05.

FAVOUR AUTHENTIC LEARNING		GENDER		OCCUPATION	
	TOTAL	FEMALE	MALE	STUDYING	WORKING
Very much agree	61.3	66.7	53.3	95.0	49.1
Agree	28.0	26.7	30.0	5.0	36.4
Agree nor disagree	8.0	6.7	10.0	0.0	10.9
Disagree	2.7	0.0	6.7	0.0	3.6
Very much disagree	0.0	0.0	0.0	0.0	0.0

Table 6-20. Frequencies Authentic learning variable set in 'Total' column and Cross tabs Authentic learning variable set by Gender (%) and Occupation (%) counted by responses, significant at 0.05.

6.6.2.2. Support for course design

The course design has been based on the assumption that it supports students to master complex competences related to writing a business plan. The feedback from the students after experiencing the course has been the first indication of the success of the course design to reach that goal. In total four questions have been dedicated to the course design. On three of these questions (support for the course model; did it work for you; did classroom discussions help you) all respondents answered positively. The step-by-step approach based on the task and activity structure in the course design is not welcomed by 2 respondents, representing a significant (at $p<0.05$) 13.3% of the respondents. Given the 100% score on most questions a check against gender and occupation is not relevant.

6.6.2.3. Support for the delivery mode

Did the participants see ELearning as an alternative for classroom teaching? When asked directly the response has been significantly positive at .05 (Table 6-21). Up to 86.7% has chosen very much agreed.

STATEMENT	SCORE (%)					
	VERY MUCH AGREE	AGREE	AGREE NOR DISAGREE	DISAGREE	VERY MUCH DISAGREE	TOTAL
ELearning is an alternative for classroom teaching	86.7	13.3	0.0	0.0	0.0	100

Table 6-21. Frequencies (%) for the statement that ELearning is an alternative for classroom teaching, significant at .05.

As the questions have been posed as Likert scale items the items can be grouped as well. The multiple response set created reveals a strong positive opinion on all relevant

points related to ELearning as an alternative for classroom teaching, only 5.5% has disagreed (Table 622). Most arguments proposed like the possibility to combine study and work, to have more flexibility, to be able to study more economically, to enjoy a richer learning environment, have been supported. The exception has been with the value of ODL based certificates on the labour market. Of the respondents 26.7% think that employers do not value ODL based certificates less. The combined items however do not show a support for ELearning on the same level that results from the direct question (Table 6-22).

STATEMENT	SCORE (%)					
	VERY MUCH AGREE	AGREE	AGREE NOR DISAGREE	DISAGREE	VERY MUCH DISAGREE	TOTAL
ELearning allows combining work and study	46.7	46.7	6.7	0.0	0.0	100
ELearning is more flexible	73.3	20.0	6.7	0.0	0.0	100
ELearning is more economic	60.0	20.0	20.0	0.0	0.0	100
ELearning offers richer learning environment	60.0	40.0	0.0	0.0	0.0	100
Best of both online and classroom	40.0	40.0	13.3	0.0	6.7	100
No difference in value of the certificate	13.3	13.3	46.7	20.0	6.7	100
Frequencies for the accumulated multiple response set, count based on responses						
ELearning multiple response set	48.9	30.0	15.6	3.3	2.2	100

Table 6-22. Frequencies ELearning variables per case (%) and Frequencies Multiple Response Set ELearning variables counted by responses (%), significant at .05.
The upper part of the table presents the scores on the individual Likert items. The last row presents the frequencies of the combined scores for the underlying variable.

When checked against the background variables it appears that females have been slightly more positive about ELearning than males. Working respondents have been more negative than studying respondents (Table 6-23). The total refers to the frequencies of the score on the multiple response set.

ELEARNING VARIABLE SET		GENDER		OCCUPATION	
	TOTAL	FEMALE	MALE	STUDYING	WORKING
Very much agree	48.9	55.6	38.9	91.7	33.3
Agree	30.0	24.1	38.9	0.0	40.9
Agree nor disagree	15.6	16.7	13.9	4.2	19.7
Disagree	3.3	1.9	5.6	4.2	3.0
Very much disagree	2.2	1.9	2.8	0.0	3.0

Table 6-23. Frequencies for the Elearning variable set in the 'Total' column and Cross tabs Elearning variable set by Gender (%) and by Occupation (%) counted by responses. The columns do not add up to 100% due to rounding to one digit.

Regarding the use of technology and multimedia in learning the students have been quite clear. All students have been positive about more use of technology and multimedia in learning. Of the respondents 76.7% have agreed that the use of technology and multimedia can lead to better learning experiences.

6.6.2.4. Support for course materials

In the previous surveys students' opinions have been asked regarding the proposed way of creating and presenting learning materials in the course. In this survey it has been possible to ask the students about the actual materials presented in the course. As the materials have been divided in a number of sub groups, respondents have been asked what materials (per sub group) they actually have used and how they have appreciated them. The results are presented in Table 6-24.

When checked for gender and occupation some differences have occurred that test significant at .05. The interpretation is that males and working students use the materials less and have focussed on writing their business plan. That part of the materials has been used by all.

MATERIAL SUB GROUPS	USED (%)	USEFUL (%)
Study guide	66.7	93.3
Introduction	88.7	86.7
Mid-term exam	40.0	46.7
Writing your business plan	100.0	100.0
Study materials	73.3	93.3
Example videos	66.7	73.3
Supportive materials	60.0	86.7

Table 6-24. Use and judgement on sub groups of materials offered (%). Judgement scores for those that indicated they used the materials.

Much of the materials is OER, especially the videos and additional study materials, questions about the use of OER in the course have been included. Of the respondents 66.7% think that OER based certificates are not valued less. This result is significant at .05. Of the participants the females have been slightly more positive than the males. The same result is found when checked against occupation, where the full-time students have been more positive than the working students.

Related to the access to course materials the respondents have been asked if they would still enrol in a university course if the content they would need is freely available as OER somewhere on the internet. The response is clear, of the respondents 80% would not enrol. Their arguments, when asked are: I can study by myself (58.3%) and I just need the knowledge not the certificate (33.3%).

In the survey the attention for co-creation, involving students in the course creation process, has been continued. When asked to judge some Likert scale items, respondents have shown a very positive attitude towards co-creation. Of the respondents 66.7% has been confident that students can write good instructions. They also have been confident that the way students formulate the instruction, leads to a better understanding of these instructions (60%). Respondents also are convinced that being involved in co-creation helps them to deepen their understanding (Table 6-25). Looking at the underlying co-creation variable it appears that 80% of the respondents has been very positive on co-creation.

STATEMENT	SCORE (%)					
	VERY MUCH AGREE	AGREE	AGREE NOR DISAGREE	DISAGREE	VERY MUCH DISAGREE	TOTAL
Students cannot create instructions	0	13.0	20.0	60.0	6.7	100
Students formulate better instructions	26.7	40.0	33.3	0.0	0.0	100
Student written instructions are better understood	26.7	33.3	33.3	6.7	0.0	100
Including students in course development is good	66.7	26.7	6.7	0.0	0.0	100
Students deepen their understanding when writing instructions	60.0	40.0	0.0	0.0	0.0	100
Frequencies for the accumulated multiple response set, count based on responses						
Co-creation multiple response set	45.0	35.0	18.3	1.7	0.0	100

Table 6-25. Frequencies of Co-creation variables (%) counted in cases and frequencies of the Multiple Response Set (%) counted in responses.
The upper part of the table presents the scores on the individual Likert items. The last row presents the frequencies of the combined scores for the underlying variable.

Gender nor occupation influence this opinion significantly. Respondents indicate that all of them would volunteer to be involved in course co-creation activities.

6.6.2.5. Support for VLE

The switch to MOODLE has changed the way the support for the VLE is measured in the survey. The questions asked have been about MOODLE and the course in MOODLE. The difficulties students have accessing MOODLE have been reflected in the responses. The overall opinion about MOODLE has not been extremely positive. In Table 6-26 it shows that the respondents have indicate that 46.7% have experienced problems. Still 66.7% of the respondents think that MOODLE is intuitive to use, suggesting that it is not MOODLE as such that is judged negatively. The accessibility problems seem to have caused the overall negative opinion.

STATEMENT	SCORE (%)					
	VERY MUCH AGREE	AGREE	AGREE NOR DISAGREE	DISAGREE	VERY MUCH DISAGREE	TOTAL
No problems using the system	6.7	33.3	13.3	40.0	6.7	100
The system is intuitive in use	20.0	46.7	6.7	26.7	0.0	100

Table 6-26. Overall opinion on MOODLE, counted in responses. (%)

Of the respondents 46.7% has reported problems using the system (Table 6-27). Access to the system has been the main problem, reported by 60%. Submitting assignments, including uploading documents has been another issue reported by 53.3% of the respondents. The bandwidth available as such seems to be sufficient. Of the respondents 80% indicate not having had problems playing videos. When looking at the underlying variable defined as support for MOODLE it can be seen that the problems reported have led to a slightly negative view on the system (49%).

STATEMENT	SCORE (%)					
	VERY MUCH AGREE	AGREE	AGREE NOR DISAGREE	DISAGREE	VERY MUCH DISAGREE	TOTAL
Problems finding what to do	6.7	46.7	26.7	0.0	20.0	100
Problems getting access	33.3	26.7	13.3	20.0	6.7	100
Problems submitting assignments	13.3	40.0	0.0	20.0	26.7	100
Problems opening documents	0.0	20.0	13.3	26.7	20.0	100
Problems watching videos	0.0	13.3	6.7	53.3	26.7	100
Frequencies for the accumulated multiple response set, count based on responses						
MOODLE multiple response set	10.7	29.3	6.7	33.3	20.0	100

Table 6-27. Frequencies of variables on the use of MOODLE (%) counted in cases and frequencies Use of MOODLE Multiple Response Set (%) counted in responses.

The upper part of the table presents the scores on the individual Likert items. The last row presents the frequencies of the combined scores for the underlying variable.

In the survey no questions are included to ask participants where they access the MOODLE system. It has been assumed that most of them would use the Tangaza facilities. When finally asked whether respondents would recommend to use MOODLE 93.3% have answered positive.

6.7. Reflections on this chapter

The project to create a course in social entrepreneurship has been part of a learning path. The start of this learning path goes back to the beginning of the collaboration with Tangaza University College in 2007. Since May 2010 the collaboration has focussed on the innovation of the curriculum of the ISMM institute. The project reported has covered the period from May 2010 until June 2016.

ISMMs mission is geared towards development through education. The educational institute is organized the classical way. Campus-based classroom teaching and a lecturer focussed teaching model. But the institute is aware of a need for change. Partly that change will come from the ambition to become a fully independent university, which e.g. will add the need for a stronger research agenda. As far as teaching is concerned the institution is aware of the possibilities of both open education and online education. The innovation agenda of the institution already contains the expansion of the online education offerings. The course development project at hand has fitted into these ambitions. The innovation agenda does however not (yet) contain any concrete attempts to work towards open education, although there is an interest in the use of OER. The course project has also collected information on these early developments.

In this section the course development project will be evaluated. The evaluation will cover the process and outcomes over the six years of continuous work on the project.

6.7.1. Process evaluation

A six year project is likely to show a change in ambition and targets over the years. Such a project is subject to threats in continuity over time, caused by internal or external factors. Looking back at the project there have definitively been those moments where the project has been threatened. These threats have e.g. been caused by changes in governance and policies as well as a major reorganisation at the Open Universiteit. The reorganisation did go hand in hand with a revised strategy. At the beginning of the project the attention for Open Education has been in line with the universities strategy. After the reorganisation the universities strategy changed and Open Education remained a topic of interest, but has no longer been a strategic goal.

Although the project has had the continuous support of both the UNESCO Chairs at the Open Universiteit it has meant in practice that the position of the project has become more isolated. Colleagues that have been involved in the project or have supported the project have left the university, or did no longer have the same possibilities to dedicate time to the project. This contributed to the isolation. This isolated position only shortly before the end of the project has changed again. With the instalment of the new UNESCO Chair on Open Education, a renewed interest in the project has been noticed.

At Tangaza two institutional directors in succession have embraced the project. The handover in power has not lead to a threat to the project. It has been the pressing agenda of reaching an independent university status, forced by changes in Kenyan Higher Education laws and policies, which influenced the project. This agenda has absorbed staff time, meaning that there has been less time available for the project. For staff members involved the status of the project has been unclear over periods in time. Those have been the times when communication in the project has been at its minimum. The project could be finished, because it has again been positioned as a curriculum innovation activity that fitted the new agenda for the institute. The moment this text is written, discussion on new collaboration is ongoing that is building on the results of this project.

Another threat for the project from outside has been the switch in ambition to not just create an elective course, but expand to a full diploma program. Introduced as an opportunity it has lead to a delay of more than a year to create all the new course materials needed for this switch. The institutes' decision not to launch the diploma program after the launch was already postponed one extra semester has hit the project hard. The project has however recovered from this blow, because of the deeper relationship established over the years. Parties involved have felt an obligation to find a way forward to finish the project. The best way to do this has appeared to be to return to the focus on one course and take this course as an example. By targeting an existing course in the running curriculum the risks have been minimized. Nevertheless this last switch in the project has meant another year and a half of extra time and effort.

A last threat, external to the project, has been the status of the IT infrastructure at Tangaza in general and the failed installation of EMERGO on that infrastructure. The Tangaza IT infrastructure is under development. The quality of the staff is adequate and the infrastructure reflects the efforts of the university to invest. The project has experienced restless support from the IT staff. But at the same time the project has experienced some setbacks. One setback causing delay in the project has been the failed attempt to install EMERGO in the Tangaza IT Infrastructure. The fall back scenario (using MOODLE) has worked well, since Tangaza already has been running a MOODLE

installation. The needs of the project however have ran a bit a synchronic with the schedule of installing MOODLE upgrades. As work arounds have been available this has been solved, but at the cost of extra deleay. For the students however the biggest challenges to work with MOODLE has been the fact that they are not very familiar with studying online. The frequent breaks in the internet connection have frustrated students in submitting assignments on schedule.

Apart from the external threats, the project has had some remarkable internal strengths. These strengths are connected to the individuals involved in the project. Each partner in this collaboration has had individual staff engaged in the project, who has had a direct benefit from being involved. For two of the staff members involved throughout the project spanning 7 years a PhD trajectory has emerged as a result of the collaboration. This thesis would not have been written without the personal dedication to the project as such. But in times where the problems have been piling up, the determination to finish this thesis has been the personal driver to continue. For my colleague Ms. Judith Pete it was this project that introduced her to the Global OER Graduate Network (GO-GN, founded by the UNESCO Chair on OER at the Open Universiteit) and through this network to the international research community on Open Educational Resources (OER). Through this connection Ms. Pete got involved as a researcher in the international ROER4D project, that is the basis for her own PhD trajectory.

Over the years strong interpersonal relationships have been built and even friendships have evolved. This has created a level of trust that has contributed to the continuation of the project. Problems have risen that have been solved by discussing them 'of the record'.

To further interpret the experience of 7 years of collaboration several observations that are important to share but not systematically documented are reported. One of these observations has been that the actual time dedicated to the collaboration has been (considering the duration of 7 years) rather limited. The most active periods have been the periods where one side has visited the other. During the intervals between the visits the activity level has dropped considerably, especially the intensity of communication. Surprisingly enough this has not damaged the ambitions for the project. During those intervals each party has worked on their own part of the project on their own level of ability given available time and resources.

Another observation is that given the collaboration between institutions and people with different backgrounds, positions and ambitions, it has been essential to act cautiously and based on good local information. The level of trust built over the years between project members on both sides has contributed to a deep level of communication on cultural habits and institutional procedures. Expectation

management towards project members as well as others connected to the project has been very important throughout the project. Personally this has led to an appreciation and deeper understanding of the Kenyan society and its complexity. I am convinced that without such an understanding successful collaboration will not be possible or at least will not be sustainable over time.

This project shows that over the years the ambition to address curriculum innovation in such a way that it is relevant to students has been the central theme that has carried this project to a result. There have been ups and downs, internal and external threats influencing the project and its outcomes. But in the end the project has resulted in outcomes that are valuable for the further development of the ISMM institute. It is now up to the ISMM management to study the results of this project, and expand the curriculum innovation activities systematically to a broader (institutional) level.

6.7.2. Outcomes evaluation

The outcomes of the project have been focussed around the course development activities. Course development has been organized in several steps. Each step has been evaluated and has been concluded with a go-no go decision to enter the next step. The main steps evaluated have been 1) the choices for didactical principles and design principles 2) the curriculum design as a blended mode solution and 3) the actual course developed. The results of these activities have been systematically documented by interviewing management, staff and alumni and the use of questionnaires to collect feedback from students and alumni. In 2013 the first step has been evaluation using interviews and the first student/alumni survey. In 2015 an intermediate step has been evaluated, due to the switch in the ambition of the project to scale down from a diploma program approach to a one course approach. The 2015 student survey has been used to put more focus on innovative issues like co-creation and the use of OER. The 2016 student survey amongst the third year students in the BA program has been organised to collect student feedback on the course developed.

The external validity of the outcomes of the project has been limited to the setting within Tangaza University College. The small numbers in the samples per survey and the individual interviews do not allow for more generalised conclusions. In fact the numbers are that small that a statistical analysis of the data collected only allows for the use of a very limited set of statistical techniques. Next to statistical methods a researcher is obliged to use common sense and experience, especially when statistical falsification of hypothesis is out of reach. It is my believe that the conclusions from the research feeding into the decision making process in the project have contributed to the quality of that process. The consistency of the results between the three surveys justify this (see Table 6-28)

SECTIONS OF THE SURVEYS	MAIN CONCLUSIONS OVER 3 SURVEYS	REMARKS
Competence based learning	90-100 % support for the shift to CBL. 89 – 93 % prefers authentic cases. 69 – 100 % prefers using their own case.	All three surveys show a very high support for CBL as the learning model. This result is in line with the institute already applying an adult learner oriented learning model. CBL relates to the issues reported from practice by alumni.
Curriculum design	80 – 100 % supports the curriculum design.	The mix between ICT based assignments and classroom discussions and instructions is received very positively. E.g. a case-based approach, based on the students own cases is favoured.
Delivery mode	87 – 94 % see ODL as a full alternative for classroom teaching. 100 % support more use of ICT. 50 – 60 % think that ODL based diplomas are valued less on the labour market.	A blended learning delivery is appreciated because of its flexibility especially for those who have other duties next to studying. In general respondents expect the value of a diploma based on online learning to be an issue on the labour market.
Materials	60 – 73 % expect a quality effect from the use of OER. 70 % expect this effect to be positive.	The appreciation of OER is high, but mixed. Effects on the quality of the materials are expected.
Virtual Learning Environment	90 % supports the design in EMERGO. 53 % indicates problems in navigating in MOODLE. 93 % would yet recommend MOODLE.	The connectivity problems reported in the last survey troubled a lot of participants. Nevertheless these respondents indicated to recommend MOODLE to others

Table 6-28. Main results of the three surveys: an overview.

The analysis of the three surveys has revealed that two background variables influence the perception of students. The first variable is the gender variable. In general male respondents are more positive in their responses. The other variable is occupation. Working respondents tend to respond differently from students.

The interviews have provided background information on the motivation of partners to join the project. It has been shown that the project seamlessly fitted in the ambitions of the institute ISMM. The institute's mission to educate those who will transform society has been enhanced with the recognition of the role of social

entrepreneurship. Social entrepreneurship is seen as a concept that can actually offer individuals and groups the freedom to develop. Key is that this development is owned and controlled by the individuals and groups involved and no longer dominated by sponsors. Interviews with the alumni who already have worked according to these concepts have shown that what they are doing in practice is very much related to social entrepreneurship.

The interviews also have shown a strong support for change in the teaching model, using more technology and multimedia to actually accommodate the envisaged change. The need to better connect the academic education to the needs in society has been recognized. The suggested way to anchor this connection has been by involving experts from the field and alumni in developing and running the educational programs. The interviews have provided insight in the envisaged problems to solve while realizing the institutions mission. Relying on technology and innovations in education have required staff training and proper introduction to students. The business model of the institute and even the university has been affected by these changes. A blended model of learning and teaching seems to be the best compromise for the near future. It can lay a basis for fully online solutions to reach out to students not coming to the main campus in Nairobi. The blended model also allows for the accommodation of the needs of the students to interact on a personal level with peer students and staff members.

The development of the course in social entrepreneurship has resulted from the project after the goals and ambitions have been changed several times. Generally this can be interpreted as a result of expectation management that was critical for the project. External factors have influenced the decisions in the different stages of the development. The end solution is a compromise that is workable. The institute has gained experience in running courses online, in the blended mode setting. It has contributed to the readiness of the staff to adopt the new possibilities. The pressure on the institutions' business model will increase and this will be a driving force to accommodate more change. For the students it has been straightforward and simple. Based on the results of the research parallel to the course development and on the course feedback students have been very positive about innovating the learning and teaching model at ISMM. From the research it can be concluded that students have expected and have experienced gains in quality of the learning experience, preparing them better for the labour market. But more important students have expected that they can improve their role as change agents in the transformation of society, based on the experience of taking the course on social entrepreneurship.

7 Conclusions and recommendations

7.1. Conclusions

How can the development and implementation of a course in social entrepreneurship, that is based on a competence based learning model and uses ICT and OER to ensure efficiency and effectiveness, be positioned in the Kenyan context of economic development and reduction of poverty?

The research problem as formulated implies a relationship between education and development. It also implies that innovations in education like Online Learning (the use of ICT) and Open Educational Resources (OER) can support the impact of that relationship. The third implication of the research problem is that the policy developments on a national level find their way into the curriculum and courses offered on the institutional level.

To clarify the implications identified three research questions have been formulated:
1. Can literature help to come to a clear understanding of the concept of development?
2. Can literature help to come a clear understanding of the role of education in development and can this be done for the Eastern African situation and Kenya in particular?
3. Can the theoretical arguments raised in the discussion on development and innovation in education be translated to the level of course development?

In order to create a more profound background around these questions and implications, three desktop studies have been undertaken. The first one is covered in chapter three and relates to the concept of development, where the intention is to provide a more holistic view on this concept that has a history primarily in the economic sciences. The second desktop study, reported in chapter four, looks into the relationship between education and development. The third study described in chapter five is considering innovations in education and leads to the proposal of a new tool to scan developments in education for their potential to innovate educational systems on the national level. Finally, a course development project is being described and evaluated in chapter six documenting the translation of theory and policy into the teaching practice.

Research question 1

From literature it is learned that development is firmly rooted in economics. At the same time there is growing evidence that dealing with development from the sole viewpoint of economics is partly missing the point. Economic development is not the end goal. The end goal is erasing poverty and working towards a sustainable future

for the people on the planet. The United Nations Sustainable Development Goals, accepted September 2015[64] mark this significant change in the view on development.

To summarize the answer to the first research question it can be concluded from the desktop study that development is now seen as a concept that is human centred and an ongoing process towards a sustainable future where individuals have the freedom to develop their potential to live their lives in peace and prosperity. With this understanding of the concept of development it becomes clear that it can be applied in situations not just limited to wat are called the developing countries. In fact all countries are on a continuous road to development as they are all engaged in an ongoing search to balance the different interests that lead to prosperity and a higher quality of life for all. If this is accepted the term developing country has lost its traditional power to classify countries. The shift in the definition of the term development therefore as a consequence requires a new classification of countries that will help to further their development. The Human Development Index (HDI) is a good candidate to play that role. In the HDI one of the important factors is the status of the educational system in a country, especially where this system is supposed to create, collect and distribute the knowledge needed to further development. Based on internationally agreed principles of human rights and the Sustainable Development Goals the relationships between countries are to develop into international partnership.

From the literature on development it is also learned that Eastern Africa, including Kenya, is in a process of development that is for the larger part dealing with the remains of its colonial history and the early periods of independency. This puts the situation for these countries in perspective. Citizens need to understand their role in society and acquire the knowledge and the skills to participate in a society that is developing. This is where education relates to development, as education is the national system for knowledge acquisition and distribution.

Research question 2

Regarding the relationship between education and development, the desktop study provides an overview of the historic development of education in Eastern Africa and Kenya in particular. This development is compared to the global developments in education. It can be concluded that a country like Kenya is still struggling to develop an educational system that supports the further development of the country and is geared to optimize the talents of all citizens.

Moreover a further search for generally applicable methods to improve an educational systems, points to an objective way to look at educational systems along its three pillars: accessibility, quality and efficiency. For these pillars measurements can be

[64] http://www.un.org/sustainabledevelopment/sustainable-development-goals/, accessed December 27, 2016

applied that do justice to the diversity of systems embedded in different cultures. The results can be used to compare development over time within a country, and to compare development between countries. For Eastern Africa and Kenya in particular an overview is provided how they perform on the three pillars.

Shifting the focus to educational innovation, the desktop study underlines the importance of directly linking innovations to the three pillars of education: accessibility, quality and efficiency. A so-called 'Iron Triangle Scan' is introduced in order to assess the potential of educational innovations to improve performance in all three pillars simultaneously, rather than in merely one of them while dropping the level of performance in the other two. This is being referred to as 'breaking the performance deadlock' in the (iron) triangle of accessibility, quality and efficiency. And that is precisely what a country like Kenya would require from innovating its education.

Three innovations are considered: Open Education (including Open Educational Resources /OER), Education for Sustainable Development (ESD) and Online Learning. They are all judged through the 'Iron Triangle Scan'. In some cases the outcome is that indeed there is potential to break the deadlock and I refer to such cases as a 'no-regret' option. In other cases, when the deadlock remains, an innovation can still be qualified as 'desirable' … or maybe not. The 'no-regret' options identified are OER and ESD, while Open Education (which embraces OER as one of its five components) comes out as 'desirable'. Online Learning represents a too broad and diffuse spectrum of approaches to be assessed uniquely with the 'Iron Triangle Scan', but MOOCs (Massive Open Online Courses), for example, may qualify as conditioned 'desirable'.

It can be concluded from this study that national education policies, should embrace a deliberate and proper choice out of various educational innovations available. Priority should be given to OER and ESD while sensible cherry-picking from opening up education in general and online learning /MOOCs could be included as well.

Research question 3

The research problem in this PhD study entails one more component not yet covered. How to position the development of a course in social entrepreneurship, where the insights of and the arguments on development and innovation in education come together in a recognizable and fruitful way? The process of development of such a course as well as the feedback from staff, students and alumni during this process is reported along five stages of development. In these five stages successes and failures are described. In the early stages the design of the course has been discussed. The design is incorporating some of the ingredients and lessons learnt from the desktop studies. It is student centred, the materials are OER and the delivery mode is blended.

The course itself is a response to demands from alumni working in communities and therefore has roots in ESD.

The determination to innovate the curriculum at the Institute of Social Ministry is connected to the mission of the institute which focusses on educating those who can bring about change in society. With alumni having reported that the curriculum is not providing the education to meet the challenges they experience in the field, the curriculum has to be updated. Throughout the project and despite obstacles that have been reported, the main goal has remained. Given the results of the project the institute can be encouraged to continue and extend its efforts to innovate the curriculum. That would serve learners' and societal needs and therefore further strengthen the institute's profile and position.

From the feedback collected from staff, alumni and students a consistent result comes up. Throughout the course development there is very positive feedback on the use of competence based learning, the design of the course, and the online delivery mode. In the end when the course is offered to students, the only problems reported are with the facilitation of MOODLE and the connectivity to this system. Given the small numbers of the samples in each of the three surveys and the interviews, there is no statistically firm evidence for the overall positive conclusion on the course developed. With the consistency in results at different stages of the project and the tests showing significance one may, however, assume that at least the conclusions and decisions taken throughout the course development project have been based on pretty solid ground. Generalising the outcomes is another matter.

7.2. Recommendations

A number of recommendations can be derived from the findings in this thesis. I have grouped the recommendations in three groups: general recommendations, recommendations for Tangaza University College and recommendations for further research.

General recommendations:

1. It is recommended to judge the educational system in a country according to its ability to actually collect and distribute the knowledge needed to further development and to adopt indicators accordingly. A first step could be based on internationally agreed principles of human rights and the Sustainable Development Goals.
2. The current state of the educational systems in Eastern African states seems to be influenced by colonial past and the nation building process. This has not necessarily lead to systems that meet the demands of society. To establish a stronger role for education in development, these countries and Kenya in particular could review their educational policy in the light of the factors that influence the growth and improvement of the system: accessibility, quality and efficiency.

3. It is recommended that 'breaking the performance deadlock' in the (iron) triangle of accessibility, quality and efficiency in education should become the prime motivator for educational policy. This means that countries have to have a firm knowledge of the performance of their educational system on the three pillars of education. Indicators to measure this performance have been pointed out. But it is up to the countries to monitor the performance of their educational systems and set the criteria for accessibility, quality and efficiency.
4. Countries that have limited resources available to boost their educational systems (like the countries in the Global South and Kenya in particular) it is even more relevant to use a systematic approach to prioritising investments in education. The systematic approach and arguments based conclusions offered through the use of the Iron Triangle Scan, provides a government with a more solid base for decisions.
5. The 'Iron Triangle Scan' outcome in this study leads to a recommendation to governments in general, and in particular also including the Kenyan government, to give high priority in their national educational innovation efforts to the adoption and implementation of Open Educational Resources (OER) and Education for Sustainable Development (ESD), both being qualified as 'no-regret' options. For Open Education (which includes OER) and Online Learning (containing MOOCs) such a single and general recommendation cannot be given since – different from OER and ESD – these approaches should account for the diversity that is needed by different categories of learners and in different cultural contexts and societies. Some ingredients may be 'desirable', others may be not.

Recommendations for Tangaza University College

6. The new social entrepreneurship course, its design and innovation principles, its development, its very favourable appreciation among different stakeholders, its first run, this all gives rise to a recommendation to Tangaza University College and the Institute of Social Ministry in particular, that is to continue and step-by-step extend this journey. Through a further development and provision of the ICT-supported learning model with a strong involvement of students and alumni, a unique curriculum can be created that is connecting to modern academic knowledge, to currently required competences, and to the needs of learners, local communities and Kenyan society at large. As a result Tangaza's profile and position in Kenya can be further strengthened.
7. As Tangaza University College is in the process of becoming a full and independent university, the institution is working on its research program. A recommended line of research is to follow alumni in practice and use their work in the communities as a research theme. This type of research will not only further support the alumni in their work but can also be used to further contribute to the effectiveness of the curriculum.

Recommendations for further research

8. The 'Iron Triangle Scan' which has been introduced and used in this dissertation to scan three educational innovations on their potential to be qualified as 'no-regret' or 'desirable', needs further study. First of all it would be worthwhile to make an attempt to go beyond the purely argumentative approach as applied in this study toward collecting evidence based on data which could make the scan a more objective measurement.
9. I like to encourage others to apply the scan, thereby contributing to a possible basis for inter-subjective validity and to possible extension to other educational innovations.

Summary

Chapter one describes the background of the authors personal motivation to define the study and report the results. From an interest in causes and explanations for regional differences in the level of development of societies to a level of understanding of the relationship between education and development is a long journey. Triggered by the question how education could support the ambition to actually provide individuals with the knowledge to improve their life, this journey has nevertheless been undertaken in the past 10 years. This thesis is the result of this journey.

Coming from a background in human geography, having the experience of working in a higher education institution for a long time, having the experience of working in a global movement like education for sustainable development and having experienced the confrontation with the life of people in Africa in particular the search for answers has resulted in a research project reported here.

In **chapter two** the research approach is specified. It was obvious from the beginning that solutions were not to be found in a laboratory setting. The research problem can be defined as a wicked problem. A wicked problem is a social or cultural problem that is difficult or impossible to solve for as many as four reasons: incomplete or contradictory knowledge, the number of people and opinions involved, the large economic burden, and the interconnected nature of these problems with other problems.[65] The ambition for this research therefore is mainly to contribute to the unravelling of the complex problem and adding to the understanding of the problem in a real life situation. For the research a participatory approach is chosen, supported with a literature research. For this approach to be effective it was necessary to choose a region of focus and identify partners in such a region to collaborate with. The choice was made to team up with Tangaza University College in Nairobi, Kenya. This organisation stands out in offering education to those who want to learn how to transform society on the local level in collaboration with local people. For more than 10 years a collaboration with the Institute of Social Ministry created a mutual situation of trust that made the research possible. This collaboration resulted in the development of a new course in social entrepreneurship, using ICT options and exploring the concept of open education. The literature research was to provide a basic understanding of the concept of development, the connection between education and development, innovation in education and how this general knowledge relates to the situation in Kenya.

[65] www.wickedproblemscom, benadert op 27 oktober, 2016

In **chapter three** the literature research focussing on understanding the concept of development is reported. From this research a picture is built where development has become a global issue and a global concern (resulting in institutions like the World Bank, the IMF and the United Nations). The definition of what development is has shifted over time. Initially there was a strong basis in economic theory with a focus on national policies. It was considered important to know the economic status at a given point in time and measure it for benchmarking, using e.g. the GDP. The concept has evolved into a notion of continuous improvement of the quality of life of individual people, measured by e.g. the HDI. The economic basis has been replaced by a broader view of the human right to experience the freedom to develop and live a life of good quality.

When looking at Eastern Africa in particular it is noted that two factors have been of strong influence on the situation today. One is the concept of development and how its changing definition has influenced international and national policies. The second factor is the colonial history of African countries. The colonizers have had a strong influence on the freedom of the African nations to develop, both during the era of colonisation, and after gaining independence. The way that relationships between countries have developed are strongly influenced by this history of colonisation. The way that the African countries have developed after independency is strongly influenced by the colonial history. The concept of development as it has been used for some decades has replaced colonial domination by a relationship of financial and economic dependency. Only when the concept of development changed and the African nations gained self-consciousness to opt for African solutions, the ownership of development started to shift towards the people and individuals concerned. At the same time it is shown that most African societies are barely ready to take responsibility.

Development as a concept nowadays applies to all nations around the globe. The need to adopt to changing circumstances and new challenges (population growth, shortage of natural resources, conflicts) and the obligation to improve the life of those that are still not enjoying a life of good quality is expressed in the Global Sustainable Development Goals (GSDG). The GSDG address the relationship between nations, where partnership is the preferred form of relationship.

In **chapter four** the study on the relationship between education and development is reported. The study is organised around understanding the educational systems, originating from colonial times and under development since, from the perspectives of accessibility, quality and efficiency. Performance indicators are discussed and identified to enable a comparison between nations, to support the process of policy development and implementation and to enable evaluation of policies over time.

In **chapter five** the need for innovation in education is discussed. Education has to change as the challenges faced cannot be solved within the limitations of the

current system. To facilitate the discussion the question under study is reframed. The 'Iron Triangle Model' is identified as a model to discuss innovation in education, striving to change the fixed relationship between the three corner stones of any educational system: accessibility, quality and efficiency. Concerning the 'Iron Triangle Model' some modifications are suggested and it is suggested to use the model as the basis for an 'Iron Triangle Scan' for innovations in education. Innovations that pass the scan have a better chance to break the fixed relationship between accessibility, quality and efficiency in education. These innovations therefore should be adopted because they will support the development of a future proof educational system. From the 'Iron Triangle Scan' performed, it becomes obvious that no innovation is available as a panacea for the challenges education is facing. Open Education is the best option ad hand, but its adoption depends largely on the choices made by society and by individual institutions. When looking in more detail using the Open Education Pentagon Model, it is shown that the 5 components that are involved (Educational Resources, Learning services and Teaching efforts on the supply side, and Learners' needs and Society needs on the demand side) can be divided in no-regret options and desirable options. The no-regret option standing out is Open Educational Resources. Large scale introduction of OER can only lead to improvement in education. ESD is an interesting innovation as it has a strong focus on the demand side of education. MOOCs can be of interest in situations where large numbers need access.

In Africa in general an awareness of the potential of the innovations discussed (Open Education, ESD and MOOCs) has been established. The challenge is to transform that awareness into a sense of urgency to achieve implementation on a large scale to become effictive. It would be interesting to see a combination of OE and ESD based policies, providing a localized African solution.

In **chapter six** the collaboration with Tangaza University College/ Institute of Social Ministry is reported. In this collaboration online learning is introduced to a campus based university. The resulting blended learning model is applied to a new course on Social Entrepreneurship. The course is a regular course in the bachelor program of the institute. Introducing innovations to a level of acceptance amongst management, staff and students was reached in a step by step development approach involving the stakeholders. Next to online learning as a delivery model, the concept of OER was applied in material development. For the course development the 4C-ID model was used to introduce task based/ output based learning. From the evaluation results reported it can be concluded that the stakeholders are very enthusiastic about the new approach. The enthusiasm mainly based on the fact that the new approach actually resolves some of the problems noted in the traditional classroom model that is used for teaching in the institute.

In **chapter seven** the evaluation of the project is presented followed by some recommendations for further activities. The main points raised in the evaluation are:

- The concept of developing countries has lost its function in defining development policies. Due to globalisation and the change in perception on development asks for new concepts and a new view on development, away from the strong focus on economic development in the past and more towards a human centred approach to development.
- Education is an important driver for development as it is a main mechanism for knowledge distribution.
- Innovation in education is needed as new views on development require new views on education. Innovation in education is based on improvement in performance on three pillars: accessibility, quality and efficiency.
- Scanning innovations in education for their innovative power is a useful tool for policy makers in education. Passing the Iron Triangle scan for innovation in education, means that an innovation can improve performance of an educational system by improving the performance on the three pillars (accessibility, quality and efficiency) at the same time breaking the so called Iron Triangle without reducing diversity in solutions that are applicable e.g. in the African context.
- The three innovations put to the Iron Triangle scan (Open Education, Education for Sustainable Development and MOOCs) appear to have strong characteristics that make them interesting for policy makers.
- Developments in Africa show that Open Educational Resources (OER) and Education for Sustainable Development are innovations that have been noted by policy makers. The next step would be to integrate aspects of these innovations in the national policies.
- The research has shown that it is possible to translate the latest innovations in education to the institutional level.

Chapter seven ends with some recommendations grouped in three groups: general recommendations, recommendations for Tangaza University College and recommendations for further research.

General recommendations:

1. It is recommended to judge the educational system in a country according to its ability to actually create, collect and distribute the knowledge needed to further development and to adopt indicators accordingly. A first step could be based on internationally agreed principles of human rights and the Sustainable Development Goals.
2. The current state of the educational systems in Eastern African states seems to be influenced by colonial past and the nation building process. This has not necessarily lead to systems that meet the demands of society. To establish a stronger role for

education in development, these countries and Kenya in particular could review their educational policy in the light of the factors that influence the growth and improvement of the system: accessibility, quality and efficiency.

3. It is recommended that 'breaking the performance deadlock' in the (iron) triangle of accessibility, quality and efficiency in education should become the prime motivator for educational policy. This means that countries have to have a firm knowledge of the performance of their educational system on the three pillars of education. Indicators to measure this performance have been pointed out. But it is up to the countries to monitor the performance of their educational systems and set the criteria for accessibility, quality and efficiency.
4. Countries that have limited resources available to boost their educational systems (like the countries in the Global South and Kenya in particular) it is even more relevant to use a systematic approach to prioritising investments in education. The systematic approach and arguments based conclusions offered through the use of the Iron Triangle Scan, provides a government with a more solid base for decisions.
5. The 'Iron Triangle Scan' outcome in this study leads to a recommendation to governments in general, and in particular also including the Kenyan government, to give high priority in their national educational innovation efforts to the adoption and implementation of Open Educational Resources (OER) and Education for Sustainable Development (ESD), both being qualified as 'no-regret' options. For Open Education (which includes OER) and Online Learning (containing MOOCs) such a single and general recommendation cannot be given since – different from OER and ESD – these approaches should account for the diversity that is needed by different categories of learners and in different cultural contexts and societies. Some ingredients may be 'desirable', others may be not.

Recommendations for Tangaza University College

6. The new social entrepreneurship course, its design and innovation principles, its development, its very favourable appreciation among different stakeholders, its first run, this all gives rise to a recommendation to Tangaza University College and the Institute of Social Ministry in particular, that is to continue and step-by-step extend this journey. Through a further development and provision of the ICT-supported learning model with a strong involvement of students and alumni, a unique curriculum can be created that is connecting to modern academic knowledge, to currently required competences, and to the needs of learners, local communities and Kenyan society at large. As a result Tangaza's profile and position in Kenya can be further strengthened.
7. As Tangaza University College is in the process of becoming a full and independent university, the institution is working on its research program. A recommended line of research is to follow alumni in practice and use their work in the communities as a research theme. This type of research will not only further support the alumni in their work but can also be used to further contribute to the effectiveness of the curriculum.

Recommendations for further research

8. The 'Iron Triangle Scan' which has been introduced and used in this dissertation to scan three educational innovations on their potential to be qualified as 'no-regret' or 'desirable', needs further study. First of all it would be worthwhile to make an attempt to go beyond the purely argumentative approach as applied in this study toward collecting evidence based on data which could make the scan a more objective measurement.
9. I would like to encourage others to apply the scan, thereby contributing to a possible basis for inter-subjective validity and to possible extension to other educational innovations.

Samenvatting

Hoofdstuk een beschrijft de achtergrond voor dit project, deels gebaseerd op de persoonlijke motivatie van de auteur om deze studie uit te voeren en de resultaten te rapporteren in een proefschrift. Belangstelling voor het zoeken naar oorzaken achter waarneembare verschillen in ontwikkeling in uiteenlopende delen van de wereld is de onderliggende drijfveer om uiteindelijk te komen tot meer inzicht en de relatie tussen onderwijs en ontwikkeling. Een belangrijke vraag die onder dit onderzoek ligt is hoe onderwijs tegemoet kan komen aan de ambitie individuen zodanig kennis te laten opdoen dat dit leidt tot een beter leven. Dit proefschrift is een verslag van een tienjarige zoektocht naar antwoorden.

De opleiding tot sociaal geograaf, de werkervaring opgedaan in het hoger onderwijs, de ervaring opgedaan in globale netwerken zoals die rond leren voor duurzame ontwikkeling en talloze bezoeken en projecten in Afrika vormen het kader waarin de antwoorden werden gezocht.

In **hoofdstuk twee** is de onderzoekaanpak verder uitgewerkt. Een belangrijke beslissing voor dit onderzoek was om participerend onderzoek uit te voeren. Deze beslissing is gebaseerd op de complexiteit van het gedefinieerde onderzoeksprobleem. Een viertal factoren zijn aan te voeren om deze keuze te rechtvaardigen:

Er is onvoldoende kennis of tegenstrijdige kennis beschikbaar om de vragen te beantwoorden, grote aantallen verschillende mensen met verschillende belangen zijn betrokken bij het probleem, het probleem heeft een belangrijke economische component, dit probleem is verweven met andere problemen. Dergelijke problemen worden aangeduid als 'wicked problems'[66].

De ambitie van dit onderzoek is bij te dragen aan het ontrafelen van dit complexe probleem en een bijdrage te leveren aan het beter begrijpen van het probleem vanuit een concrete context.

Parallel aan het participerend onderzoek is literatuuronderzoek verricht. Om de gewenste concrete context in te vullen is gekozen voor het concentreren op een regio en het samenwerken met een lokale partner. Deze lokale partner is Tangaza University College in Nairobi, Kenya. Binnen deze instelling is het instituut voor sociale wetenschappen gericht op het opleiden van veranderingsmanagers die een

[66] www.wickedproblemscom, benadert op 27 oktober, 2016

gemeenschap kunnen transformeren. Al voorafgaand aan dit project bestond er al een lange samenwerking met dit instituut en was er een sterke vertrouwensband opgebouwd. De samenwerking tot nu toe resulteerde uiteindelijk in de ontwikkeling van een cursus in sociaal ondernemerschap, waarbij elementen van Open Onderwijs en onderwijstechnologie zijn toegepast. De literatuurstudie heeft een fundament gelegd voor een beter begrip van het concept ontwikkeling, de relatie tussen onderwijs en ontwikkeling, de betekenis van innovaties in het onderwijs en hoe deze te zien in het kader van de situatie in Kenya.

In **hoofdstuk drie** worden de resultaten van de literatuurstudie gericht op het concept ontwikkeling gepresenteerd. Ontwikkeling heeft een globale betekenis en een globale betrokkenheid. Organisaties als de Wereldbank, het IMF en de Verenigde Naties komen voort uit die betekenis en betrokkenheid. De definitie van ontwikkeling heeft in de tijd een verandering ondergaan. Lag de focus initieel op economische ontwikkeling, tegenwoordig is de definitie gebaseerd op het inzicht dat ontwikkeling een continue aanpassing aan veranderende lokale en globale situaties is. Van een nadruk op nationaal economisch beleid en het belang van het Bruto Nationaal Product (BNP) is de betekenis verschoven naar een continue optimalisering van de levenskwaliteit van individuen, waarbij de individuele vrijheid zich te ontwikkelen ter bevordering van die eigen levenskwaliteit centraal staat.

De literatuurstudie is deels gericht op de situatie in Oost-Afrika. Uit de studie komt naar voren dat twee factoren van belang zijn geweest op de ontwikkelingen in deze regio. De eerste factor is de hantering van het concept ontwikkeling, waarbij de veranderende definitie het nationale en internationale beleid heeft beïnvloed. De tweede factor is de koloniale geschiedenis in Afrika. De koloniserende landen hebben een grote invloed gehad op de vrijheid van Afrikaanse naties zich te ontwikkelen, zowel tijdens het koloniale tijdperk en nadat de onafhankelijk was verworven. Relaties tussen landen zijn nu nog sterk bepaald door het koloniale verleden. De ontwikkeling van de onafhankelijk geworden Afrikaanse landen is nog lange tijd bepaald door het koloniale verleden. Zoals het concept ontwikkeling oorspronkelijk was gedefinieerd en is gebruikt kan dit worden opgevat als een verlengstuk van de koloniale overheersing door financiële en economische afhankelijkheid. Pas nadat de definitie van ontwikkeling is veranderd en de Afrikaanse landen wonnen aan zelfbewustzijn en durfden te kiezen voor Afrikaanse oplossingen, is de focus van ontwikkeling verschoven naar de naties en individuen waar het daadwerkelijk om gaat. Tegelijkertijd komt uit de literatuurstudie naar voren dat de meeste Afrikaanse maatschappijen nog niet voldoende geëquipeerd zijn de mede verantwoordelijkheid voor de eigen ontwikkeling te dragen.

Een ander aspect van de verandering van definitie van ontwikkeling als concept is dat het nu toepasbaar is op alle landen. De noodzaak voortdurend aan te passen aan veranderende omstandigheden en nieuwe uitdagingen in een

globaliserende samenleving geldt voor alle landen en zelfs voor regio's binnen landen. Bevolkingsgroei of krimp, een tekort aan grondstoffen, voedsel veiligheid, klimaatverandering, toegang tot veilig drinkwater, conflict beheersing en vluchtelingen en de verplichting om te streven naar een beter leven voor alle mensen maakt ontwikkeling een concept dat voor iedereen van belang is. Dit belang is uitgedrukt in de Global Sustainable Development Goals (GSDG). De GSDG geven richting aan de relaties tussen landen waarbij samenwerking de voorkeur heeft.

In **hoofdstuk vier** wordt ingegaan op de literatuurstudie m.b.t. de relatie tussen onderwijs en ontwikkeling. Het begrijpen van hoe onderwijssystemen functioneren staat centraal. Voor Afrika specifiek is de invloed van de koloniale periode op de onderwijssystemen bestudeerd en hoe deze doorwerkt in de ontwikkeling van deze systemen. Als organiserend principe is in de studie gekeken naar de onderwijssystemen vanuit de perspectieven toegankelijkheid van onderwijs, de kwaliteit van onderwijs en de efficiëntie van investeringen in onderwijs.

In **hoofdstuk vijf** is gekeken naar innovatie in het onderwijs als antwoord op de huidige problemen, samenhangend met de 'Iron Triangle Deadlock'. Voorgesteld is om innovaties te beoordelen door een 'Iron Triangle Scan' om de potentie voor innovatie beter in te kunnen schatten. Innovaties die door de scan komen en aantoonbaar toegankelijkheid, kwaliteit en efficiëntie van het onderwijs kunnen verbeteren kunnen dan in de praktijk van het onderwijsbeleid gebruikt worden. Drie innovaties zijn besproken: Open Education, Education for Sustainable Development en MOOCs. Vervolgens zijn deze innovaties aan de scan onderworpen. Voor Open Education bleek dat diverse componenten aanbevolen kunnen worden omdat ze de diversiteit aan mogelijke oplossingen niet in de weg staan. De belangrijkste component hierin is Open Educational Resources. Voor Education for Sustainable development wordt geconcludeerd dat het vooral de componenten aan de vraagzijde zijn die ESD tot een innovatie maken. Voor MOOCs wordt geconcludeerd dat er in potentie sprake kan zijn van innovatieve aspecten – in het bijzonder aan de aanbod zijde – maar dat hierbij zwaarder dan bij de andere gescande innovaties de context en omstandigheden bepalend zijn voor de functionaliteit van MOOCs.

Voor de Afrikaanse context wordt geconcludeerd dat er reeds aandacht is voor de hier besproken innovaties, maar dat de bewustwording van de potentie nog omhoog kan. Aanbevolen wordt om voor oplossingen in de Afrikaanse situatie uit te gaan van een integratie van OE en ESD gebaseerde oplossingen, omdat dit kan leiden tot de diversiteit aan oplossingen die tegemoet komt aan de behoeften in de diverse regio's.

Hoofdstuk zes geeft zowel een procesverslag van de samenwerking met Tangaza University College als een verslag van het flankerend onderzoek bij de ontwikkeling van een cursus Social Entrepreneurship. De samenwerking was gericht op het

introduceren van innovatieve aspecten in het onderwijs van het instituut Social Ministry. Het blended learning model dat hieruit is voortgekomen is gebruikt in de cursus ontwikkeling en heeft centraal gestaan in workshops gericht op het introduceren van ondersteunende onderwijskundige theorieën. Onder andere is het 4C-ID model voor ontwikkeling van complexe taken geïntroduceerd. Er is aandacht besteed aan het ontwerpen van cursussen bedoeld voor online onderwijs. Ook is er aandacht besteed aan het gebruik van Open Educational Resources.

Uit het onderzoek komt naar voren dat alle betrokkenen (management, staf, alumni en studenten) enthousiast zijn over de mogelijkheden van een mix van klassikaal en online onderwijs. Dit enthousiasme is terug te voeren op het feit dat deze oplossing tegemoet komt aan de problemen die in de praktijk worden ervaren met het huidige onderwijs.

Hoofdstuk zeven is een terugblik op het gehele project. Tevens zijn enkele aanbevelingen geformuleerd. De belangrijkste punten uit de evaluatie worden puntsgewijs weergegeven:

- Het concept ontwikkelingsland heeft haar betekenis verloren als het gaat om het formuleren van ontwikkelingsbeleid. Ontwikkeling is tegenwoordig breder gedefinieerd dan economische ontwikkeling en daar hoort een ander concept bij, waarin de mens centraal staat.
- Onderwijs is een belangrijke aanjager voor ontwikkeling, omdat onderwijs de primaire infrastructuur vormt voor de verspreiding van kennis.
- Onderwijsinnovaties zijn noodzakelijk, omdat duidelijk is dat de vraag naar onderwijs binnen de huidige onderwijssystemen en modellen niet kan worden ingevuld. Bovendien hoort bij een vernieuwde kijk op ontwikkeling ook een vernieuwde kijk op onderwijs. Hierbij wordt innovatie gezien als een mogelijkheid de prestaties op de drie steunpilaren (toegankelijkheid, kwaliteit en efficiëntie) van onderwijs gelijktijdig te verbeteren.
- Het scannen van potentiële innovaties met behulp van de 'Iron Triangle Scan' is een methode om relatief snel de werkelijke innovatieve potentie vast te stellen. Hiervan kunnen beleidsmakers in het onderwijs profiteren. Het doorstaan van de 'Iron Triangle Scan' betekent dat een innovatie daadwerkelijk in potentie de prestaties op alle drie de steunpilaren van onderwijs gelijktijdig kan verbeteren zonder dat de diversiteit van oplossingen wordt ingeperkt.
- De drie innovaties (Open Education, Education for Sustainable Development en MOOCs) die aan een scan zijn onderworpen, zijn innovatieve benaderingen die de 'Iron Triangle Deadlock' kunnen doorbreken.
- Ontwikkelingen in Afrika laten zien dat m.n. Open Educational Resources en Education for Sustainable Development reeds onder de aandacht zijn bij beleidsmakers. De volgende stap zou zijn deze bekendheid te verhogen en de concepten te integreren in het onderwijsbeleid.

- Het uitgevoerde onderzoek m.b.t. de cursus Social Entrepreneurship laat zien dat het mogelijk is om binnen de context van een university college in een Afrikaans land een vertaling te realiseren van algemene innovaties in het onderwijs naar de onderwijspraktijk op institutioneel niveau.

Het hoofdstuk wordt besloten met een aantal aanbevelingen gegroepeerd in drie groepen: algemene aanbevelingen, aanbevelingen voor Tangaza University College en aanbevelingen voor verder onderzoek.

Algemene aanbevelingen:

1. Het wordt aanbevolen op nationaal niveau het onderwijs systeem te beoordelen op het vermogen daadwekelijk kennis te verzamelen en te distribueren die relevant is voor de verdere ontwikkeling van het land. Hiertoe moeten waar nodig indicatoren worden ontwikkeld. Een eerste stap tot ontwikkeling van nieuwe indicatoren is het vertrekken vanuit de internationaal erkende rechten van de mens en de Sustainable Development Goals.
2. De huidige situatie m.b.t. het onderwijs is voor veel Oost Afrikaanse landen, en dus ook voor Kenya, nog mede bepaald door het koloniale verleden en het proces van de opbouw van een zelfstandige natie. Dit heeft tot nog toe niet noodzakelijkerwijs geleid tot een onderwijs systeem dat in dienst staat van de ontwikkeling van het land. Om de rol van het onderwijs in ontwikkeling te versterken wordt landen als Kenya aanbevolen hun onderwijsbeleid te herzien in het licht van de factoren die groei en verbetering bepalen. Deze factoren zijn: toegankelijkheid, kwaliteit en efficiëntie.
3. Het is aan te bevelen 'breaking the performance deadlock' in de (ijzeren) driehoek tussen toegankelijkheid, kwaliteit en efficiëntie van onderwijs tot belangrijkste motivatie te kiezen voor het onderwijsbeleid. Dit betekent dat landen gedegen kennis dienen te hebben van de prestaties van hun onderwijssysteem op de drie pilaren van het onderwijs. Indicatoren om deze prestaties te meten zijn reeds aanwezig. Maar het is aan de landen zelf de monitoring van hun onderwijssysteem en de daarbij geldende criteria te definiëren.
4. Landen die slechts over zeer beperkte middelen beschikken om hun onderwijssysteem om te vormen naar een systeem dat de ontwikkeling van het land volledig ondersteunt (zoals landen in Afrika en Kenya in het bijzonder) wordt aanbevolen een systematisch en op argumenten gebaseerde aanpak te kiezen als het gaat om het prioriteren van investeringen in hun onderwijssysteem. Deze systematische benadering en de benodigde argumenten kunnen worden verkregen door het toepassen van de Iron Triangle Scan.
5. De 'Iron Triangle Scan' resultaten in dit onderzoek leiden tot de aanbeveling voor overheden, en special voor de Kenyaanse overheid, hoge prioriteit te verlenen aan Open Educational Resources (OER) en Leren voor Duurzame Ontwikkeling (ESD) bij hun nationale inspanning op het gebied van innovatie van het onderwijs. Voor Open

Onderwijs (dat OER omvat) en Online Leren (dat MOOCs omvat) kan deze algemene aanbeveling niet worden gegeven omdat de diversiteit aan oplossingen die nodig is hiermee niet zou zijn gediend. Sommige ingrediënten zullen hierbij wenselijk zijn, andere niet.

Aanbevelingen voor Tangaza University College

6. Tangaza University College en het Institute of Social Ministry in Mission wordt aanbevolen de met de ontwikkeling van de nieuwe cursus sociaal ondernemerschap ingeslagen weg voort te zetten en gestaag uit te breiden. Deze aanbeveling is gebaseerd op de brede steun die is uitgesproken door diverse betrokken partijen voor de manier van ontwikkelen van de cursus, alsmede op de resultaten van de eerste ervaringen in de praktijk. Door het ICT gebaseerde model van onderwijs met een sterke inbreng van studenten en alumni, kan een uniek curriculum worden ontwikkeld, met een sterke relatie naar actuele onderwijstheorie, dat aansluit bij de behoefte aan competenties en dat aansluit bij de behoeften van studenten, lokale gemeenschappen en de Kenyaanse maatschappij in het algemeen. Hiermee kan het instituut haar positie in Kenya verder versterken.
7. Omdat Tangaza University College een process doorloopt naar de status van volwaardige universiteit, is een aanbeveling gericht op het onderzoeksprogramma van de instelling. ISMM is in een unieke positie om onderzoek te verrichten naar het werk van haar alumni in de diverse gemeenschappen in Kenya en Oost-Afrika. Met dit onderzoek kan het instituut het werk van de alumni verder ondersteunen, maar zeker ook de kwaliteit van het eigen curriculum doorlopend verbeteren.

Aanbevelingen voor verder onderzoek

8. De 'Iron Triangle Scan' zoals hier geïntroduceerd en toegepast op drie innovaties in het onderwijs om hun potentie voor de kwalificatie 'no-regret' of 'desirable' te scannen, moet verder worden onderzocht. Een eerste stap zou zijn om verder te gaan dan de argumentatieve aanpak, zoals hier is toegepast, naar een aanpak waarbij empirisch bewijs gebaseerd op empirisch onderzoek zou leiden tot een meer objectieve meting.
9. We zouden het toejuichen als anderen de scan zouden gebruiken. Daarmee ontstaat er een bredere basis voor een intersubjectieve validatie van de scan en mogelijk een uitbreiding naar andere innovaties in het onderwijs.

Curriculum Vitae

Jos Rikers is born in Heerlen (1956) in the Netherlands. After completing secondary education he studied Geography and Spatial Planning at Utrecht University. He graduated in 1984. After working in several jobs after graduation he started his academic career as a researcher at Twente University, School of Education (1985-1990). In 1990 he switched to his current employer, the Open Universiteit in the Netherlands (OUNL). He held several positions in the university (e.g. quality assurance in assessment 1990-1996; educational technologist 1996-2001). Since 2001 he is a senior policy advisor. He developed an interest in the concept of education for sustainable development. In 2004 he was one of the founders of RCE Rhine-Meuse, a regional centre of expertise on education for sustainable development. He was the director projects at RCE Rhine-Meuse 2004-2010. He was a member of the City of Kerkrade Climate Advisory Council 2009-2010.In 2006 he became active in the field of Open Educational Resources.
Since October 2009 he became the coordinator of the program of the OUNL UNESCO Chair 'Knowledge Transfer for sustainable development supported by ICTs'. In December 2010 he also became the coordinator of the program of the OUNL UNESCO Chair on Open Educational Resources.

The Social Entrepreneurship Project in collaboration with Tangaza University College (Nairobi, Kenya) was initiated in 2007. In 2010 this project was redefined towards a focus on innovating the educational model of the Institute of Social Ministry. This project is the basis for this thesis and was supervised by the UNESCO Chair 'Knowledge Transfer for sustainable development supported by ICTs' (prof. Rietje van Dam-Mieras). Hans van Ginkel, who was my professor at Utrecht University and developed the concept of RCE's when he was rector at United Nations University, was my supervisor. Second promotor is prof. Fred Mulder, former rector of the Open Universiteit in the Netherlands, and UNESCO Chair in Open Educational Resources at the same university.
In 2012 the author became the first director of the Global OER Graduate Network (GO-GN), founded by the UNESCO Chair on OER at the Open Universiteit, prof. Fred Mulder. In 2014 the coordination of the network was transferred to the Open University in the UK.

The author has published in scientific journals on ESD and RCE related topics. In addition he has co-authored publications on ESD and OER. He has presented at global conferences on ESD, Open Education and OER.

Jos Rikers was invited to give guest lectures on ESD at Zuyd University of applied science, the Netherlands, St.Pauls University, Kenya and Handong Global University, Republic of Korea.

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Every person has the right to be educated in such a way that he or she has the knowledge and the ability to participate in society as a critical and independently thinking individual. Given the rapid developments in society it is inevitable that education will also be needed to update the knowledge and skills of individual members of society. How to do this has been a leading question in my activities as a professional, working in a higher education environment. Although my personal contribution to the answer is only marginal, it is the Open Universiteit that is making a major contribution. Therefore I am blessed to be able to work in such a rich environment, rich in experts in the field of education and educational technology. No doubt all the colleagues have contributed to my ability to write this thesis and I want to thank them.

During my work between 1990 and 2014 I had the pleasure to work with colleagues at other universities around the world. But my special interest and my heart is with Africa. The colleagues at UNISA, University of Pretoria and University of Cape Town (South Africa) have been a source of inspiration over the years. Especially I want to thank Anthony Melk, Paul Steyn and Vasi van Deventer, who worked and work at UNISA and became friends over the years. I also want to thank Pieter and Elize Botha, who are involved in home schooling in South Africa for showing me new possibilities for education and for their ongoing friendship. It is this Africa connection and personal involvement that made it clear from the start, that if there was going to be a thesis project, it would serve the needs of African learners.

Writing this thesis has been a long and complex journey that started with discussions at a breakfast table in Ghent (Belgium) between my wife and my supervisor in April 2005. It took until 2010 before the ongoing discussion ended with a realistic (☺) research plan. In the first stages of the project the outline of this thesis was drawn on a napkin at a safari camp in Masai Mara, Kenya. Without the financial support of the Dutch National Decade Program for Education for Sustainable Development the plan would not have gone beyond the napkin. I therefore thank the coordinating director of the program Mr. Roel van Raaij for his support.

Working on a thesis for so many years takes a lot of energy and requires persistence that in some stages was almost too much. Those were the moments that I had the active support of those that I want to thank by name here. First of all my wife, Cocky Huisman, who never got tired of asking me about progress in my research and supported me along the way. Secondly my supervisor prof. Rietje van Dam-Mieras, who at some points in time seemed to be the only one believing in a successful ending of the project. Her

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