Development of Interactive Online Learning Modules: Lessons from Kenyatta University, Kenya

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Abstract
Kenyatta University established the Open and Distance learning (ODL) programme in 2003. At its inception, the programme was reliant on print modules which were distributed to the students enrolled in the programme. In 2014, the university embraced the concept of e-learning and changed the programme’s name to Virtual and Open Learning. Despite the change of name, instructional materials and pedagogical approach have not changed much to reflect this shift. The current print modules have very little interactivity as would be expected of an effective online learning. This may largely be attributed to course facilitators’ lack of capacity to not only develop interactive online modules but also to e-teach. To address this problem, Kenyatta University’s School of Education in collaboration with the Commonwealth of Learning trained three academic staff from each of its seven departments on development of interactive modules from 26th October, 2015 to 6th November, 2015. After the training, the members formed departmental teams of two staff and were able to convert the soft copies of selected print modules into interactive modules. The trained academic staff are expected to cascade the skills acquired to the untrained counterparts in the university. Despite the challenges faced in the development of interactive modules, there are important lessons that are worth sharing. Firstly, the benefits realised during the capacity building and development of the modules far outweigh the challenges. Secondly, management involvement and support must be at the centre of the process for it to succeed. Thirdly, ICT technical support and team work are necessary. Lastly, technology is constantly evolving hence there is need for continuous retooling of online facilitators for best practices in developing online modules. These lessons may inform other institutions of higher learning desirous of making their online programmes more supportive, collaborative and effective.

Keywords: online learning, interactive modules, interactivity

Introduction and Literature Review
Over the last few decades, there has been an increase in online learning programmes in most Universities in Kenya. This has largely been due to increased demand for university education, continued skills upgrading and retraining as well as the flexibility of the programmes (Nyerere, Gravenir & Mse, 2012). Kenyatta University (KU) established its Open and Distance learning (ODL) programme in 2003. At its inception, the programme was and still is a blend of face-to-face learning and online reading of print modules that are uploaded on the University moodle platform.

In 2014, the University embraced the concept of e-learning. Consequently, the ODL programme’s name was changed to Virtual and Open Learning and put under the Digital School of Virtual and Open Learning (DSVOL). Currently, there are about 4,000 students enrolled in various programmes in DSVOL out of the total student population of about 70,000. Out of around 1,500 lecturers in the University, about 400 (27%) facilitate the 1,200 course units being offered in the programme. In order to motivate the learners under the DSVOL programme, KU issued tablets with the necessary content to all the registered students beginning with first year students of Year 2014/2015. Despite the change of name from ODL to DSVOL and use of tablets, the instructional materials and pedagogical approach did not change to reflect this shift. As in many other universities in Kenya, almost all the modules uploaded on the university’s moodle platform and in the tablets for the DSVOL programme were and still are soft copies of the print modules with very little interactivity as would be expected in effective online learning (Makokha & Mutisya, 2016).
Interactive modules refer to online modules whose design and purpose is to actively engage learners to search for and share knowledge, ideas and open educational resources with other learners as they also benefit from feedback about their learning from performance in certain activities as well as from their facilitators. Interactivity therefore refers to the resultant learning relationship, process and activities (Stout, Villegas & Kim, 2001). This may involve learners comparing ideas via live chats, google sheets, google groups and wiki spaces, sharing and following a hyperlink to some extra digital content, supplementing their content with more interesting content supported by videos, animations and simulations as well as instant feedback on learning through the use of incorporated self-scoring online tools such as flubaroo for quizzes. According to Murphy and Cifuentes (2001), this interactivity helps in creating a sense of presence and community that is very vital for online learners. A lot of literature supports the fact that a change from the traditional face to face learning to an effective online learning programme should be supported by a corresponding training of staff in design of online teaching materials as well as online pedagogical skills (Brown & Volts, 2005; Mpofo et al., 2012; Nyerere, Gravenir & Mse, 2012). The online learning materials should be interactive in order to realise enhanced learner support, continuous feedback and acquisition of 21st Century skills such as collaboration among students, problem-solving and knowledge creation (Bachner, 2014). Similarly, UNESCO (2011) recognizes the need for learners to interact, collaborate and create knowledge that will help in creation of harmonious, fulfilling and prosperous societies. Hart (2013) also asserts that effective online learning experiences should not be driven by content alone but rather complemented by resources, activities and pedagogy that allows for exchange of ideas, knowledge and resources.

This lack of paradigm shift in KU may largely be attributed to the teaching staff’s lack of skills in online pedagogy (Commonwealth of Learning, 2004) as well as lack of skills to develop e-content (Tarus, Gichoya & Muumbo, 2015). A study by Nyerere, Gravenir, and Mse (2012) on the state of online learning programmes in Kenyan universities established that most (68%) of the e-learning facilitators had not been trained on the necessary pedagogical skills as well as design of effective online learning materials. The facilitators are therefore forced to use learning materials meant for the residential model of study that may not be suitable for online learners. Due to inadequate capacity by the facilitators to develop interactive modules and e-teach, the pedagogical approach has mainly been teacher-centred instead of student –centred. Learner support in terms of access to additional online resources such as videos, simulations and hyperlinked e-books and articles has been inadequate. The learners have also not been benefitting adequately from facilitators’ feedback on many aspects of learning as is required of an online learning programme. There has also been inadequate interaction and collaboration among online learners in their search for knowledge. Learners’ acquisition of 21st Century skills may also have been hampered. Rotherham and Willingham (2010) opine that 21st Century skills such as critical thinking, problem solving, collaboration and global awareness are important for learners because their success collective or individual depends on it. They therefore argue that learning experiences must be deliberate about how to achieve these skills. Due to these limitations of the DSVOL programme, there has been reduced learning outcomes and a general dissatisfaction with the programme.

It is against this background that KU School of Education in collaboration with Commonwealth of Learning (CoL) jointly undertook a two weeks project from 26th October, 2015 to 6th November, 2015 on ‘Integration of ICT in teaching and learning’. The project was financed by CoL and had two components: (i) Capacity building workshops; (ii) Development of interactive modules. In this paper, we outline the process of capacity building, the development of interactive modules, the results, the challenges encountered, as well as the lessons learnt. It is hoped that other institutions of higher learning offering e-learning in Kenya as well as in other countries will find the lessons useful as they make their e-learning materials more interactive. We acknowledge that in addition to lack of interactive modules, other factors such as lack of technical support and learner characteristics may affect e-learning outcomes. It is our contention however that ability to develop and use interactive modules will make learning more learner-friendly, flexible and more engaging as learners interact and collaborate in their search for knowledge. This will help in achievement of the intended learning outcomes as well as acquisition of 21st Century skills so needed by learners to succeed in the world today.

**The Process of Capacity Building**

Two workshops each lasting a week were held at Kenyatta University from 26th October, 2015 to 6th November, 2015. The workshops’ facilitator was Ms Omashani Naidoo who was appointed by CoL from SchoolNet, South Africa. The first training workshop was attended by 27 participants. Each of the seven academic departments from the School of Education was represented by three academic staff making a total of 21. In addition, there was one representative each from DSVOL, the Directorate of e-learning, a lead project coordinator (Dean, School of Education) and 2 assistant coordinators. Gender distribution of the participants was equitable with 14 (51.9%) males and 13 (48.1%) females.
The objectives of the first workshop were to:

i. Learn new ways of using ICT in teaching and learning.
ii. Gain knowledge and skills in identifying relevant online apps for educational use.
iii. Learn techniques for designing interactive online modules.
iv. Acquire hands-on experiences in use of ICT focusing on engaging outcomes.
v. Enhance collaborative work among staff in designing interactive e-learning modules.
vi. Create departmental ICT integration champions to support online learning in the School.

To achieve the first objective, participants were taken through a brainstorming session in which they were supposed to take stock of available ICT resources at their disposal and discuss how such resources could be used in teaching and learning. The outcome of the brainstorming session was a realization that the various ICT resources at their disposal such as smartphones, tablets and computers could be used for teaching and learning. The online forums at their disposal such as WhatsApp groups, google groups and even Facebook could also be used.

To achieve the second objective, the participants were trained on how to find and evaluate online educational resources such as Vimeo, Teacher Tube, TED Ed, Pro Teachers Video, Academic Earth, and Education World among others. The criteria taught for identifying the source to use included relevance, clarity, appropriate length, subject and quality of presentation among others. Participants were also trained on how to share links to web pages or ideas one to one with colleagues, as a group on campus and with unknown global peers through cloud storage (drop box). This was followed by a practical lesson where the participants in groups of three, selected an educational resource from amongst the ones mentioned by the trainer and evaluated it against the criteria given above. The outcome was the knowledge that there exists online educational resources that can support learning and enhance learning outcomes.

The third objective was to learn techniques for designing interactive online modules. To achieve this objective, participants were trained on the use of various online tools such as creating and uploading videos into YouTube, searching for relevant videos and use of hyperlinks to videos and other online resources. Also taught was the use of Google Earth for visual representations in subjects like Geography, simulations, photographs, and use of skype video calls to experts to enrich content and how to chunk excess information in a module by hyperlinking it to a google document where learners can click and get the details. Participants were also trained on how to incorporate the use of google sheets, google groups and wiki spaces to enable learners interact and collaborate through discussions in their search for knowledge. The same could also be used for self-assessment by learners and for feedback by both facilitators and learners. The outcome of this training was an excited, knowledgeable and resourceful group of facilitators. The participants were excited about the new skills they had learnt on how to integrate ICT in teaching and learning. Many were surprised that many of the social media applications they had been using only for social interactions could be exploited for educational purposes.

The second workshop was built on the first one. A total of 19 participants attended. Each of the seven departments from the KU School of Education was represented by two academic staff members making a total of 14. There was one representative each from DSVOL, the Directorate of e-learning, a lead project coordinator (Dean, School of Education) and two assistant coordinators. There were 11(57.9%) female participants and 8(42.1%) male participants. The workshop’s main objective was to equip participants with practical skills to enable them produce interactive e-learning modules. It therefore involved putting into practice what had been learnt in the first workshop. The fourth, fifth and sixth objectives were therefore achieved during this workshop. The fourth objective sought to assist the participants acquire hands-on experiences in use of ICT focusing on engaging outcomes. This objective was closely tied to the fifth one that sought to enhance collaborative work among staff in designing interactive e-learning modules. To achieve these two objectives, the participants were divided into seven groups of two participants based on the seven departments from the KU School of Education. Using the knowledge and skills imparted during the first workshop, the participants spent time practising various ICT techniques and tools. A dummy module was used to practice how to develop an interactive module. After incorporating the various learner activities and learning resources taught in the first workshop, each team presented their work in PowerPoint to others for evaluation as the CoL trainer gave constructive feedback that the participants used to make the modules better.

Development of Interactive Modules
After capacity building, the second phase of the project involved the actual development of interactive modules. Each department represented in the second workshop was supposed to review an existing module and make it interactive by end of December, 2015. Although Ms Omashani Naidoo, the facilitator hired by CoL from SchoolNet, South Africa, left after the second workshop, she continued to give technical advice and feedback to
the module writers. Each group sent the first two topics of their interactive module to her for guidance and correction. The feedback and guidance given helped them to develop the remaining topics. The University technical support bench was also represented and therefore provided support whenever called upon. Regular meetings of the module developers sustained the momentum. There were constant consultations amongst the module writers especially on the use of some of the online resources perceived to be difficult to use. Some seven interactive modules were developed, one from each of the seven academic departments from the KU School of Education. The completed interactive modules were sent to Ms Omashani Naidoo in February, 2016 to ensure compliance with best practices in terms of interactivity. She was also supposed to select the best modules so that its developers could participate in the final stage of the process that involved editing and reviewing all the modules. Two module developers and one assistant coordinator plus the Dean, School of Education did the final editing and reviewing of all the interactive modules in two months.

The results of this exercise were seven interactive modules developed and uploaded into the University’s e-learning moodle platform as well as shared with CoL (see Table 1)

Table 1: Kenyatta University-CoL Project Interactive Modules

<table>
<thead>
<tr>
<th>TITLE OF MODULE</th>
<th>DEPARTMENT</th>
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<tbody>
<tr>
<td>EPS100: Introduction to Psychology</td>
<td>Educational Psychology</td>
</tr>
<tr>
<td>EMP401: Educational Administration</td>
<td>Educational Management</td>
</tr>
<tr>
<td>ISC404: Digital Libraries</td>
<td>Library &amp; information science</td>
</tr>
<tr>
<td>ESN100: Name Development of Special Needs Education</td>
<td>Special Needs Education</td>
</tr>
<tr>
<td>ECE204: Introduction to Art and Craft Activities for Young Children</td>
<td>Early Childhood Studies</td>
</tr>
<tr>
<td>EFN204: Sociology of Education</td>
<td>Educational Foundations</td>
</tr>
<tr>
<td>UCU100: Communication Skills</td>
<td>Educational Communication &amp; Technology</td>
</tr>
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The other notable result was demonstrable staff confidence, competence and capacity to use ICT due to ICT retooling and practical lessons. There was creation of a team of champions in writing of interactive modules from each of the seven departments in the KU School of Education. These ICT champions as they are dubbed are supposed to cascade the skills learnt to other staff in their departments to enable them acquire skills to develop interactive modules in their areas of expertise. Finally, the participants developed a new zeal and commitment to develop more interactive modules and support online learners in their search for knowledge. The evaluation tool administered after writing of the interactive modules attest to these results as shown in Table 2. Participants were required to evaluate the training process by giving their perceptions on various aspects on a 4 point Likert scale (1 representing the lowest and 4 the highest). The following were their responses condensed into four key aspects.

Table 2: Participants’ Evaluation of the Training Workshop

<table>
<thead>
<tr>
<th>Statement</th>
<th>Mean</th>
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<tbody>
<tr>
<td>1. The usefulness of the content covered</td>
<td>3.9</td>
</tr>
<tr>
<td>2. The hands-on skills acquired</td>
<td>3.8</td>
</tr>
<tr>
<td>3. The presenters knowledge of subject matter</td>
<td>3.9</td>
</tr>
<tr>
<td>4. The presenters style of teaching</td>
<td>3.8</td>
</tr>
</tbody>
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Table 2 reveals that the participants’ ratings of those 4 aspects were very high. The participants were also asked to rate the impact of training on them on a number of aspects. The responses condensed into three key aspects were on a 5 point Likert scale (1 not good; 5 excellent) are shown in Table 3.

Table 3: Participants’ Rating of Impact of Training

<table>
<thead>
<tr>
<th>Statement</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Rating of change in skills for integrating ICT in the design of e-modules as a result of the 2nd workshop</td>
<td>3.5</td>
</tr>
<tr>
<td>2. Rating the increase in knowledge and skills to articulate learning objectives/outcomes, develop relevant online learning activities and assessments</td>
<td>3.8</td>
</tr>
<tr>
<td>3. Rating how 2nd workshop has strengthened participants capability to train other colleagues in designing e-modules</td>
<td>4.1</td>
</tr>
</tbody>
</table>
From Table 3, it is clear that the participants gave a high rating on the impact of the workshop on their skills and capabilities. The following is a summary of what the participants liked best/found most useful;

i. Applying the skills learnt in making a module interactive
ii. Being able to integrate multimedia in a module
iii. The practical aspect of module review and making it interactive.
iv. Coming up with module writing and reviewing rubrics
v. Learning how and where to source for multi-media for educational purposes

The challenges faced in development of interactive modules

These challenges can be clustered into three though some overlap. These are; individual, institutional, and technical. Individual challenges included an initial ambivalent attitude towards training especially because it came at a busy time in the University calendar. Most of the staff selected for training were teaching big classes as well as undertaking other duties. Others had attended ICT trainings before and so did not feel that they needed the training. In addition, others were PhD students busy preparing for final defences of their theses and therefore felt overwhelmed by the prospect of a week-long compulsory training workshop. Additionally, some of the original print module writers were not among those selected for training and module review. They therefore felt like their work was being tampered with or even diluted by the interactive module developers. This demoralized some module developers. Two of the print modules originally selected for review, had to be replaced with others later because they were technical and not in the area of expertise of those picked for training. During modules development, some of the participants were not happy with the consultants’ feedback concerning their module review. They felt that she was too critical of their efforts and this demoralized them. Due to lack of constant practice, some online resources such as use of flubaroo for designing online quizzes proved difficult to use. During the final stage of editing the reviewed modules, some original module writers did not like the changes to their modules especially due to chunking even though no content had been lost.

Institutional challenges included the KU policy that restricts access to You-tube during learning hours. This meant that even the participants could not access some You-tube videos that they needed for development of interactive modules. There was also a challenge in the University email settings in terms of what information and learning materials and exercises could be shared outside the university. Due to the restrictions, participants had to use their personal emails. The greatest challenge was limited time because the training workshops and the actual modules development, writing, editing and review came during the busiest semester at the University.

Technical challenges included internet connectivity which was not very reliable. The training workshops and actual development of interactive modules required internet connectivity which kept going on and off. The CoL consultant and the participants had to occasionally use their cell phone wifi hotspots. Development of the final interactive modules was also dependent on the unreliable internet in terms of uploading and access to the various activities therein. Some features got distorted during uploading and some videos and graphics failed to load. Some online resources were not trustworthy while others kept dying off. Another challenge was how to successfully chunk the excess content in the original print modules without losing the vital details. For instance, one module initially had 168 pages but was eventually reduced to 68 pages through chunking and hyperlinking the information to google documents.

Lessons learnt

Despite the challenges faced, the following lessons were learnt. That;

i. The benefits realised during the capacity building and development of the modules far outweigh the challenges experienced.
ii. Technology is constantly evolving. There is need therefore for continuous retooling for best practices in online learning. If online facilitators are trained, encouraged, and motivated, they can design and use interactive online learning resources effectively for the benefit of learners. Competence in ICT enhances confidence, motivation and zeal to develop and use online learning materials effectively. This knowledge can be cascaded to others to ensure that effective interactive online resources are created and reviewed regularly for relevance.
iii. Management involvement and support should be at the heart of online learning for it to succeed. Enough resources both financial and human should be set aside regularly for improving the online learning programmes. With proper training and management support, modules in the university can be made interactive for the benefit of online learners. Management support in terms of financial resources, reliable internet connectivity, relief from classes, prioritizing online learning and general guidance is very necessary in order to sustain an online learning programme.
iv. An ICT technical support office is necessary to continuously work with online course content developers and provide assistance whenever necessary.
v. It takes time, effort and commitment to create effective interactive modules. This would be better achieved when the university is at a low peak season in terms of teaching and other duties so that facilitators do not feel overwhelmed by activities or outside the university environment to allow for maximum concentration.

vi. Team work approach helps because there is need to maintain the momentum and keep learning from each other.

vii. Online facilitators must be assisted to have good ICT skills to help them communicate at a distance using technology. This support can come from their institutions or from agencies and organisations partnering with their institutions as demonstrated by the joint KU-CoL partnership.

viii. It would help a lot if the original print module writers (if still within the university) are involved in the process so that they can review their modules and therefore own the process.

In conclusion, the results of this capacity building process are encouraging and worth the effort. The experience has positively impacted on the facilitators’ professional development and given them more knowledge, skills and confidence to effectively integrate ICT in online teaching and learning. As a way forward, the process should be replicated in other Schools within the university. Training workshops should be organised so that the knowledge and skills acquired by the ICT champions can be cascaded to other online facilitators. This will ensure that all Schools in KU have interactive modules. Another important undertaking should be the monitoring and evaluation of the use of the interactive modules. This would give the university a basis upon which to review the existing online modules. All this will go a long way in ensuring that online modules being used in the university are interactive, supportive, collaborative and therefore effective in meeting learning goals.

References


