

Quality Indicator Framework for Assessing DEeL Programs in Kenya: A Technological and Educational Functional Parameters Approach

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ABSTRACT

The demand for university education has continued to grow and hence there has been a phenomenal expansion in enrolments that is not matching with the expansion of facilities. Several policy reports commissioned by the Government of Kenya highlight the importance of affordable, accessible and quality education through e-learning platforms to achieve education for all as envisaged by the Millennium Development Goals (MDGs). In particular, The Government of Kenya Policy Framework for Education, Training and Research highlights the unexploited means of access to education such as Open Distance and E-learning (ODEL) and virtual institutions particularly in higher education and training; unregulated examination and certification of Distance Education eLearning (DEeL) programmes and lack of national capacity for curriculum design for ICT-supported educational programmes to facilitate access to quality education to learners at all levels of the education system. As institutions of higher learning gear up to offer their academic programmes by DEeL mode of instructional delivery, there are concerns from stakeholders about the quality of the diploma and degree awards. This can be attributed to inadequate quality assurance standards to assess the quality and value of DEeL academic programmes. This paper is aimed at identifying critical factors influencing Distance Education and e-Learning (DEeL) in higher education in Kenya and to develop an appropriate framework for assessing quality indicator measures.

Keywords: DEeL, e-learning, technological, educational, ICT-supported learning, distance education

1. BACKGROUND AND RATIONALE OF THE STUDY

The aim of this study was to identify, develop, validate and implement a quality indicator set for ICT-supported distance education aka Distance Education eLearning (DEeL) in Kenya. Based on an established set of indicators, the research was oriented towards the development of a valid and reliable instrument to monitor the quality of ICT-supported higher education programmes. The implementation of the indicator set, its instrument and their definitions will enhance the management of higher education as offered through the DEeL mode. This will lead to an increase in the number of accredited educational facilities for students in the region as well as enhance the quality and employability of the graduates.

This research builds upon the successes of an infrastructure, human capacity building and research project at the University of Nairobi. The project's three components included deployment of requisite university-wide infrastructure comprising of learning centres, computer networks, servers and relevant hardware and software. The project also focused on capacity building, training, design, development, production and implementation of course materials for various degree programmes that embraced distance education mode of delivery. More than 60 different training programmes using a curriculum that had been tested and validated through pilot studies were used. Two key research programmes were undertaken in the areas of Learner Support systems, namely, adaptive Programming for e-

learning implementation in higher education sector and Adoption of ICT-supported Distance Education [3] and a research on adaptive systems aimed at using Artificial Intelligence (AI) Techniques to model some of the aspects of the study [7].

As a logical extension of the above successful programme, this study aimed at ensuring that the quality of the training modules and training materials produced and the effectiveness of the learning process are guaranteed and hence extend the experience, products, tools and methodologies to the rest of the country and the region. It is for this reason that this study on development of the quality indicators was carried out to help in the implementation and management of the drivers and functional parameters of the process.

2. PROBLEM STATEMENT AND ANALYSIS

The study problem was addressed from different perspectives: (a) the restriction of the use of ICT-Supported Education driven by the fear that expanding access would dilute the quality of education. It was clear that there is need for increased access to higher education in Kenya beyond what is offered by traditional on-campus-based instructional modes and therefore this fear cannot be justified. Consequently, the alternative to address the problem of quality is not viable. (b) Address the problems related to access and use of ICT in education. Although this alternative may improve access, it does not guarantee high quality and effective education as ICT is only a facilitator. (c) Provide the means and tools

for managers, administrators and policy makers for higher education to use in regulating the quality of ICT-supported education. This is what we considered to be the best alternative under the circumstances, to deal with the current problem of quality of ICT-Supported higher education in Kenya. In arriving at the alternative objective to address the problem, we were guided by the need to provide a sustainable demand-driven access to education that is benchmarked using quality guidelines and indicators, which were developed, tested, validated and implemented. A problem tree model for problem analysis was used and yielded two causes, namely, inadequate research in Quality Indicators and lack of guidelines to measure quality of ICT-Supported Distance Education.

3. STUDY OBJECTIVES

This study was guided by the following objectives:

- (a) To identify critical factors influencing Distance Education and e-Learning (DEeL) in higher education in Kenya for purposes of formulating and developing indicators of assessing quality.
- (b) To develop an appropriate framework for assessing quality in DEeL in higher learning institutions in Kenya.
- (c) To produce a baseline for DEeL quality assessment in higher learning institutions in Kenya.

This paper focuses on the first two objectives.

4. METHODOLOGY

The research team used the problem tree analysis approach to identify, the causes, the effects and the means for solving the identified challenges. The purpose of this stage was to understand how the issue of quality in DEeL affects different stakeholders who include the Learner, Institution, Employer, Faculty, Society and Government and the priorities in addressing them. This enabled the team to establish the hierarchy of problems in the light of cause and effect relationships affecting the stakeholders. This formed the basis for formulating the objectives of the study. A logical framework approach to communicate the study outline in terms of breaking down the problem into logical chunks with specific objectives, verifiable indicators, discrete work elements and intermediate results for effective management and monitoring of the study process was then applied.

5. RESEARCH DESIGN

The study used a cross-sectional mixed method approach using a combination of descriptive survey, exploratory and explanatory approach, contextual enquiries and observation. Through a problem tree analysis approach, we were able to tease out the issues pertaining to quality DEeL in Higher Learning Institutions (HLI) within the context of cost and stakeholder expectations and requirements.

A desktop study was carried out to explore the form and initial content of quality indicators for assessing the quality of DEeL programs in higher education

institutions in Kenya. Features of the phenomena under study including the quality of DEeL in HLI, the framework for measuring the quality of programs and the perceptions of the stakeholders on the quality of the DEeL were identified. We explored different frameworks on assessing the quality of DEeL in various countries and institutions such as the Commonwealth of Learning [2], Commission for University Education (CUE) [1], OECD [10], American Association for Higher Education and UNESCO guide to measuring ICT in Education [8] with a view to understanding best practice on which to benchmark. This resulted in a draft set of quality indicators that were clarified further through field visits to some institutions, observation of the practices, and contextual enquiries. The information gathered at this stage was presented to stakeholders where the problem was further refined and a draft framework with definitions of the indicators and the tools for data collection were developed. The draft framework with the definitions was presented to a second stakeholder meeting for validation. The feedback from the stakeholders were reviewed and used to enrich the framework and the accompanying tools for data collection and analysis.

6. DATA COLLECTION METHODS, TOOLS AND PROCEDURE

The main approach used in developing the draft framework was desktop review and plenary discussion among the DEeL experts. The purpose was to conduct an environmental scan for relevant works and best practices in DEeL. The outcomes from this process were mainly DEeL frameworks and indicators used in different parts of the world. Out of these the most suitable ones were selected, discussed and contextualized.

The first stakeholder workshop comprised representatives from a cross section of public and private university DEeL practitioners, the higher education quality assurance regulator (Commission for University Education), employers' federation, learners, national curriculum development agency, national examination body, international organizations working in the ICT for Education sector and the Kenya Education Network (KENET). Through focus groups and discussions, it was possible to collect the necessary feedback on the framework and the indicator set. Useful insights on the nature of the problem were gathered.

Alongside the stakeholder workshop, key informant interviews were conducted. The approach used was face-to-face informal interviews. The informants were key participants in the workshop including representatives from Strathmore University, African Nazarene University, Inorero University, Free University of Brussels, UNESCO and Commission for University Education.

During the second stakeholder workshop, the draft framework and its indicators, indicator definition, measurement scale, data analysis and summarization approach including the index, were presented for

validation. The feedback received was used to enhance the framework and enable the team to develop the tools that included the questionnaires and the handbook guide to facilitate the quality assessment process. Focus group discussions and interviews with key informants were employed.

A few institutions were sampled and visited in order to understand the DEeL situation in HLI and to identify the main issues as well as validate the appropriateness of the framework and the preliminary tools developed. Questionnaires, observations and contextual enquiries were used to collect the necessary data.

7. SITUATION ANALYSIS

The study took place in May-August 2014. Seven universities, namely, Kenyatta University, Maseno University, Kisii University, Egerton University Technical University of Mombasa, Strathmore University and University of Nairobi were sampled. We used purposeful sampling from a total of 22 universities in Kenya which offer distance education programs. A questionnaire using both a face-to-face method and contextual enquiry approach was administered. The key objective of the study was to find out the situation on the ground by applying a questionnaire that contained the draft indicators. This phase collected data on DEeL implementation and perceptions, which helped to clarify the indicator set and framework itself.

The key findings from this pilot can be summarized into four categories. First, it was established that most of the seven universities do not have adequate implementation plans for DEeL programs. Documentation explaining the status of the various programs in terms of numbers, projected enrolments, relevance and support systems was not available in most universities surveyed. Without adequate planning, institutions are faced with the challenge of justifying further investments and unexplained trends that may be observed during the implementation process. It creates suspicion and surprises that may not have been envisaged. Secondly, it was observed that most of the universities implemented some form of DEeL programs using borrowed staff. The common model involved employing a core team of two or three and relying on staff from the various departments who have DEeL programs.

For instance, at the University of Nairobi, the coordinators for the various programs are members of staff in the departments and faculties where the programs are domiciled, while the technical staff are drawn from the ICT department. A similar situation was observed in Kenyatta University. Thirdly, it was observed that the DEeL infrastructure comprising the campus network, the devices for learner access and the student support systems were inadequate in some cases. Whereas some universities boasted of a robust broadband connectivity across the campuses, access to content on servers was sometimes problematic and unavailable in some situations.

In cases where the devices are pre-loaded with content, it was observed that the content and the devices did not seamlessly synchronize. Fourthly, some programs lacked key components for effective realization of the learning objectives without minimal tutor intervention. Learning objects such as animations, simulations, graphics, audio and video were not effectively used to enrich content. Finally, a few students interviewed complained of lack of or late feedback from tutors during scheduled online discussions forums on topical issues.

Most universities use open source platforms for content management and delivery. Universities that offer blended learning, have centres from which the online programs and courses are supported. It was however noted that all the six universities offer the blended mode of delivery except Maseno which has fully online programs. In terms of funding for the programs, it was noted that all the six Universities surveyed fund online learning from student fees including factoring-in payment and incentives for the lecturers. A key component of DEeL programs implementation is to ensure that online and offline learner support is provided. Even though most universities have some form of support, students complained that the online support was rarely effective.

There are mechanisms for quality assurance on development and delivery of programs and courses in ODeL in most universities. However, only a few aspects of the key attributes are monitored while others such as student satisfaction, online support and orientation and program relevance to the industry are not given commensurate due attention. Whereas content is largely developed by the faculty, its quality was not guaranteed mainly due to inadequate capacity (or time) to develop complex content objects, weak processes of quality checks at the various levels and lack of clarity on copyright issues.

8. RESULTS AND DISCUSSION

The methodology described in this paper was used to develop the quality indicator framework. The framework is hinged on six perspectives that cover any ICT Distance Education (DE) programme. Each perspective or dimension has an objective that is assessed based on relevant and pertinent criteria. The criteria are a logical grouping of attributes of the perspective. For instance, in the Learner perspective, three important attributes to assess include learner profile, learner support and technology. For each of these criteria, indicators were established to assist in gauging each respective criterion as a way of assessing the programme's quality. Each criterion can have several indicators. This is presented in tables 1 and 2. As illustrated in table 2, for each indicator, there must be evidence that will be evaluated to assess that indicator. The 5-point Likert scale [0/1/2/3/4] was adopted. Again, for each indicator, a most appropriate respondent was established. The respondents in this case would be learners, institution, employers and government. For ease of administration, the instrument was divided into four parts in order to make it easy to capture data from the

respective stakeholders. To operationalize the framework definitions for the indicators were formulated. and subject it to a common interpretation, a set of

Table 1: An overview of the quality framework

PERSPECTIVE	OBJECTIVE	CRITERIA	INDICATORS
LEARNER PERSPECTIVE	Analyse the extent to which the ICT-DE programmes satisfy the learners needs	Learner Profile (LP) Learner Support (LS) Tutor Support for learners Technology Costs, Expectations and Value Information Transparency (Including programme suitability) Course Structure Didactics Learning Effectiveness Program Suitability Cultural Contextualization Institutional Support for Learners	Indicator LP1 (e.g. Demographic information of the learner is captured) Indicator LP2 Indicator LS1
EMPLOYER PERSPECTIVE	Establish extent to which the ICT-DE programmes meet the employers' expectations	Employers' Expectation Public Private Partnerships Cost-Effectiveness Integration of work and learning	Indicator EP1 Indicator EP2
GOVERNMENT REQUIREMENTS PERSPECTIVE	Establish extent to which ICT-DE programmes adhere to government requirements	Ethical requirements Accreditation requirement Legal and Statutory requirements Equity and access Political commitment/ National Policy	Indicator GRP1 Indicator GRP2

INSTITUTIONS PERSPECTIVE	To identify indicators for quality assurance from an institutional management perspective	Policy and Planning Quality of management of programs Continuous Quality Improvement Measures Access Evaluation of Program Effectiveness Student Satisfaction Post Graduation Employment Success Assessment Quality of ICT infrastructure Infrastructure Programme Development Course Design Monitoring and Evaluation	
FACULTY REQUIREMENTS PERSPECTIVE	To isolate the indicators that define requirements for effective functioning of staff to support quality online programs	Faculty incentives	Indicator FRP1 Indicator FRP2
SOCIETY REQUIREMENTS PERSPECTIVE	To identify indicators for the capacity of programs to address the needs of the society such as lifelong learning and development of human resource capacity	Lifelong Learning Relevance to Society Needs Contribution to Human Resources	Indicator SRP1 Indicator SRP2

Table 2: An illustration of quality indicators, evidence performance measure and the respondent for learner perspective: Learner profile

Criteria	Indicator	Evidence	Performance Measure	Respondent
Learner Profile	Demographic information of the learner	The learner profile captures Age, Gender, Geographic location and their occupation	Likert scale 0/1/2/3/4	L/I
	Learners' qualifications and experience	Learners' qualifications and experience are captured at the point of enrolment	Likert scale 0/1/2/3/4	L/M
	Learners' study skills and style	Learners' study skills and style are captured at the point of enrolment	Likert scale 0/1/2/3/4	L/M
	Learners' Special needs	Learners' special needs such as physical and learning difficulties are captured at the point of enrolment	Likert scale 0/1/2/3/4	L/M

Having assessed each quality indicator, an aggregation of each institution’s ICT DE programme is done using the sample shown in Table 3 and graphically presented in a radar chart as shown in Figure 1. The performance is aggregated along each perspective with an interpretation of the score provided. This is important to

facilitate performance comparison, self evaluation and for monitoring and evaluation purposes. Figure 2 shows a comparison on all the perspectives for three universities chosen. More universities can be added into the comparison frame.

Table 3: An illustration of the aggregated performance by each perspective for an ICT DE programme

Perspective	Criteria								Aggregate	Interpretation (remark)
	1									
Institution	Average Score for all the indicators of this criteria for this perspective	..							3	
Society	...								4	
Faculty									0	
Learner									2	
Employer									1	

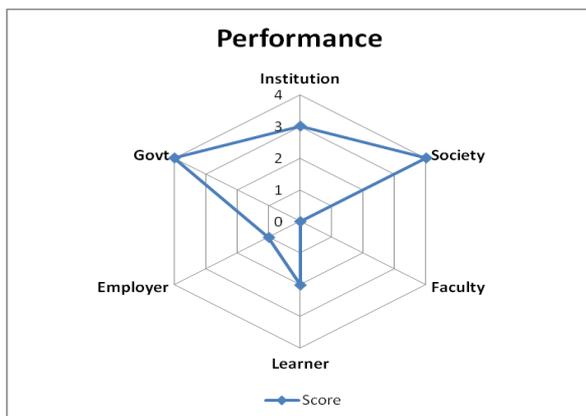


Figure 1: A graphical representation of the aggregated performance by each perspective for an ICT DE programme.

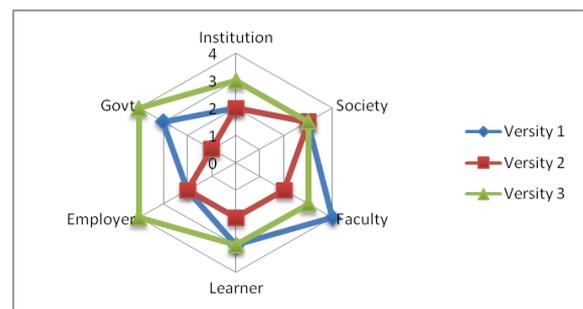


Figure 2: A comparison of performance representation on all the perspectives for three universities

9. DEFINITION OF INDICATORS

The framework for assessing the quality is complete when the criteria, together with the indicators are interpreted in a common approach. A clear and concise definition is provided for each indicator. The definition in some cases incorporates aspects of the objectives, justification, rationale and relevance. This also guides the evidence that is required to assess each indicator. This is illustrated in Table 4 using the Learner perspective.

Table 4: An illustration of indicator definitions

Criteria	Indicator	Definition
Learner Profile	Demographic information of the learner	Providers need to understand the socio-economic, cultural, political and educational differences to prevent exclusions arising from factors relating to gender, traditional and cultural practices. If

		learner profiles are not known, the programme and course cannot be designed with needs, knowledge and experience of the learners in mind.
	Learners' qualifications and experience	The learners' entry level qualifications and prior experience as captured at the point of enrolment to guide pedagogical tools and methods, including pacing, content variety, online group formations, among others
	Learners' Special needs	Learners' special needs such as physical and learning difficulties are captured at the point of enrolment to ensure that learners with these needs are catered for and are able to participate in the learning processes
	ICT proficiency	Learners' ICT proficiency (such as ability to use word processors, email, bulletin boards, online collaborative working tools e.g. Skype, and social media for learning such as YouTube, Facebook or Twitter), is captured before and during the programme. This is to guide on what tools can be used to support effective student learning

10. VALIDATION

The validation of the framework went through several stages. The first stakeholder workshop focused on the approach of the study and the draft framework and indicator set. Participants provided input through focused group discussions and guided plenary presentations. The input was used to enrich the framework and the tools for measurement. It was recommended that different questionnaires and other tools for the various target groups should be developed. Additionally, the 3W and 1H approaches should be used to specify Why data will be collected, Where it will be collected, What will be collected and how it will be collected. Thirdly, target groups should include various respondent groups that include: students, lecturers, learners, educational managers, education policy makers, regional education representatives, employer/employee unions, and relevant government agencies. Fourthly, the stakeholders concurred with the approach and methodology being used in the project. In particular, they pointed out that the use of empirical and expert focus group approach and involvement of stakeholders will guarantee effective implementation of project procedures and results. Finally, the stakeholders appreciated the use of the dashboard model to explain and visualize the need for quality indicators for higher education. The feedback specified also included the building blocks of the framework and indicator set. These are:

- (a) The following data will be expected to be already available: data about learners, e-readiness, existing quality assurance frameworks in the academic and regulatory institutions, staffing, infrastructure (physical and ICT), investment in ICT-DE, and strategic importance of ICT-DE

- (b) In addition to addressing the Vision 2030 objectives in terms of enhancing the quality of education and capacity building, there is need to align the quality indicator set to the general national and international development goals.
- (c) The workshop participants noted that it was an opportune moment for the country to have the quality indicator set developed, considering that many stakeholders are now in the process of implementing ICT-DE
- (d) The participants appreciated involvement of stakeholders in the development since it will promote ownership and use of the indicator set
- (e) The fact that the indicator set includes government and employer perspectives was of great additional value
- (f) There is need to clearly bring out the assumptions and risks involved in the whole process of development and implementation of the Quality Indicator Set
- (g) There is need to guarantee the quality of ICT-DE so that credit transfer and movement of students within the region is possible. There is also need to involve higher education regulatory bodies in the region to achieve the possibility of credit transfer in the region and beyond
- (h) There is need to develop indicators which are generic enough so that they can be used in the region.

The second stakeholder workshop was used to capture specific comments and contributions on the quality of the indicators in terms of their formulation, phraseology and target group. The participants evaluated each indicator on a scale of 0 (irrelevant) and 5 (excellent) and an average of 4.6 was realised indicating that the

framework was well designed and had little deviations from the understanding of the stakeholders. There were minimal changes on the target groups for the various indicators. It was recommended that collection of feedback should be done continually to improve acceptability of the framework. Participants agreed that use of a 5-point explanatory-based likert scale was the best option to use in data collection on the evidence of attainment of performance based on the indicators.

11. BENCHMARKING

Several frameworks were studied with a view of building an understanding on the key dimensions contained, the indicators, purpose and use of the framework, data analysis, index calculation and interpretation [5], [6], [8], [9]. We highlight the key features of some these frameworks. The Commission for University Education [1] has a self-evaluation questionnaire for a chartered university. The tool checks whether the university is meeting the objectives of the university including those for which the university was established which involve the kind of graduates developed in the university. It also checks measures being put in place to ensure that the objectives are met.

The questionnaire also checks whether administrative staff are conversant with the objectives of the university and this was relevant for DEeL because students studying by distance or e-learning modes really benefit from the administration staff. This was a critical indicator of the DEeL quality. Other areas captured in the evaluation tool include the physical facilities for the university's programmes and for DEeL, teaching and administrative space, equipment and library resources, among others, available for teaching and learning purposes. The tool also captures issues on staff numbers and capacity building, student enrolment and services offered to them, curriculum structure, internal quality assurance measures, and issues of examinations, and student counselling - all of which are important indicators of quality of DEeL.

A study by [5] under UNESCO Bangkok on Open and Distance Learning (ODL) in Asia and the Pacific resulted in the publication of "Innovative and Good Practices of Open and Distance Learning (ODL) in Asia and the Pacific". By referencing the ODL practices in Asia and Pacific, it was possible to strengthen the indicator set being developed on quality assurance, curriculum, administrative processes and use of technology.

A model for quality assessment of e-learning developed by the Swedish National agency for Higher Education [4] was also referenced. Their e-learning quality model consisted of 10 quality aspects. Some of the key items contained in the model that were relevant to our model for DEeL include material/content, the learning environment, communication, cooperation and interactivity, modes of student assessment, student and staff support, staff skills and experience, and the holistic and process aspect of e-learning.

The Commonwealth of Learning [2] Quality Assurance Toolkit for Distance Higher Education Institutions and Programmes was also used for benchmarking. There were relevant indicators on institutions, namely, vision and mission; management, organizational culture and leadership. There were also indicators focusing on learners, human resource development, program design and development, course design and development, learner support and progression, learner assessment and evaluation, learning infrastructure and resources. The dimensions had various parts: criteria statement, performance indicators, source of evidence and the measure used.

12. CONCLUSION

The outstanding features of the framework include the fact that it takes care of key stakeholders in developing the composite (aggregate) score. It also has a 5-point uniform like scale that ensures reduction of internal inconsistencies in interpretation of the scores. It is observed that the regulator, the Commission for University Education (CUE), is applying some key sections of the study framework. The framework is flexible and modular in design and its administration is made simpler through the application of a tailor-made tool for each perspective.

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