IMPROVING QUALITY OF LIFE IN AFRICAN COUNTRIES THROUGH OPEN, DISTANCE AND E-LEARNING

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Based upon research conducted in countries of sub-Saharan Africa, this paper advocates the usage of Open, Distance and e-Learning (ODeL) as a tool of improving Quality of Life and links it to the UN Millennium Development Goals. The authors propose a model of an ODeL project focusing on Higher Education Institutions. In this model, the authors identify parameters (political, socio-economic, demographic, geographic, cultural etc.) that contribute to the success or failure of an ODeL project, making a distinction between the components of the ODeL project and their influencing parameters. The success of an ODeL project leads to improving Quality of Life. The model is used to create a Balanced Scorecard for evaluation of (existing) ODeL projects. Available data from several Higher Education Institutions in three countries – Mozambique, Rwanda and Uganda - are used for the validation of the Balanced Scorecard, thus validating the proposed model. The proposed methodology allows implicit evaluation of improving Quality of Life (QoL) through measuring the success of an ODeL project and then linking the QoL indicators to the success of an ODeL project.

Keywords: improving quality of life, modelling, information technology, higher education institutions, open, distance and e-learning, developing countries

1 Introduction

While identifying the ways for improving Quality of Life (QoL) in Russia through usage of ICT (particularly ODeL), it is necessary to take into consideration the experience of other countries, both developing and developed.

1.1 ODEL - Main Concepts

ODeL (under the names "заочное обучение", later "дистанционное обучение») has been known in Russia for a long time (Mogilev et al. 1997). Since the advent of the Internet in Russia in beginning of 1990s, there were many attempts to implement ODeL systems based upon ICT usage, for example, (Zlotnikova 2004a, 2004b, 2005).

In spite of ODeL gaining popularity in Russia, there are some myths still prevailing in the society which put barriers to wider deployment of ODeL, such as that ODeL always gives worse results than traditional, face-to-face education. Another myth is that the distance degrees are easy to get, thus have no value.

The modern vision on ODEL is expressed as follows in (ODEL, 2012):

> In the 21st century, open learning, distance education, and e-learning are inextricably linked. The philosophy of open learning, with its emphasis on learner control over the time, place and pace of study, has animated distance education since its emergence as a mode of educational provision. Distance education in turn has contributed much to making educational systems more open and flexible, through its adoption of various education technologies. Online distance education in particular, has proven to be a transformative influence, as it demonstrates how the use of information and communication technologies can re-shape the teaching and learning transaction.

Open, distance and e-Learning has revolutionized the perception of universities and the role of education in development. It has contributed to the making of a borderless world driven by innovation and knowledge creation for policy development, advocacy, and community transformation and action.

1.2 Millennium Development Goals and Quality of Life

The eight Millennium Development Goals (MDGs) – which range from halving extreme poverty to halting the spread of HIV/AIDS and providing universal primary education, all by the target date of 2015 – form a blueprint agreed to by all the

world's countries and all the world's leading development institutions (UN 2000). Although the MDGs mostly aim at meeting basic needs, such as universal/ primary education, or Education for All (and not higher education), ICTs are considered as a powerful tool contributing to MDGs achievement. Particularly, Target 8.F sounds as follows (UN 2000):

> In cooperation with the private sector, make available benefits of new technologies, especially information and communications
> - Demand grows for information and communications technology
> - Access to the World Wide Web is still closed to the majority of the world's people
> - A large gap separates those with high-speed Internet connections, mostly in developed nations, and dial-up users

Millennium Development Goals are closely linked to the concept of Quality of Life (QoL). The term Quality of Life is used to evaluate the general well-being of individuals and societies (Wikipedia, 2012). Standard indicators of the Quality of Life include not only wealth and employment, but also the built environment, physical and mental health, education, recreation and leisure time, and social belonging.

There are different metrics for evaluating QoL. The Human Development Index (HDI) is a comparative measure of life expectancy, literacy, education, and standards of living for countries worldwide. It combines three dimensions: 1) a long and healthy life: life expectancy at birth; 2) education index: mean years of schooling and expected years of schooling 3) a decent standard of living: Gross National Income (GNI) per capita, Purchasing Power Parity (PPP), US$.

The Happy Planet Index, introduced in 2006, in addition to standard determinants of well-being, uses each country's ecological footprint as an indicator (Happy Planet Index 2012). However this index is controversial and often criticized for not taking into consideration political freedom and human rights (Ben-Ami 2006).

The Economist Intelligence Unit's quality-of-life index uses nine quality of life factors to determine a nation's score (Economist Intelligence Unit 2005). This QoL index is used in the current study to identify links between ODeL projects and QoL.

It is surprising (and even shocking) that in many ratings on QoL Russia is ranked among or even below African countries (for example, see (Economist Intelligence Unit 2005)). The personal experiences of the authors show that in many

QoL-related cases such as gender equality or handling ecological problems some African countries (like Rwanda) have more advanced policies than Russia.

1.3 An Overview of ODeL Policies and Practices in African Countries

In sub-Saharan Africa, most countries of which are traditionally ranked very low in the sense of Quality of Life, there are significant attempts to implement ODeL projects. Almost all African countries currently have ODeL projects. The only exceptions are Central African Republic, Comoros, Eritrea, Gambia, Guinea-Bissau, Liberia and Sao Tome and Principe. Numerous ODeL projects are initiated by both governmental and non-governmental organizations (NGO).

The African ODeL projects have to be summarized yet. The main question to be answered is what components an ODeL projects should consist of and what external parameters then make these projects succeed, thus improving quality of life in African countries, or fail, thus wasting scarce resources. Knowing these components and parameters, how they relate and how they form meaningful clusters would help ODeL policymakers and practitioners in African countries to be more effective and to avoid steps that would lead to wasting time and/or money.

To conduct a review of existing ODeL projects the authors have concentrated on ODeL projects in Higher Education Institutions (HEI) in three African countries with approximately equal GDP (PPP) per capita – Mozambique ($800), Rwanda ($1044) and Uganda ($1152), since these countries are most familiar to the authors. Then these three cases have been considered within the wider context of countries from sub-Saharan Africa.

The review of African policies and practices in Open, Distance and e-Learning (ODeL) generally was based on the reports on ICT in education as provided by InfoDev (Farrell and Shafika 2007). InfoDev is a reputable programme sponsored by the World Bank and many other international development agencies. These reports under the general name "Survey of ICT and Education in Africa: 53 Country Reports" picture the situation in all African countries. This remarkable collection of facts about ICT educational policies and practices has required for its composition the

employment of significant human and financial resources. The fact that those reports are dated back to 2007 does not undermine their importance since these reports still present the most complete information about ICT educational policies and practices in African countries. Some gaps in these reports have been filled using other available sources on African countries - Botswana (Batane 2004, Paterson 2007, Government of Botswana 1994), Cameroon (Ministry of Post and Communications of Cameroon 2004, Nana and Ogechi 2008), Kenya (Ministry of Information and Communications of Kenya 2006), Namibia (Government of Namibia 2005, Paterson 2007), Rwanda (Government of Rwanda 2000, 2005, Ministry of Finance and Economic Planning of Rwanda 2000, Zlotnikova 2008), Seychelles (Paterson 2007), Tanzania (Esselaar and Associates 2001, Tilya 2007), Uganda (Ministry of ICT of Uganda 2001, Reijswoud and Mulo 2006), Zimbabwe (Government of Zimbabwe 2005). Bassi (2012) provides the most complete list of ICT in Education policies and plans worldwide, including African countries, also used in this study. The review has demonstrated remarkable diversity in the area of ODeL. While some countries have not only policies on ODeL or at least legal provisions for ODeL in their ICT educational policies, but also governmental projects on ODeL, others still have nothing.

1.4 Impact of ODeL on Quality of Life

Up to now there were no significant efforts to identify the impact of ODeL on Quality of Life in qualitative or quantitative terms. There were also no attempts to identify components of successful ODeL projects and link them to the QoL indicators. While Peters (1994) indicates that "the educational quality of a learning environment is not only measured with regard to professional norms or predetermined teaching objectives, but also with regard to its functionality, its meaningfulness and the quality of life it brings", he does not identify the links between an educational quality of e-learning environment and QoL indicators.

Murangi and Nitschke (2008) identify the role of open learning in increasing the percentage of graduates entering the Higher Education Institutions and reducing the unemployment rate. These two parameters (the percentage of ODeL learners entering HEI and reduction of the unemployment rate as a result of ODeL) can be considered as QoL indicators although the authors do not state it explicitly.

Nekongo-Nielsen (2006) explains that ODeL can contribute to the development of a country, thus improving Quality of Life, in several ways. First, learners gaining qualifications through ODeL can still have a full-time employment which is better for a country since working learners pay taxes and tuition fees for their children etc. Since they do not apply (and do not qualify) for bursaries or study loans, these funds can be allocated to needy younger students. Third, during the study learners keep playing their social roles being important members of society. They can assist and consult their local communities immediately applying gained knowledge and skills and thus contributing to the community development. Fourth, as a result of achieving higher qualifications through ODeL, learners can find better jobs and be better paid. Fifth, ODeL helps in providing gender equality. For instance, 70% of ODeL learners in Namibia are female. New knowledge and skills acquired by women through ODeL lead to more "wage-in-cash" earnings for them (traditionally attributed to their male counterparts while women are mostly involved into subsistence farming). Sixth, ODeL provides equal opportunities to have an access to education for inhabitants of remote areas. Seventh, as it was stated by Boshier (2002 as cited in Nekongo-Nielsen 2005) competing in the global and knowledge-based economy requires skills acquired at tertiary level. In many cases (working adults, inhabitants of remote areas, single mothers, disabled people etc.) this level of education can be achieved only through ODeL. Finally, ODeL provides opportunities for life-long learning which is crucial for the social and economic development of a country.

Other ODeL researchers and practitioners indicate the following positive impact of ODeL on different aspects of Quality of Life:

1) reducing time away from home for professional development purposes (Margueratt and Fahy 2003)

2) saving tuition and other costs - "no travel expenses, no childcare services, no absence from work, and usually no out-of-state fees" (Graduate Educational Information Service 2012)

3) improving incomes of graduates, shortening waiting time for employment (Faustine 2012)

4) closing the digital divide, giving people an equal opportunity to communicate, to have an access to education, to get a job (Block 2010)

5) for disabled people – breaking the isolation and integration into a virtual learning community, restoring a social identity by giving them access to work or helping them maintain a job by improved qualification (Hamburg and Ionescu 2001)

6) providing greater equal opportunities for working adults, in-service teachers as well as high school graduates to attend university education; improving the skills, competencies, professional competitiveness, and eventually the quality of life among women (Zuhairi, Zubaida and Daryono 2008)

7) providing fair opportunities for all learners both to enter higher education programmes and succeed in them; offering learners the opportunities to advance, develop and enrich themselves, both intellectually and materially (Moodly 2002)

8) achieving social justice in terms of human development; improving the access to quality higher education (Murugan 2010).

1.5 An Analysis of the Existing Models in ODeL

Before proposing a new model of an ODeL project, the authors have analyzed existing models in ODeL. All models identified could be transformed into tools for evaluating the success of either an e-learning system or an ODeL project. The general

difference between models is what the creators of a model have chosen as success criteria. There are three common approaches:

1) success from the point of view of the e-learner (mostly the degree of their satisfaction with an e-learning system)

2) success from the point of view of the trainer (the progress shown by e-learners)

3) success from the point of view of the institution/ organization (mostly financial success, sustainability of a project).

All these approaches lack a global vision. They consist of the number of components and do not take into consideration influencing them external parameters.

The analysis of the ODeL models helped the authors to identify the existing gaps and to propose their own components of the ODeL project model. Since these numerous components needed systematization, the authors have chosen as a framework the Dutch model of ICT in Education "Four in Balance" (Kennisnet ICT op School Foundation, the Netherlands cited in Engelen, Ludeking and Myk 2006). This model being converted into a monitoring tool is widely used in the Netherlands helping the schools to monitor their level of ICT usage compared to the national average. The "Four in Balance" model is not related specifically to ODeL, but, being universal, can be applied to almost any situation involving ICT usage in education. The high level of abstraction - it does not contain any components specific to the Netherlands - allows its usage not only in developed, but also in developing countries. Its components include

1) Vision and Leadership (sometimes called Educational Philosophy)

2) Knowledge and Skills

3) Educational Software and Content

4) ICT Infrastructure

Taken the "Four in Balance" model as a framework the authors divided the identified components of the proposed ODeL project model into four coherent groups.

1.6 Objectives and Scope of the Study

The general objective of this study is to create a model for an ODeL project success. In order to achieve this objective, the area of research is decomposed into the following specific objectives:

1) To identify an impact of ODeL projects on QoL

2) To identify the components of a successful ODeL project and links between them

3) To identify country-related parameters potentially influencing ODeL projects and links between those parameters and components of ODeL projects

4) To construct a model relating these components to these parameters

5) To develop a Balanced Scorecard for evaluation of ODeL projects on the base of the proposed model

6) To validate a model and a Balanced Scorecard using available data

The scope of the paper includes only ODeL projects undertaken within Higher Education Institutions (HEI). ODeL projects carried out by NGO's tend to be short-term, one-time activities. They lack sustainability and longevity and stop once financing stops. The research is based upon the primary data collected in Mozambique, Rwanda and Uganda, as well as the secondary data obtained from other available sources.

2 Methodology
2.1 Employed Methodologies and Objectives

To achieve the objectives stated above the following methodologies have been employed.

First, a critical analysis of existing ODeL projects in African countries has been done as specified in the Introduction of this paper. Simultaneously, the available literature on ODeL models has been reviewed in order to identify both the components of these models and their existing gaps. As a result a list of components contributing to the success of an ODeL projects has been compiled.

Second, the authors have chosen the QoL indicators based upon The Economist Intelligence Unit's quality-of-life index which is the most complete set of QoL indicators (Economist Intelligence Unit, 2005). These indicators are as follows: 1) material wellbeing: Gross Domestic Product), PPP in $; 2) health: life expectancy at birth, years; 3) political stability and security: political stability and security ratings; 4) family life: divorce rate; 5) community life; 6) climate and geography: Latitude; 7) job security: unemployment rate; 8) political freedom: average of indices of political and civil liberties; 9) gender equality: ratio of average male and female earnings. Then the potential impact of ODeL projects on QoL indicators has been identified.

Third, the authors have identified the external parameters influencing the success of an ODeL project through the critically analysis of open sources of the statistical information about African countries such as the IndexMundi website (IndexMundi 2011). This website provides most complete country profiles. The data are based on reputable sources such as CIA World Factbook, International Monetary Fund, United Nations Statistics Division etc. The existing gaps have been filled with alternative data sources, or by personal experience of the authors. As a result the list of identified parameters (political, socio-economic, demographic, geographic, cultural etc.) that contribute to the success or failure of ODeL project has been obtained.

Fourth, based on the literature review and personal experience in the area of ODeL, the model of the successful ODeL project in African countries comprising both its components and external influential parameters has been compiled. The components have been divided into four clusters, according to the widely accepted in the Netherlands "Four in Balance" framework (Engelen, Ludeking and Myk 2006). The four core components of the framework are: 1) Vision and Leadership; 2) Knowledge and Skills (professional development); 3) Educational Software and Content; 4) ICT Infrastructure. This framework has been chosen because it is known in the Netherlands as giving good practical results that contribute to its validation. Since it does not contain components specific to the Netherlands or developed

countries in general, being thus universal, it can be easily applied to developing countries.

Then, taking into consideration the components of the proposed model, a Balanced Scorecard as a metric for evaluating ODeL projects in Africa has been created. The Balanced Scorecard concept refers to the theory of metrics linked by the specific rules, where the total value is calculated using specific formulas (Kaplan and Norton 1996, Balanced Scorecard Institute 2010). Metrics are considered as a means of accessing performance in institutions, businesses, programs or resources.

The proposed metrics have been divided into four clusters, according to the "Four in Balance" framework (Engelen, Ludeking and Myk 2006). All metrics have been normalized to the interval *[0,1]* where *0* is the worst score and *1* is the best. Sometimes the metric also is shown as a percentage. Weights have been assigned according to the importance of the parameter and then adjusted to give maximum total performance of *1*. Let x_i be the score assigned to the ith parameter of the ODeL project, and w_i the weight of this parameter, then the total performance P_{total} is calculated as the weighted average:

$$P_{total} = \sum_{i-1}^{n} x_i \cdot w_i . \quad (1)$$

Since the weights add up to 1, the value P_{total} will range between 0 and 1. The value P_{total} allows us to evaluate an ODeL project. The closer is the value to 100%, the more successful a project is (see Fig. 1).
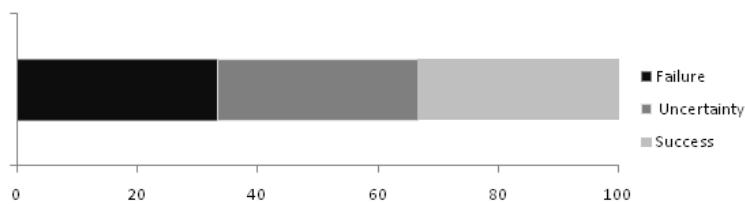

Figure 1. A simple scale indicating the degree of success of an ODeL depending on the total performance value $P_{total.}$

Finally, the model has been validated using the data collected in higher education institutions in Mozambique, Uganda and Rwanda. Methods of data collection in all three countries included questionnaires (delivered in advance), face-

to-face interviews conducted at the higher education institutions and facilitated discussions during the workshops on ODeL.

3. Results

3.1 Identified Impact of ODeL Projects on Quality of Life

This research uses nine quality of life factors as identified in (Economist Intelligence Unit 2005). Table 1 represents these factors and identified qualitative links with ODel.

Table 1. Identified links between ODeL and QoL

S/N	Quality of Life Factors	Link with ODeL
1.	Health: Life Expectancy at Birth	The link is implicit. Educated people and people with high income tend to live generally longer than non-educated and poor people. The same applies to the whole nations. Also if ODeL projects aim at health improvement, then there is a direct link with health, such as Community Outreach Projects (COP) on AIDS/ HIV or reduction of infant mortality.
2.	Family Life: Divorce Rate	No link identified
3.	Community Life	The link can be traced only in the case if an ODeL project is at the same time a COP aiming in improving Community Life. In this paper research is limited by HEI, so there is no link identified.
4.	Material Well-being: GDP per person, in USD	The link is as follows: the higher educational level gained as a result of ODeL means the higher income of an individual and the higher GDP (PPP) in a country.
5.	Political Stability and Security	No link identified
6.	Climate and Geography: Latitude	No link identified
7.	Job Security: Unemployment Rate (%)	The higher educational level (gained as a result of ODeL) means the more chances to get the job either inside the country or at the global job market (throughoutsourcing)
8.	Political Freedom: Average of indexes of political and civil liberties	Political Freedom is linked to Information Freedom, and Information Freedom, in its turn, can be achieved through the use of ODeL. More educated people better understand their rights and can fight for them.
9.	Gender Equality: Measured using ratio of average male and female earnings.	The link is that in many cases ODeL is more convenient for women (remember the high level of dropouts in African schools due to teenage pregnancies). It is necessary to include special Gender Equality provisions when developing ODeL projects. Being educated, women will earn more.

In this paper, the authors do not consider the impact of each component of the model of the successful ODeL Project (see Section 3.2 below), but consider the overall impact of the ODeL project on the QoL. The identification of links between individual components of the ODeL projects and QoL indicators, as well as the revision of the list of these indicators, will be undertaken in the extended version of this paper.

3.2 Proposed Model

The results of research have led to the creation of a new model of the ODeL project that extends the existing models. In this model, the authors distinguish between components and their influencing external parameters. Components of an ODeL project are influenced by numerous parameters (economic, political, demographic, technological and cultural).

The model of a successful ODeL project and its influencing parameters is presented in Table 2.

Table 2. Parameters and components of the model of the successful ODeL project

Parameters	Components
Economic Parameters	**Vision at the Institutional Level**
P_0 - GDP (PPP) per capita	C_0 –Implemented and Adopted Institutional Policy on
Political Parameters	ODeL or ICT Policy with Provisions on ODeL
P_1 – Political Stability	C_1 – Investments into ODeL
P_2 – Democracy, Lack of	C_2 – Longevity and Sustainability of ODeL Projects
Censorship	within the Institution
P_3 – Implemented and Adopted	C_3 – System of Incentives for Teachers
ICT	C_4 – Methods of Encouraging Students to Participate in
Policy	ODeL
P_4 – Implemented and Adopted	C_5 – Common Pool of e-Learning Resources within the
ICT Educational Policy	Institution or within the Consortium of Institutions
P_5 – Provisions and Advocacy for	C_6 – Common e-Learning Platform within the
Free	Institution or within the Consortium of Institutions
and Open Software (FOSS) in	C_7 – Provisions for Free and Open Source Software

Policies

  P_6 – Implemented and Adopted Educational Legal Framework

Demographic Parameters

  P_7 – Education Expenditures

Technological Parameters

  P_8 – Developed ICT Infrastructure

  P_9 – Number of Internet Service Providers

  P_{10} – Number of Personal Computers per 100 population

  P_{11} – Number of Internet Users per 100 population

  P_{12} – Number of Mobile Phones per 100 population

  P_{13} – Number of Community Telecenters in Remote Areas

Cultural Parameters

  P_{14} – Value of Education in the Society

  P_{15} – Community Values

(FOSS)

  C_8 – ODeL Center/Unit within the Institution

  C_9 – Alternative Methods of Delivery of Learning Materials

Knowledge and Skills

Knowledge and skills of Students

  C_{10} – Knowledge and Skills of Students as a Result of Introductory Training on ICT Literacy

  C_{11} – Knowledge and Skills of Students as a Result of Introductory Training on ODeL

  C_{12} – Subject Knowledge and Skills of Students as a Result of ODeL

  C_{13} – Knowledge and Skills of CS/ ICT Students on Development and Maintenance of an e-Learning System

Knowledge and skills of Teachers

  C_{14} – Knowledge and Skills of Teachers as a Result of Training on ICT Literacy

  C_{15} – Knowledge and Skills of Teachers as a Result of Training Teachers on Pedagogical Aspects of ODeL

  C_{16} - Knowledge and Skills of the Technical Staff as a Result of Training on Technical Aspects of ODeL

  C_{17} – Percentage of Students Using an e-Learning System on the Regular Base

  C_{18} – Percentage of Teachers Developing and Posting Materials into the e-Learning System

  C_{19} – Percentage of Teachers Interacting with Students via an e-Learning System on the Regular Base

Educational Content/ Software

  C_{20} – Digital Coverage of Courses Taught in the Institution (in percent)

  C_{21} – Usage and Development of e-Learning Platform(s)

  C_{22} – Usage and Development of Other Kinds of Educational Software

	C23 – Usage and Development of Software for Administrative Purposes
	ICT Infrastructure
	C24 – Ratio Student/ Computer within the Institution (headquarters and remote branches)
	C25 - Ratio Student/ Computer outside the Institution
	C26 – Internet Access Availability for Students outside the Institution (especially in rural and remote areas)
	C27 – Ratio Teacher/ Computer within the Institution (headquarters and remote branches)
	C28 – Bandwidth within the Institution
	C29 - Multimodality of ODeL

The parameters have been distributed between coherent groups. The components have been organized in four coherent groups according to the Dutch model "Four in Balance". The influence relation is presented in Table 3.

Table 3. Relation scheme between components and influencing parameters

	P_0	P_1	P_2	P_3	P_4	P_5	P_6	P_7	P_8	P_9	P_{10}	P_{11}	P_{12}	P_{13}	P_{14}	P_{15}
C_0		1	1	1	1		1									
C_1	1	1						1								
C_2	1	1						1								
C_3	1							1							1	
C_4									1	1	1	1	1	1	1	
C_5									1						1	1
C_6									1						1	1
C_7			1			1										
C_8	1			1	1			1								
C_9													1	1		
C_{10}	1							1			1				1	
C_{11}	1							1	1		1	1			1	
C_{12}	1							1	1	1	1	1	1	1	1	
C_{13}	1							1	1	1	1	1			1	
C_{14}	1							1	1		1				1	

C_{15}	1							1	1		1	1			1	
C_{16}	1							1	1		1	1			1	
C_{17}								1	1		1	1	1	1	1	
C_{18}	1							1			1					
C_{19}	1							1	1	1	1	1	1			
C_{20}	1							1			1					
C_{21}	1							1	1	1	1	1				
C_{22}	1							1			1					
C_{23}	1							1			1					
C_{24}	1							1			1					
C_{25}	1										1			1		
C_{26}	1								1	1	1	1		1		
C_{27}	1							1			1					
C_{28}	1							1	1	1						
C_{29}													1			

3.3 Balanced Scorecard for Evaluating ODeL Projects in HEI

Using the methodology described above, the authors proposed a Balanced Scorecard for evaluating ODeL projects. It has to be noted that metrics comprising the Balanced Scorecard do not necessarily repeat components of the ODeL Project model. For example, components related to Knowledge and Skills cannot be measured without direct communication with teachers and students (through questionnaires, tests, practical assignments, discussions, observations etc.) or full access to the data accumulated in the institution. Thus those components have been replaced by simpler metrics. For example, the metric Introductory Training of Students on ODeL reflects the fact of training, but not the level of knowledge and skills acquired by students as a result.

In general, while selecting metrics, the authors took into consideration the following criteria:

1) importance of the component/ parameter expressed numerically as its weight
2) its measurability from outside.

Table 4 presents the identified metrics together with their scores and weights.

Table 4. Balanced Scorecard for Evaluating ODeL Projects in HEI

	Name of the metric	Score	Weight
Vision			
C_0	Implemented and Adopted Institutional Policy on ODeL or ICT Policy with Provisions on ODeL	0 – No 0.5 – Implemented, but not adopted 1 –Yes	4.124
C_1	Investments into ODeL	0 – No 0.5 – Yes, but not in the regular systematic way or most ODeL projects are financed from outside 1 – Yes	3.093
C_2	Longevity and Sustainability of ODeL Projects within the Institution	0 – No ODeL projects at all 0.5 – ODeL projects are mostly short-term and stop when the outside financing stops 1 – ODeL projects are long-term and sustainable; mostly internal sources of financing	4.124
C_3	System of Incentives for Teachers	0 – No 0.5 – Either tangible or intangible 1 – Both	3.093
C_4	Methods of Encouraging Students to Participate in ODeL	0 – No 1- Yes	3.093
C_5	Common Pool of e-Learning Resources within the Institution or within the Consortium of Institutions	0 – No 1 – Yes	2.062
C_6	Common e-Learning Platform within the Institution or within the Consortium of Institutions	0 – No 1 – Yes	2.062
C_7	Provisions for Free and Open Source Software (FOSS)	0 – No 1 – Yes	2.062
C_8	ODeL Center/Unit within the Institution	0 – No 0.75 – Yes, financed from outside 1 – Yes, financed by the institution	3.093
C_9	Alternative Methods of Delivery of Learning Materials	0 – No 1 – Yes	3.093
Knowledge and Skills			
C_{10}	Introductory Training of Students on ICT Literacy	0 – No 0.5 – Yes, but not on the regular base 1 – Yes, on the regular base	2.062
C_{11}	Introductory Training of Students on ODeL	0 – No 0.5 – Yes, but not on the regular base 1 – Yes	3.093

C_{12}	Subject Training through ODeL	0 – No 0.1 - Meager 0.33 – Some subjects 0.67 – Most subjects 1 – All subjects covered	4.124
C_{13}	Training of CS/ ICT Students on Development and Maintenance of an e-Learning System	0 – No 0.5 – Yes, but not on the regular base 1 – Yes	2.062
C_{14}	Training Teachers on ICT Literacy	0 – No 0.5 – Yes, but not on the regular base 1 – Yes	3.093
C_{15}	Training Teachers on Pedagogical Aspects of ODeL	0 – No 0.5 – Yes, but not on the regular base 1 – Yes	4.12
C_{16}	Training a Technical Staff on Technical Aspects of ODeL	0 – No 0.5 – Yes, but not on the regular base 1 – Yes	4.12
C_{17}	Number of Students Using an e-Learning System on the Regular Base	0 - No 0.1 – Number of students is meager 0.33 – Some students 0.67 – The majority of students 1 – All students on the regular base	4.12
C_{18}	Number of Teachers Developing and Posting Materials into an e-Learning System	0 - No 0.1 – Number of teachers is meager 0.33 – Some teachers 0.67 – The majority of teachers 1 – All teachers	4.12
C_{19}	Percentage of Teachers Interacting with Students via an e-Learning System on the Regular Base	0 - No 0.1 – Number of teachers is meager 0.33 – Some teachers 0.67 – The majority of teachers 1 – All teachers on the regular base	4.12
Educational Content/ Software			
C_{20}	Digital Coverage of Courses Taught in the Institution (percent)	0 – No 0.1 – Number of digital is meager 0.33 – Some courses are digitized 0.67 – The majority of courses are digitized 1 – All courses are digitized	4.12
C_{21}	Usage and Development of an e-Learning Platform(s)	0 – No 0.3 – Usage and development of an e-learning platform just started 0.9 – Usage of an e-learning platform 1 – Development of an e-learning platform	4.12
C_{22}	Usage and Development of Other Kinds of Educational Software	0 – No 0.1 – Usage and development of Educational Software is meager 0.75 – Usage of Educational Software 1 – Development of Educational Software	3.09

C_{23}	Usage and Development of Software for Administrative Purposes	0 – No 0.1 – Usage and development of Administrative Software is meager 0.75 – Usage of Administrative Software 1 – Development of Administrative Software	2.06
ICT Infrastructure			
C_{24}	Ratio Student/ Computer within the Institution (headquarters and remote branches)	0 – No computers at all 0.1 – Poor 0.33 – Unsatisfactory 0.67 – Satisfactory 1 - Good	2.06
C_{25}	Ratio Student/ Computer outside the Institution (number of personal computers per 100 student population)	0 – No computers at all 0.1 – Poor 0.33 – Unsatisfactory 0.67 – Satisfactory 1 - Good	4.12
C_{26}	Internet Access Availability for Students outside the Institution (number of Internet users per 100 student population)	0 – No Internet at all 0.1 – Poor 0.33 – Unsatisfactory 0.67 – Satisfactory 1 – Good	4.12
C_{27}	Ratio Teacher/ Computer within the Institution (headquarters and remote branches)	0 – No computers at all 0.1 – Poor 0.33 – Unsatisfactory 0.67 – Satisfactory 1 – Good	4.12
C_{28}	Bandwidth within the Institution	0 – No Internet at all 0.1 – Poor 0.33 – Unsatisfactory 0.67 – Satisfactory 1 – Good	4.12
C_{29}	Multimodality of ODeL	0 – No ICT at all 0.33 – Only "old" ICT 0.67 – Only "new" ICT 1 – Both	3.09
	Maximum Total Performance		**100**

The choice and importance of each of metrics in the Balanced Scorecard for evaluating ODeL policies has been justified, but justification is omitted in this paper due to its length.

The Balanced Scorecard was validated using the data about known successful and unsuccessful ODeL projects undertaken in public and private universities of Mozambique, Rwanda and Uganda.

3.4 Validation

To validate the proposed model of the ODeL project, the Balanced Scorecard developed on the base of the model has been applied it to the data obtained in seven higher education institutions in Mozambique, Rwanda and Uganda. These particular HEI have been chosen for the reason of availability of the data since the authors either worked or have done some ODeL projects. The data for Mozambique has been taken from the unpublished report on e-learning needs assessment (Zlotnikova, Muyinda, and Lubega 2010). The taxonomy of selected higher learning institutions according to the success of ODeL projects is represented in Table 5.

Table 5. The taxonomy of selected higher learning institutions according to the success of ODeL projects

№	Name of the HEI (Full)	Name of the HEI (Abbreviated)	Country	Total Score (out of 100)
1.	Instituto Superior de Transportes e Comunicações	ISUTC	Mozambique	92.5
2.	Catholic University of Mozambique	UCM	Mozambique	85.9
3.	University of Eduardo Mondlane	UEM	Mozambique	73.7
4.	Makerere University Kampala	MUK	Uganda	70.5
5.	Pedagogical University	UP	Mozambique	43.7
6.	Polytechnic of Quelimane	PQ	Mozambique	21.7
7.	Kigali Institute of Science and Technology	KIST	Rwanda	18.8

The results can be explained in the following way. The Instituto Superior de Transportes e Comunicações (ISUTC) is a small private university founded by private companies (telecoms, airlines etc.) with the purpose of providing high-qualified human resources for transport and communication (including ICT) enterprises. The population of students is not more than 500 and ISUTC management

has no plans to expand. ISUTC has an adopted institutional policy on ODeL and ICT in Education in general. ISUTC has no branches up-country and its campus is located in Maputo, the capital of Mozambique, where the situation with the ICT infrastructure and Internet access is much better than in remote and rural areas of the country. Tuition fees in ISUTC are relatively high, so the financial situation is better than in public higher education institutions. ISUTC is able to pay their lecturers for developing e-learning courses. They also employ students to develop and maintain an in-house ODeL system arguing that developing and maintaining such a system helps students to get necessary knowledge and skills which are in a high demand at the job market (learning-by-doing).

The Catholic University of Mozambique is also a private university supported partly by the Catholic Church. It is located in the Sofala province with its main campus in Beira and several branches. UCM has an adopted policy on distance learning and policy on ICT in Education. The situation here differs from ISUTC. UCM is located in the underdeveloped area, thus problems with the Internet access. Being large and distributed, UCM is less manageable than a small private institute. Knowing difficulties faced by students in remote and rural areas, the UCM employs different modes of delivery of teaching materials (printed textbooks, CDs, lab kits etc.). Mobile phones and texting are also used to inform students about learning-related events.

There is an e-learning coordinator for the entire UCM and e-learning focal persons for each faculty. These focal points are regularly trained in e-learning pedagogy and IT technical issues. Because of bandwidth constraints, UCM has installed local instances of Moodle at each campus which are regularly updated during off-peak periods.

Staff ICT skills level in UCM was reported as being average. Staff ICT skills were self-taught but students are given a basic ICT skills course in their first year of study. At UCM the challenge of ODeL acceptance and use by older academics has been solved by pairing the older academics with young academics with a high affinity

for ICT usage. The pair meets once in a week for at least one hour. The young academics are a paid a token fee for the mentoring work.

The University of Eduardo Mondlane is the largest (20,000 students) public university in Mozambique with its headquarters in Maputo and branches up-country. UEM has a heavy deployment of ICT systems including several e-learning systems at different faculties. Those systems are not unified and their choice is determined by terms and references of received grants.

Tuition fees in UEM being a public university are surprisingly low, but the requirements to students to be enrolled are very high and the competition between school graduates is quite intense. UEM is sponsored by the government and the financial situation here is worse than in private HEI such as ISUTC and UCM. The training of teachers on ICT and ODeL was limited by several faculties due to financial constraints. Also they are not able to pay their teachers for developing ODeL materials and online tutoring unless these are specialities sponsored from outside (for example, by World Bank).

Nevertheless UEM is quite well endowed with ICT and e-learning capacities. The university is connected directly to the SEACOM cable. It has moved UEM from a bandwidth of 20Mbps to 155Mbps. UEM hosts the .MZ domain. UEM has an ICT policy and ICT master plan (2007 – 2011). UEM has developed, in house, a Course Information System (CIS) and another MIS called ISIRA. UEM is also involved in the development of ESURA. Other systems owned include: Finance and Asset Management System, Library Information System, Payroll and Human Resources Information System.

Makerere University Kampala, Uganda is characterized by uneven development of ODeL. While the most advanced in the sense of ICT, Faculty of Computing and IT has all courses taught digitally covered and all teachers communicating with the students online, other faculties are left far behind. The relatively low total score can be explained that the authors have considered the higher education institution in general, not its most advanced unit.

The Pedagogical University (UP, Mozambique) headquarters are situated in Maputo, in the area with the developed ICT infrastructure, but the majority of student population (22,000 out of 39,000) is located in remote branches. The financial situation seems to be far from desired, and the large number of remote branches and number of students make UP very difficult to manage. UP has an adopted ICT policy with some provisions for ODeL. UP has a number of different e-learning systems, one of them Moodle, some of these have been created in-house by students as a part of their final projects. Those systems are not unified thus making difficult creating a common pool of e-learning resources within the institution.

The Polytechnic of Quelimane (PQ, Mozambique) is a relatively new private HEI found in the Zambezia province. An Internet speed is extremely low at 256Kbps. Consequently, the Moodle-hosted courses are only used within the university intranet. There is the Bachelor of Information Technology programme hosted in the Moodle LMS. Other than this programme, there was no instance of e-learning in other programmes. Lack of interest for e-learning from the majority lecturers was reported as being the cause of this state of affairs. The only use of computers for learning by the lecturers was reported in undertaking research, Power Point presentations and uploading students' marks. Low level of usage of e-learning was blamed on low skills level in use of ICTs for teaching. It was reported that about 50% of the lecturers use ICTs and the other 50% does not. The university reported having organized some short courses for lecturers to help them put marks in the Unimestre system.

The Kigali Institute of Science and Technology (KIST, Rwanda) is sponsored by the government and has no other significant sources of income generation. Recent cut-off of 25% of the KIST budget has put it into the dangerous position. The ODeL is certainly not among the highest priorities of the KIST management. The team working on development of the ODeL system based upon Moodle comprises just one person. The recent survey has shown that most teachers were not aware about existence of the e-learning system in KIST. They do not understand its functions and meaning. Most teachers are ICT illiterate and won't be able to post materials into the

e-learning system without a special training. The main problem though that if even teachers posted their materials into the e-learning system, the students would not be able to access it, since students' accounts cannot be created at the moment.

4 Discussion

The main result of the study is a validated model of the ODeL project. The model can be recommended to the project makers and other stakeholders at the initial stage of the ODeL project development. It presents components of the ODeL project necessary for its success. Using it, organizations involved into the process of developing an ODeL project can be sure that none of components contributing to its success are missed.

Limitations of the study were caused by limitations of accessibility of resources. Some of resources are not available for researchers from outside.

Further research will include further adjustment of a Balanced Scorecard for evaluating ODeL projects, as well as case studies in other higher education institutions in countries of sub-Saharan Africa. The model and the Balanced Scorecard can be extended to other countries, such as Russia, for evaluating ODeL projects, thus contributing to design of the complex criteria for assessing effectiveness of socio-economical transformations in Russian Federation.

5 Conclusions

Research provides results which contribute to the deeper understanding of ODeL policies in countries of sub-Saharan Africa, especially of components of those policies leading to their success (or otherwise – to the failure). It is proven that the success of the ODeL project has a positive impact on Quality of Life in the community targeted by the project and in the country as a whole.

First, the authors have adopted a set of QoL indicators and identified the links between an ODeL project and these indicators. Thus the important role of ODeL in improving QoL has been demonstrated. Second, the components of a successful ODeL project and links between them have been identified. Third, country-related parameters have been identified based upon available sources of the statistical information. Fourth, links between components of the ODeL project and the country-

related parameters influencing the ODeL project have been established. Components of the ODeL project, country-related parameters and links between them make the model of the successful ODeL project. Based upon the proposed model, the Balanced Scorecard for evaluating ODeL projects has been developed. Finally, the proposed model and the Balanced Scorecard have been validated using the available data on HEI of Mozambique, Rwanda and Uganda.

The research thus provides a framework for developing and improving ODeL policies in countries of sub-Saharan Africa, as well as a tool for evaluation of ongoing ODeL projects and forecasting of future projects. Due to the positive impact of ODeL, it can be considered as a tool for improving Quality of Life.

Potential users of research results include policymakers within Higher Education Institutions and practitioners involved into ODeL projects.

Further work will include

1) extension of the proposed model and the Balanced Scorecard to other developing and developed countries including Russia

2) building the model linking components of the successful ODeL project to the QoL indicators.

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