REGIONAL UNIVERSITIES FORUM FOR CAPACITY BUILDING IN AGRICULTURE (RUFORUM)

SURVEY OF E-CONTENT DEVELOPMENT FRAMEWORKS

DRAFT FINAL REPORT

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SURVEY OF E-CONTENT DEVELOPMENT FRAMEWORKS

EXECUTIVE SUMMARY

For some years now the RUFORUM has been involved in promoting e-learning and e-content development in member Universities around Africa with funding from, among others, the Association of African Universities and the Bill & Melinda Gates Foundation. Despite the rapid adoption of e-learning most efforts are still in their nascent stage and there is uncertainty about the best approaches and methods for e-content development.

As a way to create a common approach to e-content development, in 2010, RUFORUM undertook to carry out a study of the various e-content development methodologies and compare these with its own approaches and, additionally, collect data on the experiences of its member institutions with respect to e-learning and e-content development.

ACTIVITIES

This study primarily had two purposes:

1. To document the e-content development activities of RUFROM
2. To survey e-content development methodologies from around the world and contrast them with the approach adopted by RUFROM.

In the attainment of these key purposes or goals, a number of activities were undertaken that include:

1. Case studies of e-learning initiatives in RUFORUM member institutions.
2. Review of E-Content Development Frameworks.
3. Documentation of RUFORUM’s e-content development history, and
4. Benchmark RUFORUM’s e-content development frameworks against other well-established frameworks around the globe.

METHODS USED

There were three main phases of this consultancy including:

1. Review of e-content development frameworks across the globe
2. Survey of RUFORUM members’ e-content development experiences
3. Compilation of RUFORUM e-content development initiatives.

Reviews of e-content development frameworks was done by searching literature online and offline for e-content and e-learning development models or frameworks; drilling into case studies to investigate their genesis, methods, experiences and tool; and interviewing known
e-learning experts to help identify the toolkits they use in developing their training packages and their origin.

The key people in charge of e-learning from a sample of seven RUFORUM member institutions were interviewed regarding their e-content development experiences. Where possible, visits were carried out to these institutions. Institutional websites from RUFORUM member institutions were reviewed for evidence of their e-content-related activities including presence of on-line courses and related policies.

Documentation on RUFORUM e-content development initiatives was obtained and collated to create a summary of RUFORUM’s e-content development initiatives. The methods and frameworks adopted by RUFORUM were compared with those reviewed from around the globe.

Though it was not possible to investigate every interesting observation, several issues emerged from this review that have policy implications.

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**LESSONS LEARNED**

The case studies and review of e-content development frameworks as well as benchmarking RUFORUM e-content development framework yields the following lessons:

1. **Technocentricty**: There is a temptation to focus too much attention on the technological aspects of e-learning, especially the Moodle learning management system, at the cost of the pedagogical, instructional design and change management issues. In some cases, staff equate e-learning with the use of Moodle.

2. **Implementation Models**: Perhaps the single most critical issue to resolve is the implementation model or framework. A number of institutions have taken the route where they place staff in a 5-day e-learning course and then expect e-learning to take off in the institution. Universities have found that implementation is a process and is multifaceted. Some things cannot be done hurriedly. We need to learn from experiences in change management, technology adoption and diffusion of innovations.

3. **Rationale for E-learning**: Many institutions have not adequately thought through the question of why they want to do e-learning. The fundamental rationale for e-learning needs to be queried and established. Assumptions and myths need to be debunked.

4. **E-Content Standards**: When setting standards for e-content, it seems that there is no common reference point. Where standards exist, each institution seems to take its own unique approach.

5. **Staff Motivation**: The issue most likely to derail e-content development efforts is staff motivation. Staff seem to be discouraged where they do not perceive any benefits for themselves either in terms of academic recognition for efforts invested
in e-content development or for remuneration for time spent on this work. There
seem to be discontent about how intellectual property rights are handled by
institutions with respect to e-content.

6. **E-Content Metrics:** The commonly cited measures of progress and success in e-
learning are the number of modules developed or the number of online users. Rarely
is success determined using measures of learner performance or quality of
instruction.

7. **Skills Development:** There seems willingness by staff and students to learn but the
skills development programs and infrastructure seem to be out of step with staff
needs. Many staff possess computers but lack skills to make the best use of the
equipment.

8. **Networking and Collaboration:** There seems little collaboration between e-learning
practitioners in different institutions in the region yet much can be shared and
reciprocal support is quite possible. There is no e-learning journal in the region
(COMESA) nor are there newsgroups or mailing lists dedicated to e-learning.

9. **Role of RUFORUM Secretariat:** Strategically, one would expect that RUFORUM
initiatives would focus where they are most likely to create sustainable positive
educational outcomes most relevant to regional aspirations. The eight areas
identified in this review are likely candidates for such support.

There is much debate in the literature about the pros and cons of e-learning. In some cases,
it would seem that e-learning is not going anywhere, but we have very encouraging cases of
quantum leaps in performance as a result of application of e-learning.

Despite the challenges, there is hope yet of taming the technology for good educational
outcomes. As one writer wrote that *e-learning should be any technology intervention, which
helps people improve their performance.* E-learning is in its youth.
E-CONTENT DEVELOPMENT FRAMEWORKS SURVEY

INTRODUCTION AND OBJECTIVES

Regional Universities Forum for Capacity Building in Agriculture (RUFORUM), a consortium of 25 universities in Eastern, Central and Southern Africa, was established in 2004. The consortium originally operated as a program of the Rockefeller Foundation from 1992. RUFORUM has a mandate to oversee graduate training and networks of specialization in the Common Market for Eastern and Southern Africa (COMESA) countries. Specifically, RUFORUM recognizes the important and largely unfulfilled role that universities play in contributing to the well-being of small-scale farmers and economic development of countries throughout the sub-Saharan Africa region.

For some years now the RUFORUM has been involved in promoting e-learning and e-content development in member Universities around Africa with funding from, among others, the Association of African Universities. Despite the rapid adoption of e-learning most efforts are still in their nascent stage and there is uncertainty about the best approaches and methods for e-content development.

In 2010 RUFORUM undertook to carry out a study of the various e-content development methodologies around the world and compare these with its own approaches and collect data on the experiences of its member institutions with respect to e-learning and e-content development. Towards this end, a consultant was hired to undertake a 12-month study with the following objectives:

To:

1. Collect and review all documents related to the RUFORUM e-learning initiatives prior to the AAU Project.
2. Carry out a literature review on models used elsewhere to integrate ICT for effective teaching delivery.
3. Document all the project activities.
5. Compare and contrast the RUFORUM approach for developing e-content with other approaches such as the approach used by the Jomo Kenyatta University of Agriculture and Technology M.Sc. Research Methods team.

The consultant was Dr. Jason M. Githeko, whose training specialization is computer-assisted instruction (University of Illinois) and is a Senior Lecturer in the department of Computer Science at Egerton University, Kenya teaching several courses including computer networks, web programming and entrepreneurship. He has been intimately involved in ICT initiatives
at Egerton University and was the director of the African Virtual University learning centre from 1999 to 2001 when he became the pioneer director of the Nakuru Town Campus of Egerton University now a Campus College. He is currently a member of the Egerton University e-learning committee and has actively participated in e-content development as a writer.

BACKGROUND

There is much debate about the pedagogical benefits of e-learning and ICT-enhanced instruction (example: Minielli, 2005). Few research studies on e-learning have a theoretical model or framework on which to base their inquiry. This state of affairs has led to a proliferation of e-learning-related research studies whose contribution to the theoretical principles of ICT-enhanced instruction are sometimes questionable. The lack of a solid theoretical framework has led to a lack of a reliable set of guidelines on which to base the development of e-content. One could ask: On what basis are today’s e-content frameworks based? (example: Shute and Twole, 2003; Pozzi and Kearney, 2007)

Similarly, many practitioners question the foundations of today’s popular calls for the adoption of e-learning. Is there agreement on the benefits of e-learning or about universal standards and benchmarks for e-content development and application? What are the economic and other justifications for e-learning? What is the return on investment for e-learning? (Example: Paley, 2007)

There are cases where e-learning and distance learning have been assumed to be synonymous leading to a belief that a university can implement its distance learning programs by adopting e-learning yet those with long experience with e-learning seem to prefer a blended approach where ICT supplements face to face instruction or vice versa (Example: Dziuban, Hartman, & Moskal, 2004).

These and other questions and issues are the chief motivation for this study. In addition, RUFORUM desires to document its initiatives and benchmark them against the state-of-the-art practices globally.

PURPOSES AND ACTIVITIES

This study had the following primarily purposes:

3. To document the e-content development activities of RUFROM
4. To survey e-content development methodologies from around the world and contrast them with the approach adopted by RUFROM.

In the attainment of these key purposes or goals, a number of activities were undertaken as follows:
A search of the websites of the 25 RUFORUM member universities showed that some have content related to e-learning. The websites that were not available in English were not examined. The universities with e-learning content were:

1. Kenyatta University, Kenya
2. University of Nairobi, Kenya
3. Jomo Kenyatta University of Agriculture and Technology, Kenya
4. Egerton University, Kenya
5. Makerere University, Uganda
6. African University Zimbabwe
7. National University of Rwanda
8. University of Botswana
9. Mekelle University, Ethiopia
10. Haramaya University, Ethiopia
11. Sokoine University of Agriculture, Tanzania
12. Catholic University of Mozambique

Originally the following seven universities were selected for this review as listed below. It proved challenging to obtain useful information from some of them, therefore, some of the institutions were replaced.

1. Makerere University, Uganda;
2. University of Nairobi, Kenya;
3. Jomo Kenyatta University of Agriculture and Technology, Kenya;
4. Kenyatta University, Kenya;
5. Egerton University, Kenya and
6. United States International University, Kenya
7. Strathmore University, Kenya

The following final list of universities who were contacted and responded with information for this review are listed below. Maseno University is not yet a member of RUFORUM:

1. Makerere University, Uganda;
2. University of Nairobi, Kenya;
3. Jomo Kenyatta University of Agriculture and Technology, Kenya;
4. Egerton University, Kenya and
5. University of Malawi, Bunda College
6. Mzuzu University, Malawi
7. Maseno University, Kenya

It would have been desirable to survey all those RUFORM members who have an e-learning initiative but budgetary constraints did not permit. Apart from the Kenyan institutions, the consultant was able to visit Makerere University and Bunda College, Malawi as well as the offices of the UbuntuNet Alliance at Lilongwe.

In each case it was intended to establish the following:
1. Justification and rationale for implementing e-learning and ICT-enhanced instruction preferably through review of written institutional policies and strategies.
2. The framework or methodology adopted for e-content development and implementation of e-learning.
3. The successes, failures and challenges associated with e-learning and e-content initiatives

Preliminary reviews were carried out at the following Kenyan institutions:

1. Jomo Kenyatta University of Agriculture and Technology
2. University of Nairobi
3. United States International University
4. Egerton University

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**Preliminary Review Questions**

The preliminary review helped establish the agenda for the broader review. The core questions during the preliminary reviews carried out via telephone interviews included:

- When they started their e-learning initiative
- What their key objectives were
- Whether they have e-learning policy and strategy
- Key Challenges of e-learning and e-content production
- Achievements this far – status report
- How many modules produced? Percentage of all courses?
- How many staff trained as a percentage of all staff?
- Whether there is an established methodology for e-content production?
- Whether there are standards for e-content production and how standards are maintained

These were later simplified as follows:

- Challenges of implementing e-learning especially e-content development
- What works and what has not worked with respect to e-learning?
- What motivates staff to develop e-content?
- What kind of related policies and strategies do you have?
- Have you developed a formal e-content development process and if so is it based on any pedagogical, instructional design or other educational framework?
- We would also be interested in some statistics on the extent of adoption of e-learning at Makerere
- Any other experiences that you may want to share with other RUFORUM members.

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**Review of E-Content Development Frameworks**
It was expected that a review of e-content development frameworks and methodologies from around the globe will reveal the underlying assumptions related to e-content development methodologies and help to separate fact from fiction and myth. The theoretical foundations of these initiatives are of particular importance to practitioners.

This review presented an opportunity to query the methodologies and fundamental rationales for ICT-enhanced learning especially e-learning. Discussions of e-learning in the literature reveal a varied and sometimes incoherent rationale for this mode of learning. Practitioners seem in doubt regarding why they are doing e-learning. It is useful to examine these rationales and distil the core justification for e-learning that is not excessively based on idealistic hyperbole and slogans about reducing the digital divide.

It is essential to return to fundamentals and rigorously query any assumptions we have made along the way keeping in mind the basic aspirations of COMESA countries in which RUFORUM operates as well as our global status and strategic imperatives for survival in an increasingly knowledge-based globalised environment whose economies are increasingly in flux since the global financial crisis of 2008.

The key questions that this review attempted to answer were:

1. Why e-learning? What are the expected benefits for learners, instructors, management, and the nation? What is its rationale?
2. What are the risks? What approaches are likely to fail or to succeed?
3. What incentives are effective in motivating e-content developers?
4. How do our universities do e-content development?
5. What are the theoretical foundations of these methods and standards?
6. Based on lessons learned, how should we do e-content development?

**Documentation of RUFORUM’s E-Content Development History**

RUFORUM has had a strong program related to the application of ICT to improve instruction and learning. Some work has been done to facilitate the adoption of e-learning in member institutions including conducting a number of writing workshops and providing incentives to e-content developers. It is the desire of RUFORUM to document these initiatives and experiences and reflect on the key issues and the lessons learned from these activities as a way to construct the framework for future action. Therefore, a summary of RUFORUM’s e-content initiatives was conducted.

**Bench-Marking RUFORUM’s E-Content Development Framework**

This activity involved a comparison of the RUFORUM approach with selected best-practice models and frameworks to identify strengths and weaknesses of the RUFORUM process and propose modifications where feasible. The examination of fundamentals will be of particular interest. These fundamentals include the core rationale for e-learning and hence of e-content development; theoretical foundations of the design methods; the economics of e-
content development; comparative effectiveness of different e-content models based on learning outcomes; challenges of e-content development; and e-content implementation strategies. This comparison is carried out as the final step of this assignment.

**METHODODOLOGY AND APPROACH**

There were three main phases of this consultancy including:

4. Review of e-content development frameworks across the globe and benchmarking the RUFORUM approach to e-content against these frameworks.
5. Survey of RUFORUM members’ e-content development experiences
6. Compilation of RUFORUM e-content development initiatives.

Simple approaches were used in each phase as described in the sections below.

**Review of E-Content Development Frameworks**

This review was carried out by searching literature online and offline for e-content and e-learning development models or frameworks and drilling into case studies to investigate their genesis, methods, experiences and tools. Known experts, especially e-learning trainers, were interviewed to help identify the toolkits they use in developing their training packages and the origin of these tools. It was found that a significant proportion of online articles and presentations on e-learning are disappointing in the depth of their analysis and the breadth of the issues considered. In many cases, it seems as if e-learning is the learning management system (LMS) and rarely is there a discussion regarding returns on investment, instructional productivity, effectiveness of learning, appropriate pedagogies and so on. In this assignment the articles that were found to provide deep and high quality analysis were few and far between. In the case of Australia an example of deep analysis was Kathryn Moyle (2010). Similar materials were sought for other regions of the world. A search for South East Asia including India did not yield much in terms of models and frameworks.

The second approach was to identify recognized experts based on their regional standing, and interviewing these people. Two were identified interviews conducted. These included the director of the ICT Center at the University of Nairobi who wrote a learning management systems and has been involved in the development of Chisimba through the AVOIR initiative (Keats, 2011). The second is the CEO of Futuristic who has had a lot of experience designing and conducting e-learning training across the African continent.

**Survey of E-Content Development Experiences in RUFORUM Member Universities**

The RUFORUM member universities have websites. These websites have been searched for the existence of any content related to their e-learning initiatives excluding those websites that were not available in English. During the website survey, one Arabic website, one French website and one Portuguese were found among the RUFORUM member institutions. Those with e-learning content were selected for the survey. The eleven institutions selected...
as listed on page 5. Three preliminary interviews have been carried out to obtain overviews of the status of e-learning in these institutions. Reports on these preliminary interviews are reported starting page 5. Five Kenyan and one Ugandan university were identified for site visits where more detailed investigations will be carried out that will include meeting with learners and, where possible, examining their e-content modules and platforms where possible. It is also planned that questions of policy will be addressed by the appropriate officers in these institutions.

For the other selected universities outside Kenya and Uganda, telephone/Skype and email interviews will be used to collect information about their e-content development experiences. Before the survey is expanded to these institutions, a list of contact people in those universities will be sought with their contact information and a letter of introduction for each institution provided by RUFORUM. It would be useful to include universities from non-Anglophone Africa as well where possible to ensure balance in the report.

Compilation of RUFORUM E-Content Development Initiatives

Documentation on RUFORUM e-content development initiatives was conducted through analysis of various work plans and reports. A visit was made to the RUFORUM offices at Makere University in August 2011 to facilitate this work.

REPORTS

SECTION 1

SURVEY OF E-CONTENT DEVELOPMENT EXPERIENCES IN RUFORUM MEMBER UNIVERSITIES

CASE OF UNIVERSITY OF NAIROBI (UON)

Based on a telephone interview with Dr. Elijah Omwenga, Director ICT Centre, UoN, on 5th May 2011.

HISTORY AND OBJECTIVES OF E-LEARNING INITIATIVE

Dr. Omwenga is the current Director, ICT Center at the University of Nairobi (UoN). His early interest in e-learning and ICT-enhanced instruction started during his postgraduate studies
at the National University of Science and Technology, Bulawayo in 1998. ICT-based learning management systems were very new then. He did some work in Java related to learning systems and got funding to present it in Paris. In 1999, he undertook his PhD in the same area of research extending his study of issues around e-learning. One of the key questions was: can you replace a teacher with software?

Because of the expense of the few Learning Management Systems available at the time, he could not afford to buy one for the purpose of his research so he undertook to write one in Java which was eventually named Wedusoft. Between 2000 and 2001, he used the system to conduct studies on e-learning and published a number of papers. His background in education helped in this work.

He demonstrated his system to their Vice Chancellor and the management of his university that helped change attitudes towards e-learning. Some who were openly sceptical to e-learning now became convinced that it was a feasible way to deliver instruction. With support from the United Nations Educational, Scientific and Cultural Organisation (UNESCO) he soon travelled around Africa installing and talking about the system in Zambia, Nigeria, Ghana, and Rwanda. The approach that he promoted at that time was blended learning where e-learning supplement face to face instruction. In 2004, UoN received a grant from Belgium to develop its ICT infrastructure, which in his view, was one of the most important factors for the success of UoN’s ICT initiatives including e-learning.

Later, in 2004, UoN joined the African Virtual Open Initiatives and Resources (AVOIR) project and was involved in developing a PHP-based application development framework called Chisimba. Wedusoft is now based on Chisimba.

**STATUS REPORT**

UoN runs the Chisimba Wedusoft e-learning platform and managed to get a good Sun Systems e-learning server on which all their web-based information systems are hosted. They have trained about 350 staff out of about 1,500 teaching staff. About 350 courses are fully developed and three full programs that are 100% digitized. Each course has a CD, print version and is also taught face to face.

Their approach is a four-way instructional approach that delivers instruction using:

- Face to face teaching
- Print resources
- CD/DVD resources
- Online resources

When students are registered for a course where a CD version is available, they automatically get the CD. Where an online version is available, they are automatically directed to its existence as they registered for the online course. All students register online. It has been 1.5 years since they automated their registration system. Reliable and high quality infrastructure is required to implement this automation.

**KEY CHALLENGES OF E-LEARNING AND E-CONTENT PRODUCTION**
The following challenges the implementation of e-learning and e-content development were cited by Dr. Omwenga:

1. **Training in Content Development**: It takes a lot of effort and patience to train staff especially those who are not at home with computers.

2. **Intellectual Property Issues**: At UoN staff are to write a module for the Open and Distance Learning (ODL) programs which is then owned by the University but the writer is free to make use of it for other purposes. There is an Intellectual Property Rights (IPR) issue: whether the work is owned entirely by the University or jointly with the writer.

3. **Specialised Skills**: It is tedious and complex to develop rich content: graphics, charts, simulations, audio and video. Specialized skills are required for e-content development but not easily available.

4. **Time to Develop Content**: It takes a lot of time to develop content yet there is a lot of competition for staff’s time. Investing enough time to e-content development is not easy.

5. **Access to Infrastructure**: Good infrastructure is required to access online content but fortunately UoN is well-endowed with ICT infrastructure.

6. **Access to Content by Students**: Some students especially those in distance learning courses, do not have access to good Internet connectivity. Off-line (CD, print) formats are required for students who may have challenges accessing the online content. However, off-line content is limited in versatility because it excludes certain features such as graded quizzes/tests, forums, chats and live links to extra Internet resources.

7. **Cost of Production**: It costs money to produce CDs. Previously, these have been provided free to students at UoN but they plan to start charging KSh.100 (about US$1.2) per CD. ODL have a budget for materials production but it may inadequate to cover all needs for e-learning content production.

8. **Incentives for Production of E-Content**: UoN does not officially recognize e-content for the purposes of promotion of academic staff. The Kagiko Report (Kagiko, 2006) is used as the basis for promotion but does not contain an explicit acceptance of e-content as criteria for promotion of academic staff. The ODL course material booklets alone not enough to get promotion although at one of the campuses, two such booklets have been said to be accepted as equivalent to one paper. UoN is very conservative with publications. E-content acceptance for promotion is a grey area. Some universities in the region are thought to recognize e-content as basis for promotion.

9. **Obtaining Buy-in by University Managers**: Though not directly stated by Dr. Omwenga in the interview, it is apparent that changing the attitude of management about e-learning is crucial to unlock resources and obtain administrative support for e-learning.

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**FRAMEWORK FOR E-CONTENT PRODUCTION?**

The Director has developed what he calls the Stratified Objectives-Driven Methodology outlined in some detailed in Omwenga, Waema, Eisendrath and Libotton(2005) and used it
to train hundreds of university staff at the University of Nairobi. He considers it to be a mature and tested training approach. Dr. Omwenga also indicated that they had a template for e-content, a curriculum and a training materials package for the purpose of staff training on e-content development. An e-learning content development guide was developed with support from ANSTI and UNESCO (Omwenga, 2005?). His proposed implementation approach was presented in Omwenga, Waema, and Wagacha(2004).

The framework seems to focus on how to structure existing material (typically Microsoft Word documents). This approach is probably influenced by the approach taken at the University of Nairobi where staff develop print materials for their Open and Distance learning programs then convert the materials for use on their e-learning platform.

The framework does not address the wider questions of theoretical foundations, instructional design, pedagogy, e-assessment, adaptability or e-content team composition. However, the approach has been used to reduce the barriers to entry into e-content development by staff by sensitising and equipping staff on e-content development.

**PROPOSALS FOR IMPROVEMENT OF E-LEARNING**

The specific proposals made by Dr. Omwenga to improve e-learning initiatives were:

1. **Sensitization**: University management and staff need well-considered sensitization on e-learning in order to obtain buy-in and ensure support for e-learning initiatives.
2. **Attitude Change**: The purpose is to obtain positive attitudes towards e-learning and hence reduce resistance to its adoption.
3. **Good Infrastructure**: This includes robust computer networks, strong servers and reliable electrical supply with standby systems.
4. **Training Skills**: The capacity to train staff in various aspects of e-learning.
5. **TOT for Staff**: Train trainers who can then train colleagues in Faculties, Schools and Colleges.
6. **Good Training Needs Assessment** Before Training Design
7. **Incentives for Content Development**: Staff need incentives to convince them to invest their time in e-content development. Staff have many demands on their time.
8. **Provide Training Materials** to trainees (staff).
9. **Mitigate Potential Staff Resistance**: Give staff opportunity to discuss hard questions such as related to Intellectual Property Rights issues related to ownership and usage rights to e-content.

**RATIONALE FOR E-LEARNING?**

No clear rationale for e-learning has been provided except to offer students another channel for instructional delivery. This implies that the aim is to expand the instructional delivery options for students. According to Dr. Omwenga, some students prefer the online content to classroom presentations while some use the online content as supplementary materials. There are still others who do not rate the online content highly. In other words,

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? Website not operational, to be verified later
there is a lot of variation in students’ perceptions of online content. The e-content is provided both in online mode and on CD/DVD thereby adding two modes to the traditional classroom and print formats of instructional delivery. It will be of interest to identify the causes of variation in student’s perceptions and to collate the various rationales for e-learning initiatives across the globe. Of interest is also the costs and benefits of e-learning as identified by RUFORUM institutions. On a micro level e-learning practitioners tend to focus on immediate instructional benefits but on a macro level policy analysis query e-learning’s contribution to a nation’s global competitive advantage in the 21st century.

CASE OF JOMO KENYATTA UNIVERSITY OF AGRICULTURE AND TECHNOLOGY (JKUAT)

Based on telephone interview with Dr. John Kihoro, JKUAT E-learning Manager on 29th April 2011.

HISTORY AND OBJECTIVES OF E-LEARNING INITIATIVE

JKUAT started their e-learning initiative in 2004 but report that progress has been restrained. For example, they still do not have a server to mount their content. This situation implies that e-learning is not considered a high priority in the University. Due to connectivity challenges, JKUAT’s target is to have 90% of its e-content off-line using tools such as active PDF with 10% of content being online.

STATUS REPORT

JKUAT has an M.Sc. program in Research Methods with 19 courses that have online content. During this preliminary survey the successes and challenges of this program in relation to learning have not been identified. Details will be available after the detailed review and site visit. However, the general challenges of their e-learning initiatives are provided in the next section while Table 4 below shows the numbers of courses available on the JKUAT Learning Management System (LMS). A Manager for E-learning has been appointed, though he reported a number of major challenges in moving forward the e-learning agenda.
These numbers do not represent real content but merely indicate that 77 courses have been created in the learning management system (LMS). Some may have no content. An interesting observation that invites further investigation is the exceptionally high contribution from the Faculty of Science at 63% of the total courses mounted on the LMS. At this time, no institutional policy and strategy exist for e-learning.

### KEY CHALLENGES OF E-LEARNING AND E-CONTENT PRODUCTION

The challenges identified by the Manager include:

1. **Doubt Regarding Quality of E-learning**: Although University leaders talk about e-learning in a way that implies they support e-learning, their actions suggest they do not believe in it. For example, some Universities have refused to hire staff who relied on e-learning for a substantial proportion of their postgraduate programs. One such program is the University of Sunderland masters in Computer Based Information Systems program at JKUAT which has not been accepted by some other universities in Kenya.

2. **Subject-Specific Challenges**: In universities whose e-learning initiatives have been relatively successful, it is the social science and humanities courses that seem easier to handle. In science courses, the complexity of, for example, construction of simulations to replace real experiments is a daunting task due to shortages of skilled specialists in this area.

3. **Low Priority for E-learning**: JKUAT has been doing e-learning since 2004 and still has no server, an indication of the low priority that e-learning is accorded at the institution. The Performance Contract of the JKUAT CEO makes no reference to e-learning, hence, there is no motivation for the University management to go into e-
learning. There are no serious digitizing efforts to build e-content. The Manager, E-learning is not in the official University establishment.

4. **Systems Reliability:** There are serious constraints to do with unreliable ICT infrastructure at JKUAT. Email does not work. Servers cannot be relied upon for example, to remain active throughout an e-quiz. In general ICT systems' reliability is low.

5. **Technophobia:** The Manager reported signs of resistance to e-learning and what some call technophobia. At JKUAT, in one MBA program, students went to the University management to complain about the use of e-learning. Though all were computer literate, the 30% who complained were very vocal. It seems at the time that a substantial proportion of the students suffer from technophobia. They prefer face to face over e-learning (Example: Mahmud, K (2010)).

6. **Plagiarism:** In the case of student resistance cited above, the lecturers believed that part of the reason for resistance to e-learning was due to the fact that it was very difficult to cut and paste in mathematics assignments which means students had to submit original work. When the content is textural, learners tend to accept more easily. Cut-and-paste is easier. It means that a digital environment seems to encourage plagiarism and discourage original work by students.

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**FRAMEWORK FOR E-CONTENT PRODUCTION?**

JKUAT has not established a standard framework or model for their e-content development efforts. They have worked with the University of Reading to develop the content for the M.Sc. (Research Methods) and have also been participants in RUFORUM e-content workshops. It is expected that they will adopt the framework that emerges out of this current assignment one of who’s objectives is to review e-content development frameworks around the globe.

**PROPOSALS FOR IMPROVEMENT OF E-LEARNING**

The specific proposals made by the Manager at JKUAT to improve e-learning initiatives were:

1. **Funding:** E-learning initiatives should be adequately funded.

2. **Leasing Servers Instead of Buying:** Lease space on hosting servers in UK or USA to host e-content because it will be more cost effective and resolve the bandwidth constraints where such constraints exist. Give each University space on this shared server. His view is that running our own servers has serious challenges even at the Kenya Education Network which has set up a modern data centre for use by its member institutions. A cost comparison will be carried out to more closely compare the two options of running one’s own servers versus leasing space or using an application service provider (ASP) based on the total cost of ownership and associated risks.

3. **Make Donor Support Conditional:** It is suggested that RUFORUM should make its e-learning funding conditional: That the recipient should show evidence of having
established the necessary infrastructure such as servers and reliable power supply. In the case of JKUAT, funds from the donor may be re-assigned to other university projects different from the original ones without reference to the Manager, E-learning.

RATIONALE FOR E-LEARNING?

One of the most fundamental questions to be investigated in this survey is the rationale or justification of e-learning initiatives in the different universities. According to the Manager, e-learning, e-learning is fad. He doubts that many who enthuse about it really believe in it. The apparent support may be motivated by a perception that there is donor money for e-learning programs. His view is that though there is lot of funds for workshops to discuss e-learning, no persuasive justification for e-learning has been provided. If e-learning is justified on the basis of its ability to solve staff challenges then you would expect that it would be in use to reach multiple universities by individual lecturers but as things stands, there is no shortage of teaching staff. There are always people waiting to be allocated courses.

One interesting observation also noted at Mzuzu University, Malawi and to some extent at Egerton University, Kenya is that, the adoption of e-learning can have dramatic positive impact in student performance. The e-learning manager at JKUAT reported that in one MSc. Level statistics course that he taught, he use PDF/Javascript-based dynamic quiz to get students to solve statistical problems repeatedly. This happened after he gave a test to the students and recorded very poor performance with some scoring zero. He noticed that, each time they tried the dynamic test, the scores would improve by 10 to 15% or thereabouts. In the final example, virtually all the students scored a B grade or above (60% or greater) with most scoring an A. A documentation of these types of occurrences in the universities in the region would provide very valuable cases for lecturers to use while designing their courses.

CASE OF MASENO UNIVERSITY

Based on communication Dr. Betty Ongage, Director of E-learning, on 26th September 2011

HISTORY AND OBJECTIVES OF E-LEARNING INITIATIVE

The Maseno University eLearning programme is implemented in line with provisions of the wider Maseno University ICT Policy, developed with the support of Microsoft ESA in the year 2008 and officially launched in early 2009. This policy aims to:

- promote innovation in the use of e-learning/ICT to benefit learning, teaching and research throughout the university and affiliated institutions.
- enable and support all staff in the cultural and curriculum changes needed to utilize new technologies and learning materials.

Like many universities in the region, the core rationale for e-learning is not clear except “to benefit” learning, teaching and research.” Later in this report, we see that, though many e-
content initiatives seem to adopt the ADDIE method, some aspects of this method tend to receive very little attention. Lack of a clear rationale is a likely contributor to this situation.

STATUS REPORT

Maseno University has rolled out five programmes for learners at a distance delivered using e-learning. A total of about 200 modules will have been complete by the time all modules are fully developed by the end of the current academic year (2011/2012). Some departments, especially within the Faculty of Science and the School of Mathematics and Applied Statistics tend have blended courses for regular face-to-face students. The process of developing e-content for more eLearning programmes is just about to begin. Some the courses to be developed and put online in the next phase will include the common mandatory courses taken by all students.

The approach by Maseno seems quite similar to experiences elsewhere in a number of respects:

- Their staff initially struggled with technical skills before paying more attention on pedagogy and instructional design. Staff are challenged with this change of instructional technology and by what we may call “new pedagogies.”
- Common core courses (what Maseno calls “mandatory courses”) are likely to be given high priority in e-content development initiatives.
- E-learning tends to evolve starting from face-to-face (f2f) learning and hence blended learning is likely to be adopted before online distance learning.

KEY CHALLENGES OF E-LEARNING AND E-CONTENT PRODUCTION

The challenges identified by the Director include:

1. **Limited Budgets**: The budgets for capacity building in e-content development were limited in the initial stages.

2. **Staff Development Approach**: One-off training sessions did not yield much. Subsequently, lecturers were taken through an induction and a series of e-workshops and residential e-content development workshops that spread over a period of 1 year.

3. **Time and Instructional Design**: Most lecturers assumed e-content development was as simple as transferring their traditional notes to a learning platform and underestimated the time they needed to complete the e-content.

4. **Pedagogical Approach**: The lecturers had difficulty embracing the change of philosophy, from a predominantly instructivist paradigm in the regular programmes, to developing content for a constructivist learner-centred approach.

5. **Incentives**: There was lack of a clear compensation model for e-content development at the initial stages and this greatly hampered efforts towards e-content development.
6. **Staff Attitudes**: Lecturers seem to assign e-learning activities low priority and consider e-content an activity to engage in only when they have some “spare time”.

These challenges are similar to those reported by the University of Nairobi.

**FRAMEWORK FOR E-CONTENT PRODUCTION?**

Maseno did not report an explicit e-content development framework but their response suggest that they have:

- A pedagogical philosophy that favours a constructivist approach
- An e-content development process that involves the use of internal and external reviewers
- An e-content assessment guide specifying the expected standards for e-content.

This framework, however, was not explicitly provided.

**PROPOSALS FOR IMPROVEMENT OF E-LEARNING**

Maseno University have found that:

- Staff are highly motivated when there is promise of a definite reward, monetary or otherwise, for the time and effort spent in e-content development. Maseno University signs a contract with each e-content developer clearly detailing what the reward entails.
- Staff who have basic skills in ICT tend to develop e-content faster and more efficiently.
- Staff who had used the e-content in various ways with the regular face-to-face students tend to be more motivated to develop it further for learners at a distance.
- Staff who had little or no ICT skills were motivated to complete their modules if they got adequate and timely technical support so that they were left focus on the pedagogy in their modules. A technician was assigned to each lecturer who needed this extent of support. Based on comments from their external reviewers, modules with exemplary instructional design tend to come from lecturers who sought a lot of technical help at the beginning.
- Staff were motivated by participating in an e-workshop ahead of the e-content development especially with an online facilitator that showed an understanding of their potential limitations in e-content development.
- For those who use Moodle, there is a lot of help available from a huge community of Moodle users at Moodle.org and a lot of free and very useful plug-ins developed by this community of users.

**CASE OF EGERTON UNIVERSITY**

Information in this section is based on the consultant’s observation as a participant of every e-learning initiative Egerton University since 1998.

**HISTORY AND OBJECTIVES OF E-LEARNING INITIATIVE**
Egerton University was among the Universities that implemented programs offered through the initiative of the African Virtual University (AVU) starting in the 1990s. Starting 1999, short courses were offered using one way video conferencing based on digital video broadcast (DVB). However, there was very limited involvement of staff at the university. Later in 2002, AVU adopted WebCT when degree and diploma programs were started which exposed a few more staff to ICT-supported learning. However, it was not until the end of 2009 that the university officially created an e-learning committee and started an attempt to mainstream e-learning.

RUFORUM was a key part of the e-learning initiative at Egerton University and continues to spearhead the e-content development efforts started in June 2009 when a small group of staff from Egerton attended a training workshop at Entebe, Uganda to start work on e-content for the M.Sc. Agricultural Information and Communications Management program. Another workshop was help at Egerton University in January 2010 this time with additional support from the University of Greenwich.

In the same year, an e-learning policy and strategy was developed. E-learning was included for the first time in the performance contract of the University in the 2010/2011 academic year and staff training initiated in 2011 with about 100 staff trained.

Based on the university’s e-learning draft policy, the rationale of e-learning is based on expected benefits which are to:

- Raise instructional standards,
- Provide students with high quality instructional materials,
- Increase instructional flexibility to the advantage of University students,
- Increase student motivation and scope of learning,
- Increase time on task for students thereby improve student performance,
- Contribute to automation of student assessment, and
- Improve tutoring without increasing classroom time or number of staff

**STATUS REPORT**

About 100 staff have undergone training in e-content development and basic use of the Moodle e-learning platform. With the help of RUFORUM, seven Masters level courses have been developed and are undergoing pedagogical review before uploading. The university recently assigned a large server for e-learning (http://41.89.96.10/moodle/) and, hence, e-learning is no longer a fringe activity but is rapidly gaining stature.

Two hundred staff are targeted to be trained this year and it is hoped that the policy and strategy will be discussed and approved by the university Senate and Council. However, there have been and continue to be challenges for e-learning at Egerton University.

**KEY CHALLENGES OF E-LEARNING AND E-CONTENT PRODUCTION**

Some of the challenges that Egerton University has faced include:
1. **Slow E-content Production**: Difficulty in getting staff to create e-content. Though incentives for content developers are proposed in the policy, the policy is still in draft stage. In addition, many staff have expressed the need for more support and training in the process. The 5-day training course seems inadequate.

2. **ICT Infrastructure**: It took almost two years between the start of internal training in January 2010 and the provision of a real e-learning server. It means that content could not be reliably hosted by the university. It is also an indicator that e-learning was not initially given priority in the ICT yearly work-plans until this financial year. Aside from servers, there continues to exist limited access to Internet services in parts of the university, hence, man staff and students would find it challenging use or access online resources.

3. **Lack of an E-learning Center**: In the e-learning policy, it was proposed that a Centre for Instructional Support and E-learning be established. However, to date, this centre has not been established to a large extent because the policy has not yet been approved by the key university organs. It means that e-learning is led by an ad hoc committee and that staff, once provided basic training, have no way to obtain support as they embark in e-content development.

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**FRAMEWORK FOR E-CONTENT PRODUCTION?**

As a result of Egerton’s close collaboration with RUFORUM, the proposed e-content production framework is based on that developed by RUFORUM.

**PROPOSALS FOR IMPROVEMENT OF E-LEARNING**

Egerton has had very little experience with e-learning and, hence, the focus is on the foundation work on:

- Improving staff skills
- Providing support to staff and students
- Improving the infrastructure to support e-learning
- Creating the organizational structures and guiding policies and strategies to support e-learning.

It is expected that e-learning will evolve rapidly once staff get onboard. Already there is an effort to create a video portal with some work going on to build user interfaces for this portal whose purpose is to provide access to instructional video to support university courses. A trial with one course in computer programming showed very promising results.

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**CASE OF MZUZU UNIVERSITY**

Mzuzu University is located in northern Malawi. The information in this section was provided by Dr. Paxton A. Zozie Deputy director Centre for Open and Distance Learning Mzuzu University

Though Mzuzu University indicated that they have not done much with regard to e-content development, it is important to mention them for two reason.
1. The e-learning initiative at Mzuzu motivated by inquiries from teaching staff who requested that an e-learning platform be set up to help them handle the large classes better. One staff member who taught a common Mathematics core course made the request leading to some online research and the installation of Clalorine learning management system. When the first lecturer shared his experience with other lecturers, some lecturers requested to have their lecture notes hosted. Therefore, the drive emerged from the lecturers themselves. This is unusual because in many instances, the initiative emerges elsewhere and sold to lecturers.

2. In one Physics course that deals with energy and that has a history of poor performance by learners, there was a marked improvement in student performance when instructional resources for this course were placed online.

Like the case of JKUAT, it would be desirable to document these unusual experiences and try to isolate the reasons for improved student performance.

CASE OF BUNDA COLLEGE

Bunda College is a constituent college of the University of Malawi. Mr. Noel Jambo of the ICT department provided information about the experiences of Bunda College.

In the course of interviewing Mr. Noel Jambo of Bunda College, the consultant discovered that the college was in the process of implementing an improved Internet connection via a radio link between Bunda and Lilongwe. The link performed dismally and they were forced to fall back on the very expensive VSAT link. When asked about the Malawian NREN, Noel reported that there was indeed the Malawi Research and Education Network (MAREN) and offered to set up a meeting with the UbuntuNet Alliance secretariat to inquire about MAREN. The UbuntuNet Alliance is an alliance of African national research and education networks (NRENs).

The challenge for Bunda college was infrastructure, the foundation on which e-learning and other ICT system would be build and integrated before expecting transformation in teaching and learning. It emerged that MAREN was not doing very well and was virtually in a state of paralysis. In Kenya and Tanzania, the NRENs have been instrumental in acquiring and distributing bandwidth to the point where they have purchased Indefeasible Rights of Use (IRU) for some of the submarine fibre optic cables on the East coast of the African continent. Through their strong concerted effort, they are able to negotiate reduced bandwidth tariffs and obtain government assistance.

However, in Malawi, each institution is responsible individually for negotiating terms of Internet access. It means that interventions in Malawi should not be restricted to software systems and e-content development. Help is needed to form a strong NREN.

SECTION 2
REVIEW OF E-CONTENT DEVELOPMENT FRAMEWORKS

The following two content development models indicate two types of models that have been applied to e-content development. The ADDIE model is an old model derived from the Instructional System Development (ISD) system developed initially by the USA army (Hannum, 2005). It was originally used in the development of traditional print materials (). Although it now adopted for e-content development, no fundamental modifications have been made to adapt it specifically to e-content development. Nor is there a community of users who have developed details guides to this approach.

The case of Australia on the other had is different. The government has gone to great lengths to develop a framework, called the Australian Flexible Learning Framework, that includes a detailed e-content development model and associated

AUSTRALIA

Australia has developed an e-content development process as part of the Australian Flexible Learning Framework (Australian Flexible Learning Framework, 2010). The essential features of this process are presented in this section. The process and detailed guides are developed by Australian government agencies.

This e-content development process consists of three aspects namely, the theoretical principles that anchor content development, the content design and storyboarding. It is unique in that it provides the theoretical foundations for design and also specifies storyboards as a core tool in the content development process. The Framework goes further to provide an online toolbox that allow content providers to develop content online in real time. A summary of the details of the three aspects of this process are presented in Table 2.

There are not many other such attempts to develop e-content development frameworks. A search was made for more such elaborate frameworks but no comparable one was found in the public domain. Valuable lessons can be learned from comparisons between available frameworks and the RUFORUM approach.

TABLE 2. FACETS OF THE AUSTRALIAN E-CONTENT DEVELOPMENT PROCESS

<table>
<thead>
<tr>
<th>Theory</th>
<th>Design</th>
<th>Storyboarding</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. What is learning design?</td>
<td>10 Steps of online learning design</td>
<td>1. What is a storyboard?</td>
</tr>
<tr>
<td>2. Designing your learning</td>
<td>1. Define the project scope</td>
<td>2. Benefits and challenges</td>
</tr>
<tr>
<td>3. Learning design framework</td>
<td>2. Determine the size of the learning resource(s)</td>
<td>3. Project teams</td>
</tr>
<tr>
<td>4. Discrete learning designs</td>
<td>3. Identify existing resources</td>
<td>4. How to develop storyboards</td>
</tr>
<tr>
<td>• Task-directed</td>
<td>4. Determine the method of assessment</td>
<td>5. How to use storyboards</td>
</tr>
<tr>
<td>• Task-guided</td>
<td></td>
<td>6. Functional</td>
</tr>
<tr>
<td>• Task-autonomy</td>
<td>5. Determine the design</td>
<td>1. Part 1: Profile the target</td>
</tr>
</tbody>
</table>
6. **RPL Modes**\(^2\) (recognition of prior learning):
   - Basic RPL pathways
   - Fast-track pathway
   - Express pathway
   - Expressway models
   - Models in action

7. **Basic principles of online learning design**
8. **Web 2.0 technologies**
   - Blog
   - Wikis
   - Social bookmarking
   - Podcasts
   - Social networking

Source: [http://toolboxes.flexiblelearning.net.au](http://toolboxes.flexiblelearning.net.au)

The key reasons given for the development of the e-content development framework in Australia include:

- **Good online teaching and learning involves various forms of interactivity and consideration needs to be given to how to effectively design and develop the resources that make best use of the medium, have the right blend of activities, are motivational, accessible, and effective educationally.**
- **Communication and interaction between students is an important part of effective online learning and this again has implications for content development and may need the involvement of special expertise to build this successfully into the online course or learning content.**
- **Technical issues play a far bigger role in the development of online content than in traditional print-based resources.**
- **Large online content development projects typically involve team members from a variety of organisations and this increases the need for more formal methodologies.**

The example below shows a course module planning template based on this model.

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The workflow in this e-content development model of the Australian Flexible Learning Framework is presented in Figure 2. Below are brief explanations of the steps in this e-content development model.

1. **Preplanning:** Establishing a team with the required skill sets, obtaining finance.
2. **Planning:** Objectives, schedules, standards, setting up project management, learner profiling
3. **Content Design and Writing:** Detailed design of various components of the product
4. **Prototype:** Prototypes are used to get approval of design before detailed development
5. **Materials Development:** Producing the physical product and guides
6. **Testing:** Verify attainment of standards
7. **Evaluation:** Feedback from users for purposes of improvement of the product
8. **Distribution, Licensing and Management:**
9. **Re-Development:**
KEY SUCCESS FACTORS

From experiences in Australia they identified the following key success factors for e-content development projects:

- A balanced project
- Effective planning.
- Good communication within the project team.
- Has key features of good online resources: Accessible, motivating and engaging, appropriate style, accurate, has downloadable components.
- Has effective interrelation between learning resources, learning tasks, and learning supports.
- The development of a prototype point prior to detailed development of the whole resource.
- Final testing to ensure that the product meets the technical requirements.
- Good documentation so that teachers and learners know how to install, access, use and adapt the resources developed.

ADDIE MODEL

ADDIE first appeared in 1975. It was created by the Center for Educational Technology at Florida State University for the U.S. Armed Forces (Branson, Rayner, Cox, Furman, King, Hannum, 1975; Watson, 1981). It had a waterfall structure but has evolved a more iterative
configuration similar to the evolution of waterfall software development models. The acronym ADDIE stands for Analysis, Design, Development, Implementation, and Evaluation accordingly it has five steps as shown in Figure 3:

**Analysis:** Identify the learning problem, the goals and objectives, the audience’s needs, existing knowledge, and any other relevant characteristics. Consider the learning environment, any constraints, the delivery options, and the timeline for the project.

**Design:** A systematic process of specifying learning objectives. Detailed storyboards and prototypes are often made, and the look and feel, graphic design, user-interface and content is determined here.

**Development:** The actual creation (production) of the content and learning materials based on the Design phase.

**Implementation:** Plan is put into action and a procedure for training the learner and instructor is developed. Materials are delivered or distributed to the student group. After delivery, the effectiveness of the training materials is evaluated.

**Evaluation:** This phase consists of formative and summative evaluation. Formative evaluation is carried out at each stage.

**Figure 3. The traditional ADDIE Model**

This seems to closely follow the waterfall software development model. The modifications made to it are similar to those adopted in the spiral or interactive software development models where intermediate prototypes are created using the waterfall model in each cycle of the spiral. The prototype is used to obtain feedback from stakeholders. Such a process reduces the risks associated with a relatively monolithic process. When following the original ADDIE process, the final product is not visible until the development stage is complete. The client may desire changes at this late stage which is expensive especially for software. It is less risky to develop sub-modules as prototypes and review these with the development team and client. Changes can be made at less cost and the client can be more intimately involved in reviewing the features of the product.

A more sophisticated variant of the ADDIE model is shown below in Figure 4 and referred to as the “backward” model. The Analysis Phase has been changed in this variant to follow Phillips Needs Model and Kirkpatrick’s Four Levels of Evaluation. The activities in this model are divided into three categories: Analysis, Design, and Development. These roughly fit the
classical engineering process of Requirements Analysis, Design and Construction. In the analysis stage individual skill and knowledge needs are developed derived from the overall company objectives and the output of a training needs analysis. During the design stage, the learning activities and performance tests are specified while the actual content and its delivery system is created during the development stage. Brief explanations of the components of the model are presented in Table 3.

![Figure 4: Detailed representation of the ADDIE backward model](http://www.nwlink.com/~donclark/hrd/ADDIE/ADDIE_backwards_planning_model.html [Accessed May 2011])

**TABLE 3. EXPLANATION OF THE BACKWARDS ADDIE MODEL**

<table>
<thead>
<tr>
<th>Component</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Business Needs</strong></td>
<td>How a learning activity or program supports the organization’s strategic plan</td>
</tr>
<tr>
<td><strong>Job performance needs</strong></td>
<td>Identifies the performance deficiency that is stopping a business unit from attaining its goals and defines the desired performance standards.</td>
</tr>
<tr>
<td><strong>Training needs</strong></td>
<td>Training needs assessment</td>
</tr>
<tr>
<td><strong>Individual needs</strong></td>
<td>Assessment of individual motivation (the desire and energy that needs to be applied to reach the required goal)</td>
</tr>
<tr>
<td><strong>Reaction</strong></td>
<td>Immediate reaction of learners to the learning activity</td>
</tr>
<tr>
<td><strong>Learning</strong></td>
<td>The extent of new skills and knowledge gained as a result of the learning</td>
</tr>
</tbody>
</table>
activity

**Behaviour**
Individual capability to perform newly acquired skills on the job

**Results**
Company-wide impact of learning such as increased profit, quality of products, productivity or reduced loses.

**Objectives**
What learners are expected to do after completing the learning activity

**Performance test**
Test of the rate of performance usually done against some benchmark standard

**Learning steps**
Steps, procedures and activities the learner needs to follow to attain the required performance

**Entry behaviour**
Level of desire, energy (motivation), skills and knowledge available and directed at performing the task at hand.

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**OTARA LEARNING DESIGN PROCESS**

The OTARA model is a learning design model developed by Kate Hunt and Maurice Moore. In simple terms, OTARA is an acronym for Objectives, Themes, Activities, Resources and Assessment. The model outlines a process for constructing learning. This means it is an instructional design tool. Because it favours the constructivist philosophy, it lends itself well for the design of e-learning content. The instructional design process would proceed as follows:

1. Develop learning objectives [O]
2. Identify the evidence that is required to show that students have attained these objectives [A]
3. Select appropriate activities to help learners attain these objectives based on their entry behaviour [A]
4. Construct themes which server to guide the learner and fill any gaps not addressed by the learning resources that are to be provided [T]
5. Provide learning resources to support the learning path specified by the themes[R].

Figure 5 below is a summary of these concepts. According to its developers, OTARA is a scalable, iterative, dynamic communication tool for design of learning.

<table>
<thead>
<tr>
<th>Objectives/PCs</th>
<th>Themes</th>
<th>Activities</th>
<th>Resources</th>
<th>Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>The objective or learning goal may already be established in the course descriptor or be an element from a unit standard.</td>
<td>Scaffolding to provide clear expectations and instructions that will guide learners through the unit of work. Themes link and explain resources, and fill any gaps that may not be covered by resources available elsewhere.</td>
<td>What the learners need to do to bridge the gap between objectives and assessment. May include: Lecture; Discussion; Readings; Journaling; Quizzes; Expert; Projects; Web searches; Case studies; Scenarios; Rule play; etc.</td>
<td>What the learners need to build skills, knowledge and understanding to complete the activities and the assessment. Subject support may include: Library; Internet; Workplace; Fellow students; Tutor or facilitator; Subject specialists. Other support may include: Learning skills; Pastoral care.</td>
<td>Identify the evidence that is needed to show that students have achieved the specified outcomes. The assessment is derived from the objectives. May also be identified as the performance criteria of a unit standard.</td>
</tr>
</tbody>
</table>
PROBLEM BASED LEARNING [PBL]

Problem Based Learning is a pedagogical approach that relies on problem-solving to achieve learning. In its briefest form, the contract between traditional approaches and PBL is illustrated in Figure 6 below. In PBL, the role of the teacher changes considerably from a giver of knowledge to a facilitator of the process of searching for solutions. The learning activities change from principally listening to the teacher deliver content to working in groups to solve problems based on the guidance provided by the facilitator. This approach is adopted by JKUAT in the MSc. (Research Methods). It has also been used for many years by the Moi University School of Medicine. Like the OTARA learning design method, PBL lends itself well to e-learning. Learning Management Systems such as Moodle and Chamilo are well-endowed with the supporting infrastructure for PBL especially when combined with other online resources.

While OTARA is principally an instruction design process, PBL is principally an pedagogy. It means that the two can be merged and applied to the development of one course module. In the RUFORUM sponsored programs, OTARA is particularly attractive due to its emphasis on designing instruction to attain the course objectives. It means that, from the start, attaining the objectives is a key focus. It also includes a strong assessment component making easier to measure the extent to which learning has occurred and hence the value added by the underlying instructional delivery system and associated pedagogy.

Figure 6: Problem based learning compared to traditional learning.

TECHNOLOGY ADOPTION MODELS

Technology adoption is an aspect of e-content development that is rarely addressed. The universities cited in this report have all reported major challenges getting staff to learn and adopt e-learning tools and e-content development methods. These challenges are not limited to developing nations. Franklin and Van Harmelen (2007) report similar challenges in the United Kingdom.
A brief discussion of technology adoption models is presented here because the consultant believes the lack of technology adoption strategies increases the risks of e-content initiatives.

**Diffusion of Innovations:** Technology adoption and change management challenges have been examined from several perspectives each of which offers different insights for e-learning. One of the oldest model was Everet Rogers diffusion of innovations models first proposed in 1962 in a book titled *Diffusion of Innovations* and updated some years ago (Rogers(2003)). Rogers made several valuable observations about the diffusion of innovations. Though most of the work was based on agricultural innovations diffusing among relatively heterogeneous rural communities, these observed trends still seem to apply in many other circumstances. The key observation is that there are minorities who adopt innovations relatively quickly and others slowly. These he divided into four groups: Innovators (2.5%), early adopters (13.5%), early majority (34%), late majority (34%), laggards (16%). He also developed the “S-curve” that illustrated the adoption trend over time in a given population.

Rogers models provide a useful framework for thinking about individual adoption and for measuring the ease of adoption parameters such as relative advantage (improvement over alternatives), compatibility (fit into person’s life), simplicity/complexity, trialability (can be tried out with minimal risk/cost/effort), observability (car is more observable than e-learning).

**Concerns Based Adoption Model (CBAM):** Hall and Hord (1987, 2001) developed a useful model for change in schools whose principles and tools would add value to a change of the kind e-learning is targeting to bring to institutions. They provide a framework to gauge the attitudes of the stakeholder using the Stages of Concern scale and to identify how far change has occurred using the Levels of Use scale and associated tools. They attempt to provide strategies for facilitating change.

Change Management: In the business field, change management is an important skill for modern managers and e-learning is no exception. Software deployments and roll-outs make use of change management techniques to reduce the risks of implementation and improve acceptance of new systems. These tools and techniques are available to e-learning team leaders. Some toolkits such Improvement and Development Agency (2007) are available to change managers. Michele C. Minton (Minton, 2000) in her article titled “Is Your Organization Ready for E-Learning? Seven key questions you need to answer” discusses some of the key issues to consider when implementing e-learning. It is clear that an effective change management plan will be an essential part of the manager’s toolkit.

**Task-Technology-Fit (TTF) and Technology Acceptance Model (TAM):** TTF and TAM are seemingly more theoretical but nevertheless useful foundational theoretical models for diagnosing technology adoption issues and challenges. Other theoretical models include the Perceptual Control Theory (PCT) and Analytic Hierarchy Process (AHP). Šumak, Hericko, and Pušnik, (2011) on analysing the results of 28 e-learning acceptance studies concluded that:
1. Perceived usefulness is the strongest (direct or indirect) determinant for the learner’s adoption of a specific e-learning technology.
2. Perceived ease of use has a relatively small influence on a learner’s intention of using a specific e-learning technology.
3. The actual use of an e-learning technology is predicted by perceived usefulness and behavioural intentions.

**Capability Maturity Model (CMM):** CMM is a specification that describes how software development standards and models evolve within an organization. Though in this study, our concern is e-content, CMM’s concept can be used directly to inform key stakeholders in e-content initiatives. CMM describes how software development methodologies evolve as organizations acquire experiences and establish robust processes and mature methods. CMM assists organizations to speed up their maturity process by informing them about the aspects of their methodologies that would be expected to mature without special interventions. As an example of how this can happen, it was reported by EDUCASE (2003) that instructors new to e-learning tend to focus on the mechanics of using the tools. Once comfortable, they then seem to take more interest in the pedagogical issues. This progression implies that institutions will need to go through several cycles of e-content production in order to mature their processes and be able to precisely specify and control the quality of their products.

The above small sample of adoption models and frameworks provides some evidence that these models can be usefully applied in assisting and simplifying the seemingly complex e-learning terrain.

Case studies in developing countries such as EDUCASE (2003) reveal indications that indeed these adoption theories have value. In EDUCASE (2003), for example, they found that pioneering faculty are relatively well-equipped and motivated to adopt while those who follow later are no that well-equipped. The innovators and early adopters are different in their skill-sets and attitudes from the late majority and laggards; hence, all cannot be approached and trained in the same way. On the other hand it has been found that the so-called laggards sometimes do a better job at adoption of innovations such as e-learning than the innovators. It is interesting that, unlike Roger’s model where slow adopters are called laggards, in the EDUCASE study, they are called AVOIDERS because they actively avoid the technology and are more comfortable with the traditional board and chalk classroom tools. In the same EDUCASE (2003) study, a progression of the concerns of the instructor from technical proficiency to pedagogy was reported. The Concerns-Based Adoption Model predicts this progression in the Levels of Use framework.
SECTION 3

REVIEW OF RU FORUM E-CONTENT DEVELOPMENT ACTIVITIES

This section provides a summary of RU FORUM e-content development activities both prior and subsequent to the funding of the AAU Project MRCI 315. Table 4 is a summary of RU FORUM’s e-content activities before mid-2010 when the AAU Project MRCI 315 started.

TABLE 4 E-RU FORUM CONTENT ACTIVITIES OUTSIDE PROJECT MRCI 315

<table>
<thead>
<tr>
<th>Date</th>
<th>Title</th>
<th>Focus/Scope</th>
<th>Sponsorship</th>
</tr>
</thead>
<tbody>
<tr>
<td>7th – 11th September 2008</td>
<td>Web 2.0 Tools for Research Support and Networking in Africa, RU FORUM, Ghana</td>
<td>Learn to use Web 2.0 tools including WikiEducator and blogs</td>
<td>Center for Technical Assistance (CTA), Council for Scientific and Industrial Research (CSIR)- Ghana</td>
</tr>
</tbody>
</table>

The second CTA-sponsored workshop provided the opportunity to start work on e-content development. Participants at this workshop started work on the development of one course module. Most of the modules started at that time were not completed in readiness for content review until August 2011, a period of 13 months. An e-content review flowchart was developed during the June 2010 workshop.

Table 5 is a summary of the e-content activities that are part of Project MRCI 315. E-content review is now at the pedagogical review stage. Most of the planned project activities are complete though it is noted later in this section that time required for developing e-content was underestimated.
<table>
<thead>
<tr>
<th>No.</th>
<th>Event/Product</th>
<th>Purpose/Objective</th>
<th>Target</th>
<th>Outcomes</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Project MRCI 315 Proposal Document, Oct. 2009</td>
<td>Project Proposal to the AAU’s Mobilizing Regional Capacity Initiative (MRCI)</td>
<td>AAU</td>
<td>The proposal was funded and was the basis of the current e-content development initiative.</td>
<td>There was a very strong message in favour of OER in the proposal. Based on experiences in universities visited by the researcher, it would help to place similar emphasis on e-learning as a vehicle to raise instructional standards including the design and production of educational e-content.</td>
</tr>
<tr>
<td>2</td>
<td>4&lt;sup&gt;th&lt;/sup&gt; May 2010 to 4&lt;sup&gt;th&lt;/sup&gt; November 2011 Mid Term Review Mid September 2010</td>
<td>Project MRCI 315 work-plan</td>
<td>AAU, RUFORUM Secretariat</td>
<td>Project activities implemented in accordance to work-plan.</td>
<td>E-learning content at: <a href="http://ruforum.moodlehub.com">http://ruforum.moodlehub.com</a> Research Abstracts at: <a href="http://www.ruforum.org/documents/ruforum-research-outputs-students-and-faculties">http://www.ruforum.org/documents/ruforum-research-outputs-students-and-faculties</a> Electronic learning management system not yet activated or visible online. Research portal not yet visible online. All abstracts not available on RUFORUM website</td>
</tr>
<tr>
<td>3</td>
<td>Training &amp; Writing Retreat for the Development of E-content for the MSc. (AICM) at Egerton Univ. 2&lt;sup&gt;nd&lt;/sup&gt; – 6&lt;sup&gt;th&lt;/sup&gt; Aug. 2010</td>
<td>Mission Report</td>
<td>AAU, RUFORUM Secretariat</td>
<td>Discuss and agree on simplified e-content template.</td>
<td>In hindsight, a mechanism to more closely monitor the progress module writing was desirable to keep writers on track.</td>
</tr>
<tr>
<td>No.</td>
<td>Event/Product</td>
<td>Purpose/Objective</td>
<td>Target</td>
<td>Outcomes</td>
<td>Remarks</td>
</tr>
<tr>
<td>-----</td>
<td>-------------------------------------------------------------------------------</td>
<td>-------------------------------------------------</td>
<td>------------------------------------------------</td>
<td>------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
</tbody>
</table>
• Initiate the development of course modules for PhD. (AFS).                                                                           | The simplified template developed by RUFORUM was found to be much simpler than the previously used Commonwealth of Learning ODL³ template. |
| 5   | Financial Report to the AAU Project reference MRCI 315                        | Account for first disbursement under the Project MRCI 315 | AAU, RUFORUM Secretariat                        | Expenditure report of $22,132 of the £49,989.5 disbursed.                                                                             |                                                                                                                                        |
| 6   | E-Content Template                                                             | Guide the e-content developer in structuring their content | Lecturers/Professors                            | Has been used successfully by university staff for e-content preparation in RUFORUM’s initiatives.                                     | The template helps lecturers make the first step in their e-content development effort. An instructional design and pedagogy guide will help them make the next step to improve pedagogy and instructional design of their content |
| 7   | Project MRCI 315 progress report, 3rd Dec. 2010                               | Report on progress of Project MRCI 315           | AAU                                            | Several e-content development milestones specified were met or on course by date of report                                            | The current study was a milestone in the Dec. 2010 progress report                                                                   |
| 7   | E-content Revised Activities and Time Frame                                     | Set timelines for e-content development activities | E-content developers, project coordinators, stakeholders | Activities are progressing                                                                  | The review process slipped considerably and required intervention to bring it back on track.                                         |

³ ODL = Open and Distance Learning
<table>
<thead>
<tr>
<th>No.</th>
<th>Event/Product</th>
<th>Purpose/Objective</th>
<th>Target</th>
<th>Outcomes</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>Funding of E-content Revised Activities.</td>
<td>Specify amounts to be paid as honoraria to writers and reviewers</td>
<td>E-content developers, project coordinators, stakeholders</td>
<td>Payments have been made</td>
<td>In one case (AICM715) the reviewer did not do a good job. Payment of reviewers should be conditional as it is for writers.</td>
</tr>
<tr>
<td>9</td>
<td>E-content Retreat for AICM &amp; AFS Content Developers, at Addis Ababa, Ethiopia, 7-16 January 2011</td>
<td>Mission Report</td>
<td>AAU, RUFORUM Secretariat</td>
<td>Primary objective was to develop 12 e-content modules for 12 courses taught in RUFORUM-sponsored MSc. And PhD programs.</td>
<td>Twelve course modules were delivered and preparations started for the review of courses by subject matter experts.</td>
</tr>
<tr>
<td>10</td>
<td>Guidelines For Peer Reviewers of E-Content (AAU/Ruforum Project)</td>
<td>Instrument to guide content reviewers (Subject matter experts)</td>
<td>Content reviewers</td>
<td>Reviews were conducted using the instrument</td>
<td>There is the challenge of how to select good content reviewers. Experience showed that a subject matter expert can fail as a reviewer because they did not spend time and effort to critically and thoroughly examine the content.</td>
</tr>
<tr>
<td>11</td>
<td>Review Meeting for AICM 702 &amp; AICM 703 24-26 June 2011 at JKUAT/AICAD</td>
<td>Mission Report</td>
<td>AAU, RUFORUM Secretariat</td>
<td>Progress report on review of e-content modules is made. Only two of the seven modules had been corrected.</td>
<td>It was noted that the correction of modules the writers to incorporate the reviewer comments has taken longer than expected. It may be necessary in future initiatives to manage the review process more closely and possibly set more realistic timelines for the review. It is noted that intervention was necessary to get writers to complete their corrections.</td>
</tr>
<tr>
<td>12</td>
<td>Pedagogical Reviewers Instrument</td>
<td>To guide pedagogical review of e-content</td>
<td>E-content Reviewers</td>
<td>The tools has been used to review the modules prepared under the Project MRCI 315</td>
<td>It is expected that feedback from the pedagogical review and experiences elsewhere will be communicated to content developers and other stakeholders and used to increase the quality of e-content</td>
</tr>
</tbody>
</table>
E-content development timelines slipped substantially. Reports from institutions such as Maseno University are consistent with this trend. Staff tend to seriously underestimate the time required to develop e-content. During the preparatory meetings for the 2011 RUFORUM AGM at Lilongwe, it was observed that the most effective strategy to get content developers to deliver on time is to sequester them for a period away from routine working environment and provide appropriate incentives for them to deliver. Clearly, that is a key lesson to be learned and is likely to be one basic strategy in RUFORUM’s e-content development toolkit.

Accumulation of these kinds of strategies and methods will help mature the e-content development process and fits well with the maturity progression described by CMM. The cumulative lessons learned are presented in the next section. It would be useful to record these lessons learned from each e-content development activity
SECTION 4

BENCHMARKING RUFORUM’S E-CONTENT DEVELOPMENT METHODS

We could spend long periods discussing the pros and cons of various models, frameworks and approaches to e-content develop but, due to the relatively immature status of e-learning, it may not a worthwhile exercise. The approach selected here is to focus on asking the key educational questions based on the review of what we have called e-content frameworks and assessing whether the RUFORUM approach seems to score well against these ideals.

This exercise assumes implied standards. As has been mentioned earlier in this study, universal e-learning standards have not quite emerged and, hence, each institution tends to set its own standards. We can vary this rather subjective standard-setting approach and chose to refer to the relatively well-established models, processes and frameworks as discussed in Section 2 above.

As indicated in the in the section on Purposes and Activities on page ___, the parameters suggested for benchmarking are:

1. Core rationale for e-learning and hence of e-content development;
2. Theoretical foundations of the design methods;
3. The economics of e-content development;
4. Comparative effectiveness of different e-content models based on learning outcomes; and
5. Challenges of e-content development; and e-content implementation strategies.

CORE RATIONALE

Few institutions have a specific e-learning that is not a section of their ICT policy. Clearly, e-learning initiatives are part of a university’s core mandate and is not a subset of the ICT Centre services. Of the universities reviewed, only Egerton had a credible e-learning policy. As cited earlier, the key benefits expected from e-learning in this policy are:

- Raise instructional standards,
- Provide students with high quality instructional materials,
- Increase instructional flexibility to the advantage of University students,
- Increase student motivation and scope of learning,
- Increase time on task for students thereby improve student performance,
- Contribute to automation of student assessment, and
- Improve tutoring without increasing classroom time or number of staff

Virtually all these target instructional quality.
In a study conducted in Croatia using 90 experts in e-learning and higher education (Begicevic, Divjak, Hunjak, CEJOR, 2007) (Begicevic, Divjak, Hunjak, JIOS, 2007, the highest ranking goals of e-learning cited by the experts were:

- Improving the quality of educational process and learning outcomes and
- Innovation and modernization of the higher education system. (page 28)

In the RUFORM Project MCRI 315 proposal document, the list of five objectives given on page 12 of that proposal, the fourth objective is:

- Enable continuous peer review of the content to ensure both quality and relevance.

In the problem statement it says: Teaching and learning in African Agricultural faculties/schools/universities is greatly and negatively affected by out-of-date graduate teaching materials, coupled with inadequate funding to purchase new textbooks and teaching aids.

Therefore, it would seem that the quality of the education processes were high on the agenda in the project under review. The emphasis on creating quality content is quite unequivocal including multiple review cycles. However, it is likely that experience will be required before enduring quality standards and mature quality-assurance processes are established.

THEORETICAL FOUNDATIONS OF E-CONTENT FRAMEWORK

Are RUFORUM’s processes based on a solid theoretical foundation? The Australian Flexible Learning Framework e-content development process consists of theoretical principles that anchor content development, the content design and storyboarding. It is unique in that it provides the theoretical foundations for design and also specifies storyboards as a core tool in the content development process. This means that all three components are inputs into the process. Pedagogy is considered concurrently to instructional design and content structuring and sequencing. This approach is analogous to the quality assurance approach to manufacturing where the quality of each input and processes is closely managed to assure a quality output.

The initial RUFORUM approach, however, looked more like the older quality control philosophy where we check for quality after the production is complete. In manufacturing, such an approach is ultimately very expensive because rejecting late means resources that were used in production of the reject go to waste. Therefore, it would be desirable to borrow some features from this Australian model where some thought is given to pedagogy and instructional design in the early stages of development.
ECONOMICS OF E-CONTENT FRAMEWORK

The initial RUFORUM e-content development model had six key costs:
1. E-content construction[E]
2. Subject expert review[S]
3. Pedagogical review[P]
4. Instructional design[I]
5. Graphic design[G]
6. Uploading[U]

In addition, there are the usual costs of hosting and presenting the content as well as maintaining the content. Hosting costs include data storage costs and bandwidth costs. There is very little mention of the economics of e-learning in the literature but simple analysis would indicate the e-content may be more expensive to develop than traditional print media.

While a good book may receive the same attention from reviewers as e-content, a traditional book has no uploading, hosting of presentation costs. RUFORUM may need to develop an analytical formula to estimate the cost of delivering e-learning that allows for optimisation. A simple formula would be in the form of:

\[
C = f(E) + g(S) + h(P) + j(I) + k(G) + m(U)
\]

where \( f, g, h, j, k, \) and \( m \) are functions of the six parameters listed above. \( C \) is the cost of developing and delivering an e-learning course.

COMPARATIVE EFFECTIVENESS OF E-CONTENT FRAMEWORK

An effective framework is one that produces the intended results reliably. Though the initial RUFORUM process has delivered course modules now under review, the ultimate goal is to get students to learn. Therefore, it is too early to be able to gauge the effectiveness of the proposed RUFORUM e-content framework.

However, the three cases cited in this report where e-learning had substantial, sometimes dramatic effect on the performance of students (JKUAT, Egerton, Mzuzu), the indication is that the pedagogy is key to improving students’ performance. The opportunity to practice problem solving seems the one pedagogical strategy that produces the most dramatic improvements. Though we may be tempted to prescribe the same pedagogical approach in all courses, the assumption that one-size-fits-all is likely to fall apart sooner or later. The challenge for RUFORUM is to incorporate these desirable features early in the e-content process rather than try to modify content that has no in-built flexibility.

CHALLENGES OF E-CONTENT PROCESSES AND STANDARDS

ADDIE Process Issues: One of the experts who were interviewed indicated that many people adopt a form of the ADDIE process for their e-content development but ignore some aspects of
the process. Specifically, the “A” in the process is for Assessment of needs of both learners and instructors. This is equivalent to requirements analysis in the waterfall software development model. If this assessment is overlooked, it means the product will not fit the needs of the learner very well. Neither will it fit the capabilities of the instructor.

Similarly, the “E” is for evaluation equivalent to testing in the older waterfall model for software development. If a product is not tested, its flaws and failings will not be detected until is deployed an rolled out at which point major flaws could be force withdraw of the product with all the attendant risks and costs. In the case of software, the trend is to design and build testable products because the standards are set early in the development process. The same philosophy and practice can add much value to e-content development.

All in all, those who adopt the ADDIE process, as do those who adopt the waterfall model, tend to place much emphasis on the development stage at the cost of other stages. Figure 2 shows the e-content development cycle based on the Australian model. Almost 50% of the development cycle time is spent on planning and design.

Staff Issues: Most Kenyan universities included in this review cited issues to do with staff reluctance to develop e-content because there was not clear compensation system and an acceptable policy on intellectual property rights (IPR) in relation to e-content. Here is a situation where again, a one-size-fits-all may not apply because certain universities in the region do not seem to have compensation- or IPR-related barriers to e-content development. The RUFORUM approach of adopting open content licensing while providing modest honoraria and facilitating the e-content development process seems quite successful. A valuable aspect of this facilitation is the provision of experts to carry out instructional design and upload the content. Conceivably, staff may eventually acquire sufficient skills in these areas to execute these tasks on their own if a sustained staff development program is implemented that includes providing technical support. Staff may have challenges with use of Web 2.0 tools such as how to facilitate online discussion forums Clegg and Heap (2006).

KEY MESSAGES

Based on the analysis of the lessons learned in this review as presented in the Executive Summary, several policy messages are presented here as recommendations for improving e-content development initiatives in the region.

1. Pay greater attention to the quality of e-content and to effectiveness of e-learning activities.
2. Recognise that adoption of innovations is largely a social process that requires excellent planning and change management.
3. Reflect deeply on the rationale for e-learning considering carefully the associated expectations while noting
the myths and assumptions that cloud e-learning initiatives.

4. Adopt a solid pedagogical and instruction design foundation for e-content quality assurance while relying on tested process models for content development as newer refinements mature.

5. Manage the motivational impediments to the adoption of e-learning including inadequate infrastructure, technical support and recognition of staff’s efforts to develop e-content.

6. Use attainment of target outcomes especially instructional outcomes as the main measure of success rather than tallies of module development and statistics of online users.

7. Implement a coordinated human resource development strategy that caters for short term training and long term support to develop adequate e-learning skills among staff and students.

8. Create and sustain a collaboration and support network for e-learning practitioners in the region including an e-journal, news-groups and regular regional conferences or symposia.

9. Through RUFORUM, provide strategic support for e-learning and e-content development by targeting support where it is most likely to create sustainable positive outcomes that support regional aspirations.
This assignment was relatively simple but required a few inputs by the consultant and the client to ensure success.

**CONSULTANT INPUTS**: The consultant conducted the analysis and surveys with the required deliverables and described in the work plan on page 49 within the proposed timelines. Some limited travel was conducted within Kenya and to Kampala, Uganda. A final report was planned to be presented to the client.

**CLIENT INPUTS**: Because no reimbursables were specified in the contract, only direct payments to the consultant apply. The first, 50% of the consultancy fees, was to be paid after submission of the inception report. The final payment is expected to be paid after submission of an acceptable final report. The client was to provide contacts in each of the selected RUFORUM member institution and a letter of introduction to allow the consultant to interview them and visit where feasible. The client was to provide feedback on the interim deliverables to allow for any shortcomings to be addressed. Where possible, the client was to facilitate travel to meet and interview key informants.
### TABLE 6: TIME BUDGET BASED ON KEY ACTIVITIES

<table>
<thead>
<tr>
<th>Serial No.</th>
<th>Task</th>
<th>Estimated Calendar Days</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Experiences of Universities – take 11 cases (regional spread) – tentative [50 days]</td>
<td>50</td>
</tr>
<tr>
<td></td>
<td>1. Kenyatta University</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2. University of Nairobi</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3. Jomo Kenyatta University of Agriculture and Technology</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4. Egerton University</td>
<td></td>
</tr>
<tr>
<td></td>
<td>5. Makerere University</td>
<td></td>
</tr>
<tr>
<td></td>
<td>6. African University Zimbabwe )</td>
<td></td>
</tr>
<tr>
<td></td>
<td>7. National University of Rwanda</td>
<td></td>
</tr>
<tr>
<td></td>
<td>8. University of Botswana</td>
<td></td>
</tr>
<tr>
<td></td>
<td>9. Mekelle University, Ethiopia</td>
<td></td>
</tr>
<tr>
<td></td>
<td>10. Haramaya University, Ethiopia</td>
<td></td>
</tr>
<tr>
<td></td>
<td>11. Sokoine University of Agriculture, Tanzania</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Review of Development Frameworks – how they go about it. Why?</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>What is the theoretical foundation of that methodology? What are the unknowns? Pro and cons? Case studies of their use?</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Documentation of RUFORUM’s e-content development history – various meetings, reports, workshops, conferences. Objectives? Lessons learned, Variations in approach. Some distillation of key considerations.</td>
<td>10</td>
</tr>
<tr>
<td>4</td>
<td>Bench-Marking RUFORUM’s E-content Development Framework: Compare and contrast RUFORUM’s methodology with those around the global. Where possible, propose the best approaches.</td>
<td>12</td>
</tr>
<tr>
<td>5</td>
<td>Travel and report writing</td>
<td>13</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

Estimated date of completion of final report: 15\(^{th}\) October 2011
## APPENDIX C: PROPOSED WORK PLAN FOR RESEARCH ON E-CONTENT DEVELOPMENT FRAMEWORK

<table>
<thead>
<tr>
<th>Activity</th>
<th>Deliverable</th>
<th>2011 Month</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consultation with RUFORUM on final work-plan</td>
<td>Detailed Work-plan</td>
<td>April</td>
</tr>
<tr>
<td>Inception Report Writing</td>
<td>Inception Report</td>
<td>April</td>
</tr>
<tr>
<td>Review of current RUFORUM e-content development initiatives, visit to RUFORUM office</td>
<td>Report on RUFORUM E-Content Development Initiatives</td>
<td>April</td>
</tr>
<tr>
<td>Interviews with content developers/policy makers in RUFORUM member institutions on ICT-enhanced learning initiatives including e-content projects.</td>
<td>Individual case studies of e-learning and e-content development from RUFORUM member universities.</td>
<td>April</td>
</tr>
<tr>
<td>Summary of case studies from member institutions (views, experiences and challenges, methodology, proposals)</td>
<td>Report on Experiences and Challenges of E-learning and E-content Development in RUFROM member universities.</td>
<td>April</td>
</tr>
<tr>
<td>Preliminary identification of e-content development frameworks</td>
<td>Preliminary review of sample e-content frameworks</td>
<td>April</td>
</tr>
<tr>
<td>Review of e-learning and e-content development frameworks and case studies from around the world including lessons learned, best practices and theoretical underpinnings</td>
<td>Report on Reviews of E-learning and E-content Development Frameworks and Case studies</td>
<td>April</td>
</tr>
<tr>
<td>Comparison of the RUFORUM e-content development framework with other frameworks based on lessons learned from case studies around the world.</td>
<td>Final Report on a Bench-Marked E-Content Framework for RUFORUM</td>
<td>April</td>
</tr>
</tbody>
</table>

**Notes:**
1. Effective start date: 1st April 2011 of activities
2. Estimated date of final report: 15th October 2011
## APPENDIX D: BUDGET FOR RESEARCH ON E-CONTENT FRAMEWORK

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>Unit Cost (US$)</th>
<th>Quantity</th>
<th>Total (US$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Developer Interviews</td>
<td>Phone interviews of content developers located outside Kenya</td>
<td>10.00</td>
<td>10</td>
<td>100.00</td>
</tr>
<tr>
<td>Travel to RUFORUM Member Institutions (3)</td>
<td>Cost of local travel to three Kenyan RUFORUM member universities</td>
<td>100.00</td>
<td>3</td>
<td>300.00</td>
</tr>
<tr>
<td>Travel to RUFORUM Secretariat &amp; Makerere University</td>
<td>Visit to RUFORUM Secretariat</td>
<td>200.00</td>
<td>1</td>
<td>200.00</td>
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<tr>
<td>Professional Fees</td>
<td>Consultancy fees (effective days including report writing)</td>
<td>100.00</td>
<td>19</td>
<td>1,900.00</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td></td>
<td><strong>2,500.00</strong></td>
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</tbody>
</table>
APPENDIX E: KEY INFORMANTS

The following list includes all persons who were contacted for information for this report even where the person was unable to provide the information requested.

TABLE 7: LIST OF KEY INFORMANTS

<table>
<thead>
<tr>
<th>No.</th>
<th>Name</th>
<th>Institution</th>
<th>Relevant Position</th>
<th>Contact Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Dr. Elijah Omwenga</td>
<td>Univ. of Nairobi, Kenya</td>
<td>Director ICT Center</td>
<td><a href="mailto:eomwenga@uonbi.ac.ke">eomwenga@uonbi.ac.ke</a></td>
</tr>
<tr>
<td>2</td>
<td>Dr. John Kihoro</td>
<td>Jomo Kenyatta Univ. of Agric. and Techn., Kenya</td>
<td>E-learning Manager</td>
<td><a href="mailto:kihoro_jm@yahoo.com">kihoro_jm@yahoo.com</a></td>
</tr>
<tr>
<td>3</td>
<td>Mr. Tito Okumu</td>
<td>Makere University</td>
<td>E-learning Manager</td>
<td><a href="mailto:tokumu@lace.mak.ac.ug">tokumu@lace.mak.ac.ug</a></td>
</tr>
<tr>
<td>4</td>
<td>Mr. Noel Jambo</td>
<td>Bunda College, Zambia</td>
<td>ICT Manager</td>
<td><a href="mailto:noeljambo@bunda.unima.mw">noeljambo@bunda.unima.mw</a></td>
</tr>
<tr>
<td>5</td>
<td>Dr. Paxton A. Zozie</td>
<td>Mzuzu Univ., Zambia</td>
<td>Deputy Director</td>
<td><a href="mailto:pzozie@gmail.com">pzozie@gmail.com</a></td>
</tr>
<tr>
<td>6</td>
<td>Dr. Justus Ombati</td>
<td>Egerton Univ., Kenya</td>
<td>Chair, E-learning Committee</td>
<td><a href="mailto:jusmotush@yahoo.com">jusmotush@yahoo.com</a></td>
</tr>
<tr>
<td>7</td>
<td>Ms. Regina Mutoko</td>
<td>United States International University, Kenya</td>
<td>ICT Director</td>
<td><a href="mailto:rmutoko@usi.ac.ke">rmutoko@usi.ac.ke</a></td>
</tr>
<tr>
<td>8</td>
<td>Dr. Betty Ogange</td>
<td>Maseno Univ., Kenya</td>
<td>Director, E-learning</td>
<td><a href="mailto:ogange@yahoo.com">ogange@yahoo.com</a></td>
</tr>
<tr>
<td>9</td>
<td>Dr. Speranza Ndege</td>
<td>Kenyatta Univ., Kenya</td>
<td>Institute of Open, Distance &amp; e-Learning</td>
<td><a href="mailto:speranza_ndege@yahoo.com">speranza_ndege@yahoo.com</a></td>
</tr>
<tr>
<td>10</td>
<td>Mr. Wisdom Machacha</td>
<td>Catholic University of Mozambique</td>
<td>Director Centre of Distance Education</td>
<td><a href="mailto:wmachacha@ucm.ac.mz">wmachacha@ucm.ac.mz</a></td>
</tr>
<tr>
<td>11</td>
<td>Ms. Nodumo Dhlamini</td>
<td>RUFORUM Secretariat</td>
<td>Program Manager, ICT</td>
<td><a href="mailto:n.dhlamini@ruforum.org">n.dhlamini@ruforum.org</a></td>
</tr>
<tr>
<td>12</td>
<td>Mr. Nicholas Kimolo</td>
<td>Futuristic</td>
<td>CEO</td>
<td><a href="mailto:nicholas@futuristic.co.ke">nicholas@futuristic.co.ke</a></td>
</tr>
<tr>
<td>13</td>
<td>Mrs. Margret Ngwira</td>
<td>UbuntuNet Alliance</td>
<td>Head of UbuntuNet Alliance Secretariat</td>
<td><a href="mailto:mengwira@kcn.unima.mw">mengwira@kcn.unima.mw</a></td>
</tr>
</tbody>
</table>
APPENDIX G: RUFORUM E-CONTENT TEMPLATE

Name of University and Logo

Name of Department

Course Code

Course Instructor Details: Course Name; Department; Email; Office;

Credit Factor; Lecture Hours; Practical Hours; Tutorials

Course Description

Course Aims

Learning Outcomes

Instruction Methodology

Course Outline

Assessment

Course Evaluation

A course is normally 2 or 3 credit hours. A course outline is made up of different topics. Each topic can have a hierarchy of sub topics. The outline of one topic within a course is as follows:

**Topic Title**

**Learning Objectives**

**Key Terms**

**Introduction to Topic**

- Sub Topic 1
- Sub Topic 2
- Sub Topic 3
- ...
- Sub Topic n

**Learning Activities**

**Summary of Topic**

**Further Reading Materials**

**Useful Links**
APPENDIX H: FAO WORKFLOW FOR DESIGNING & DEVELOPING E-LEARNING RESOURCES

The IMARK workflow for e-learning development

Food and Agriculture Organization of the United Nations (FAO), 2011. E-learning Methodologies
REFERENCES


