Online Courseware Development in Public Universities in Uganda: The Precepts of Active, Passive and Exclusive Participation

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Abstract. Irrespective of the maturity or infancy of e-learning adoption in a university, the academic staff always have varying levels of commitment to online courseware development and delivery. Some will be actively engaged, some will be passively involved while others will remain ignorant about online courses' issues. This paper investigates trends in online courseware development in Uganda and classifies emerging participation levels into three, namely active, passive and exclusive engagement. The latter clustering followed a survey of 120 academic staff from six public universities in Uganda, with general findings indicating low participation of instructors in courseware development. For instance, whereas 60% of the respondents had been trained in the use of authoring tools, only about a half of them had continued to use these tools for courseware development. Essentially, the survey revealed that the variation in courseware development engagement is caused by both the individual and institutional strengths (active case) and weaknesses (passive and exclusive scenarios). As such, institutional support strategies for improvement in courseware development for each of these three categories are explored and discussed. Future researchers are encouraged to test the developed institutional support strategies in their e-learning or blended learning practice.

Keywords: E-learning · Blended learning · Courseware development · University education

1 Introduction

Electronic courseware development and delivery has become a prominent educational reform practice in university education. This has taken different forms including: the use of presentations (PowerPoint, video lessons and animated lessons); the use of learning management systems (e.g. Moodle, Edmodo, itslearning, Blackboard, WebCT, etc.); and more recently, the use of massive open online courses platforms

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(e.g. Coursera, edX, Udacity, etc.). While these developments are driven by the increasing use ICTs in education, academics still face challenges in acquiring and mastering information technology skills for the purposes of teaching. In this paper, we investigate these challenges and provide strategies for improvement that caters for the varying individual and institutional readiness levels in online courseware development.

Courseware development and delivery through a learning management system (LMS) is viewed as the basic requirement for teaching and learning in the 21st century universities [2, 16, 18]. As university education transitions to online and blended teaching modes, there is much discussion and pessimism of the capacity of universities in the developing countries to cope [4, 19]. Achieving this transition is particularly difficult because the traditional face-to-face contact mode cannot easily be adapted to online contexts without sufficient investment in ICT resources and competency of the instructors. This paper further examines the individual and institutional support strategies aligned with the real-life scenarios of active, passive and exclusive participation in online courseware development.

As a means of meeting the increasing demand for higher education and enroll more students, public universities in Uganda are encouraged to change the method of delivery of content from the traditional face-to-face (F2F) to online course delivery [6, 7]. Online course delivery as part of e-learning involves the use of computer networks to support teaching and learning remotely. Aside from the high demand for university education that can be met through e-learning, this mode of pedagogy is considered beneficial to higher education for a number of reasons including:

- Empowering institutions to flexibly support student learning without restriction of time, space and enrolment numbers [2].
- Supporting individual learner differences, allowing students to study at their pace and priorities [11, 12, 15].
- Compensating for scarcities of resources (e.g., human, lecture space, etc.) in traditional settings [8, 19].
- Building horizontal relationships amongst learners through discussion forums and vertical relationship with lecturers through online facilitation [20].
- Creating rapid and inexpensive distribution channels of educational courseware and knowledge within and outside national boundaries [1, 9].
- Improving the quality of teaching and learning as it complements the face-to-face teaching approaches [2, 15].

In contrast, online courseware development is affected by several factors that should holistically be managed for its successful utilization. These factors include: varied instructor readiness, institutional support challenges, technology accessibility issues, course content quality benchmarks, varied levels of demand for online courses by students and the society, and pedagogical changes in online delivery. Related research within East African countries have found some of these factors to be more profound. For instance, [10, 15], in their studies on the status and challenges of e-learning in Kenya, reveal that ICT infrastructure and technical competency are most significant challenges to e-learning adoption in Kenya. The same challenges with addition of staff and student attitude are reported in the Ugandan case study involving

leading universities in e-learning adoption [5, 13]. The Tanzanian case is not any different as research finding indicate similar challenges of human resource capacity, infrastructural capacity and technology use capacity [3, 4, 19].

Whereas universities continue to engage in courseware development in order to create their own online learning resources for their students, the level of participation by staff varies significantly as already highlighted. This variation including lack of participation in courseware development forms the central thesis of this paper and hence clustered as active, passive and excluded courseware developers' continuum. In the subsequent sections of this paper, we further explore the latter typology.

1.1 The Problem

Online courseware development is a laborious, knowledge intensive, technology driven and costly process. It is capable of high returns on investment when tied to a business model and can also become a waste of money, intellectual energy and valuable time when un-strategically managed. In the context of the public universities in Uganda, there are a number of positive trends such as the existence of functional LMSs, improving technical competency and percentages of staff trained in courseware development. Despite these positive trends, the existing volume and quality of courseware developed is still low [5, 6]. Moreover, most of the courses with online presence are in the engineering and related fields where information technology competency is highest [13]. A number of the universities with functional LMSs do not have any courses in the Arts and Humanities fields. Furthermore, evidence of staff trained in online courseware development but have never hosted any course in an LMS are the norm rather than the exception. These realities point to the need to cluster courseware developers according to their levels of activeness and design appropriate strategies for support as addressed in this paper.

1.2 Objective

This research sought to investigate the state of online courseware development in public universities in Uganda in order to identify gaps and develop strategies for improvement. In pursuing this aim, a two sequence research strategy was followed. Firstly, inclusivity and/or exclusivity in online courseware development was investigated at university level. This was connected to the second sequence where inclusivity was further probed at individual/instructor level to reveal activeness or passiveness in online courseware development. The strategy implied here is reflected in Fig. 1 in the next section.

2 Courseware Development Participation Indicators

The level of participation in courseware development in this research was investigated in the context of institutional initiatives and individual effort. The institutional initiatives include: hosting the preferred LMS; creating and facilitating a technical support unit for the LMS and other courseware development issues; training of staff on the use

of LMS and course authoring tools; providing on-campus internet access through local area network (LAN) and/or wireless (Wi-Fi) points; supporting off-campus internet access through prepaid internet modems; development and implementation of online/blended learning policy; and provision of computers (desktop or laptop) for staff.

Similarly, individual/instructor initiatives in online courseware development include: gaining skills on the use of LMS and course authoring tools; delivering at least one course on the institutional/university LMS; sharing content developed through an online space; seeking support from the university's technical team; and collaborating with peers on online courses development. Figure 1 therefore shows how institutional and individual initiatives are responsible for active or passive engagement in courseware development.

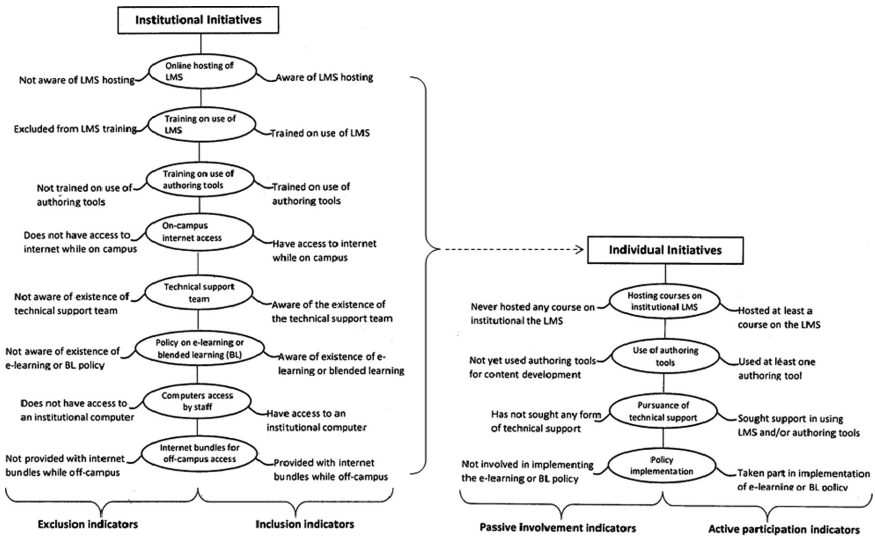

Fig. 1. Institutional and individual indicators of courseware development

The indicators of courseware development in Fig. 1, further guided the design of the data collection instrument as presented in the next section.

3 Methodology

3.1 Location of the Study

The study was carried out as part of the project title "Training for sustainable spatially enabled e-services in Uganda," under the objective "to increase on the number of e-learning researchers and managers in Public universities in Uganda." As such, the study sample was derived from academic staff of public universities in Uganda that have been

in existence for over five years. Six public universities suited this criterion including, Makerere University, Gulu University, Kyambogo University, Makerere University Business School (MUBS), Busitema University and Mbarara University of Science and Technology (MUST).

3.2 Study Population, Validity and Reliability

A cross-sectional survey was used in this study. The survey focused on three related areas, namely, online courseware development, online course facilitation and online course management. An estimated number of academic staff in the aforementioned public universities was 4221. Using [7]'s sample determination table, a sample size of 351 respondents was targeted. However, 120 valid questionnaire responses were returned representing a response rate of 34%. The reason for this low response rate was due to the delay in validating the questionnaire and subsequently end of semester II examinations for 2016/2017 academic year coincided with the actual survey. The returned questionnaires were checked for completeness and accuracy. The data was analyzed using SPSS to generate the descriptive and inferential statistics.

Prior to the actual survey, validity of the questionnaire was established by engaging one expert in e-learning from each of the participating university. These experts examined the questionnaire against four criteria as outlined by [14]:

- Whether the questionnaire measured what it intended to measure;
- Whether the questionnaire represented the desired content;
- Whether the questionnaire was appropriate for the target population; and
- Whether the questionnaire was comprehensive enough to collect all the information needed to address the purpose and goals of the study.

Following successful validation of the questionnaire, a pilot test was carried out and reliability coefficient (alpha) of 0.89 obtained for the section of questionnaire on online courseware development issues in Ugandan public universities.

3.3 Study Sample

The sample comprised of 120 academic staff distributed as 40% (48) from Gulu University, 18% (22) from Kyambogo University, 11% (13) from MUBS, 11% (13) from Busitema University, 10% (12) from MUST and 10% (12) from Makerere University. The variation of responses was due to the timing of data collection whereby the participating universities were at various stages of administering end of semester II examinations for 2016/2017 academic year. The departments from which the respondents were drawn are shown in Fig. 2.

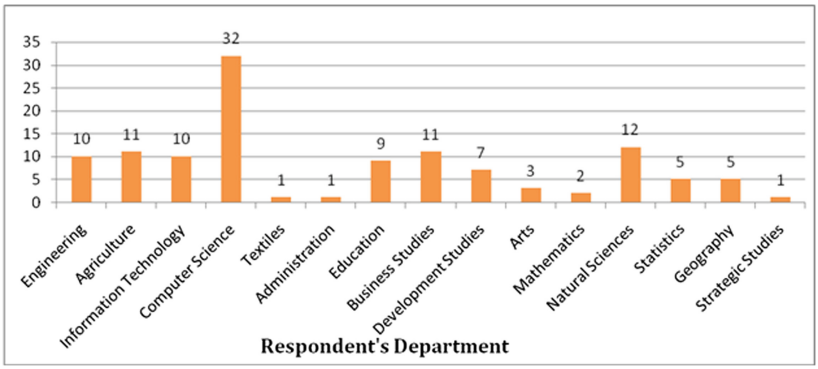

Fig. 2. Distribution of respondents by department

Other respondents' details on age group, gender, tenure are given in Table 1.

Table 1. Background characteristics of the respondents

Item	Category	Frequency	Percent
Respondents' age group	Up to 30	30	25.0
	31 to 35	23	19.2
	36 to 40	31	25.8
	41 to 45	15	12.5
	46 to 50	11	9.2
	Above 50	10	8.3
Gender of the respondents	Female	35	29.2
	Male	85	70.8
Academic rank of the respondents	Teaching assistant	21	17.5
	Assistant lecturer	25	20.8
	Lecturer	53	44.2
	Senior lecturer	19	15.8
	Associate professor	1	0.8
	Professor	1	0.8

Since this paper is particularly informed by the section on online courseware development in the survey, the level of participation in online courseware development was determined by the indicators in Fig. 1 based on institutional and individual factors.

4 Results and Discussion

The results are presented in the context of participation levels categorized as active, passive and exclusive engagement in online courseware development. The typology (active, passive, and excluded developers) represent real-life scenarios in courseware development and therefore worthy of in-depth analysis.

4.1 The Context of Active, Passive and Exclusive Participation

The context of active, passive and excluded courseware developers was informed by the results of the survey based on the institutional and individual factors as highlighted in the previous section. An in-depth contextual analysis based on institutional provisions for online courseware development is given in Table 2. From the institutional perspective, the active and passive participation is not important but rather inclusion and exclusion in institutional initiatives for improving online courseware development, as depicted in Table 2.

Table 2. Institutional initiatives for inclusive and exclusive participation in online courseware development

Institutional initiative	Inclusive context	Exclusive context
Online hosting of LMS	52% (62) respondents agreed that an institutional LMS was installed and hosted online. The actual LMS varied from Moodle, Edmodo, itslearning, WebCT to the one for Mbarara University (MUST-LMS)	48% (58) were not sure of LMS installation and hosting
Training on use of LMS	38% (46) had basic training in the respective LMS. Another 8 staff (7%) trained themselves on the use of LMS	57% (68) never participated in any LMS training
Training on use of authoring tools	60% (72) had training on use of authoring tools. This percentage includes those trained through institutional arrangements and others who learnt on their own. The authoring tools identified include: MS PowerPoint, eXe, Adobe Presenter, EasyProf, FlashPoint and Elucidat	40% (48) were ignorant about authoring tools and had never received training on their use
Provision of on-campus internet access	77% (92) could access internet on campus. There were general complaints of slow connectivity during peak hours (mid-morning to afternoon – 10:00 am to 4:00 pm)	23% (28) did not have access to internet while on campus

(*continued*)

Table 2. (*continued*)

Institutional initiative	Inclusive context	Exclusive context
Provision of off-campus internet access through prepaid internet bundles	100% not applicable response was recorded. Some of the respondents indicated that this is an unrealistic dream. Others provided resentful comments such as "only possible when university top management becomes: *.com*, *digital not analogue*, and *honest with ICT budgeting"*	
Existence of technical support team	46% (55) agreed that a technical support team exists. Some of the respondents further emphasized that the support team is centralised and easily accessible by staff of different units	54% (65) were either not sure of their existence or affirmed their non-existence
Existence of policy on e-learning or blended learning	20% (24) confirmed existence of guiding policy for e-learning or blended learning	80% (96) were not aware of the existence of such policy
Provision of computers for staff	18% (21) have access to a university's desktop or laptop computer. However, 74% (89) own laptops which they use for personal and university work	82% (99) do not have access to a university computer

Further analysis of the inclusive context was needed to discover the level of participation in online courseware development in terms active or passive engagement. To achieve this, the survey sought to investigate the level of individual participation by examining four constructs: actual use of the institutional LMS; actual use of course authoring tools; pursuance of technical support in using LMS and/or authoring tools; and engagement in e-learning/blended learning policy implementation. The results of this investigation are presented in Table 3 based on the corresponding sample sizes from the inclusive context in Table 2. For this reason, the respective sample sizes are indicated in Table 3.

Arising from the results in Table 3, we can safely suggest that measurement of the level of instructors' personal effort in courseware development can be determine by three constructs: actual use of the institutional LMS to host courses; actual use of course authoring tools to develop content; and pursuance of technical support in using LMS and/or authoring tools. The fourth construct on the level of engagement in e-learning/blended learning policy implementation, does not have definite boundaries and therefore not significant in establishing instructors' personal effort in courseware development.

Having discussed results of inclusivity and exclusivity in courseware development at institutional/university level as well as through instructors' efforts, the next section examines how instructors should be supported by their universities to become proactive courseware developers.

Table 3. Individual initiatives for active and passive participation in courseware development

Individual initiative	Active participation indicators	Passive participation indicators
Use of institutional LMS (n = 62)	53% (33) had hosted a course on the existing LMS. The 33 includes 25 out of 46 who were trained in existing LMS and 8 who learnt LMS by themselves. Further analysis on the extent of use of personal internet data for an online course activity while off-campus revealed that 14 out of 33 (42%) were involved	47% (29) were trained but never used the existing LMS on their own
Use of course authoring tools for content development (n = 72)	54% (39) used at least one course authoring tool for content development	46% (33) had not used these tools despite having undertaken basic training
Pursuance of technical support (n = 55)	42% (23) had sought support in using LMS and/or authoring tools	58% (32) had not sought any form of technical support in relation to courseware development
Engagement in e-learning/blended learning policy implementation (n = 24)	All the 24 (100%) indicated that they were not engaged in e-learning/blended learning policy implementation. Some supported this position with claims that the policies were either externally sourced through consultancy or merely drafted under donor funded projects for accountability but without involvement of the potential instructors	

4.2 Institutional Strategies for Improvement of Online Courseware Development

The low/no adoption of e-learning is directly linked to the level of scarcity of online courseware managed by the respective university. While the results of this study indicate that majority of the academic staff are either not engaged in online courseware development (excluded) or are at least passively involved, the ultimate goal is ensuring active participation in courseware development. This section therefore, presents a generic strategy for sustaining active online courseware development through institutional initiatives that uniquely support each category of developers (active, passive or excluded). Figure 3 represents this strategy as informed by the research results, e.g., the ratio of instructors engaged in courseware development decreases from the excluded category towards the active category. It (Fig. 3) depicts the relative distribution of staff by their prominence in online courseware development. Institutional initiatives are indicated in circles and aligned with corresponding context of courseware developers.

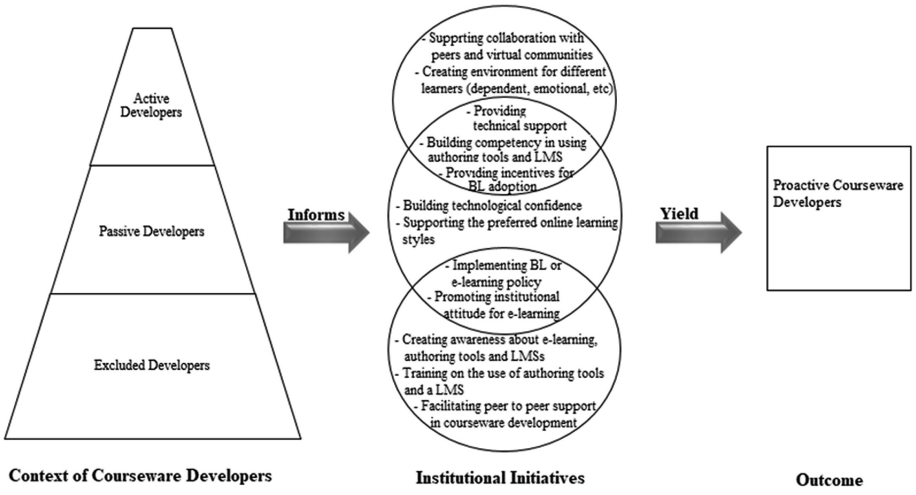

Fig. 3. Institutional strategies for attainment of proactive online courseware developers

Cross-cutting initiatives such as access to computers and provision of internet have been ignored in Fig. 3. The intersections of circles in Fig. 3 depict initiatives that are relevant to the interfacing categories. For instance the interface between active and passive developers reflects a real-life scenario where the referred active developer at the lower end of this continuum needs equal support as the developers with passive characteristics.

5 Conclusion

Online courseware development and delivery stems from instructors mastering content design techniques and delivery strategies that promote student-to-student interaction with minimal instructor intervention. Its success in turn depends on the university's commitment to technical and financial support for instructors. In the context of Uganda and emerging from this study, online courseware development has remained generally low despite evidence of mastery of content design techniques. Indeed 60% of the respondents in this study had been trained in the use of authoring tools and yet only about half of those trained had continued to use these tools to develop their content. This and related findings as presented in this paper confirmed the claim that irrespective of the maturity or infancy of e-learning adoption in a university, the academic staff will have varying levels of commitment to electronic courseware development and delivery. This research further contends that effective improvement strategies in courseware development by instructors are those that are unique to participation levels of the instructors, i.e., the active, passive and excluded instructors' clusters of courseware developers should be supported differently. This unique intervention strategy as articulated in Fig. 2, depicts the role of universities in supporting their instructors to

become proactive courseware developers. Future researchers are therefore encouraged to test the developed institutional support strategies in their e-learning or blended learning practice.

This study also confirms the previous findings that the engineering and other sciences fields are more prominent in e-learning adoption than the Arts and Humanities fields [13, 17]. For instance, while 72 instructors had under gone training on the use of authoring tools and 39 had actually used the authoring tools, only 5 out of 39 (13%) were from the Arts and Humanities fields. This notable finding suggests that passivity in online courseware development is more significant among the Arts and Humanities instructors than those from engineering and other sciences fields. As such, there is a need for further investigation into the causes of variation in e-learning adoption by the different professionals in higher education. At the same time, qualitative studies that document best practices by the prominent online courseware developers especially in Africa would inform future adoption in related contexts.

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