

Cover page

Title: Digital Learning Management Systems in Africa: rhetoric and reality

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Digital Learning Management Systems in Africa: rhetoric and reality

Abstract

This paper reports on a survey of 358 respondents across 25 African countries into their usage of learning management systems. It concludes that while there are some enthusiastic advocates of such systems, the reality is that most African educators as yet have little knowledge about, or interest in, their usage. There remain very considerable infrastructural constraints to be overcome before they can be widely adopted for open and distance learning across the continent, and there is still reluctance in many institutions to develop systems that can enable learning resources to be made available in this way. This does not mean that the potential of high quality digital learning management systems should be ignored in Africa, but rather that much more sustained work needs to be done in human capacity development and infrastructural provision if African learners are truly to benefit from the interactive learning experiences that such systems can deliver.

1. Context

This paper explores the use of Learning Management Systems (LMSs), also widely known as Virtual Learning Environments (VLEs), in African education systems. Many definitions of LMSs exist (see for example Morgan, 2003; Paulsen, 2003; Eaves *et al.*, 2007; Weller, 2007), but for the purposes of this paper they are defined 'as a software application or web-based technology that is used to plan, deliver or access a particular learning process'. Other terms used to describe them include Content Management System, Course Management Systems (especially in the USA; see Morgan, 2003), Learning Platform, and Learning Content Management System. Two important observations can be made about the focus of this enquiry: it is concerned with *integrated software packages*, and not just the use of the Web or e-mails for

learning/teaching purposes; and it is also interested in a *diversity of learning environments*, including those to be found in businesses, governments and civil society offices, as well as schools and universities.

Comprehensive LMSs are an important means through which distance based learning is now delivered, but they are also central to the blended learning solutions now adopted in many education systems, whereby learners can access a range of materials electronically to supplement more traditional modalities of learning through books and face-to-face meetings with teachers. LMSs are also an important way in which learning resources can be made freely available by institutions, and through which Open Educational Resources (OER) can be accessed (UNESCO, 2002; Hylén, 2006; Downes, 2007). LMSs are thus now seen as being the norm in schools, universities and businesses in many of the richer countries of the world, and there is strong competition for this lucrative market (Eaves *et al.*, 2007; Ipsos MORI AND JISC, 2008) between companies such as Blackboard, which also took over WebCT in 2006 (<http://www.blackboard.com>, accessed 2 April 2009), and Fronter (<http://com.fronter.info>, accessed 2 April 2009). Alongside such proprietary solutions, Open Source LMSs, most notably Moodle, but also KEWL.NextGen (<http://kngforge.uwc.ac.za>, accessed 2 April 2009) and Sakai/Vula (<http://vula.uct.ac.za>, accessed 2 April 2009) are also becoming increasingly widespread in their usage. As yet, though, there has been remarkably little rigorous research into the spread of such technologies into the Africa continent (although see Ndume *et al.*, 2008; Rodrigues and Muliaro, 2008)

In 2007, ICWE GmbH (International Conferences, Workshops and Exhibitions, <http://www.icwe.net>, accessed 2 April 2009), SPIDER (The Swedish Programme for ICT in Developing Regions, <http://www.spidercenter.org>, accessed 2 April 2009) and the ICT4D Collective (<http://www.ict4d.org.uk>, accessed 2 April 2009) undertook a comprehensive survey of e-learning in Africa (see Unwin, 2008; for more information, see below), which drew attention to complexities in the roll-out of LMSs across the continent, noting that ‘The over-riding conclusion to be drawn from this

evidence is that the majority of those claiming to be using e-learning are not using an integrated formal learning management system at all, but are rather using basic digital technologies to enhance their learning, more often than not interpreting e-learning simply as accessing information from the web' (Unwin, 2008, pp. 4-5). This provides the broader context against which the present research was undertaken. However, the immediate catalyst was a conversation in a prestigious African university in the summer of 2008 with a person charged with supporting the roll out of its new LMS. Very proudly he showed one of us their new LMS, and the ways in which it was being used. All that it contained was a list of some of the lectures. There were no lecture outlines, slide shows, chatrooms, RSS feeds, wikis, or glossaries that students in more affluent parts of the world now take for granted, let alone the audio and video files that are becoming increasingly common. There is thus a huge gulf between the rhetoric and the reality in the adoption of LMSs across Africa. It is with this that this paper seeks to grapple.²

2. The status of e-learning in Africa

Africa is replete with projects designed to introduce computers into schools, to network universities so that they can be at the cutting edge of research, and to use information and communication technologies to transform business practices. However, all too often such initiatives are top-down and supply-led, failing satisfactorily to consider either the needs of the intended users or the infrastructural provision currently available (Unwin, 2009).

Our survey of e-learning users and advocates in 42 African countries in 2007 highlighted three main conclusions: that a wide variety of different e-learning practices are currently in use across the continent; that the use of computers and the Internet for learning is still very much in its infancy, with most African usage being very rudimentary; and that there is nevertheless much enthusiasm among the respondents for developing the potential of e-learning (Unwin, 2008). Although this survey concentrated particularly on

² In order to do this, the research has also deliberately been undertaken as a collaborative venture between colleagues in Germany, Ghana, Kenya, Mozambique, Tanzania and the UK.

those who were already committed to e-learning, it did highlight significant problems in its adoption, as the following two responses indicated (Unwin, 2008, p.3):

- *We don't use any eLearning even though we are a distance learning center. Only distance training in VC and the satellite-based ones were thought about from the beginning. But when people call us, they always hope to be able to follow courses without having to move. At the time we have a lot of demands for distance learning, particularly for the ones with a diploma, but we don't have any platform for this (Senegal)*
- *Lack of awareness from most of the teachers and heads of our universities that the use of eLearning could be a benefice for the teaching or training ; I don't see any motivation of developing eLearning by our school chefs. a lack of equipment and required structures (lab with good computers, a good Internet connection, soft ware...) and also the financial resources to support the training of the trainers, the production of the contents of eLearning, to adopt another context (Cameroon)*

The report concluded that most use of e-learning in Africa focuses almost exclusively on the use of the Web to gather information and on e-mail for communicating with students; little real use seemed to be being made of integrated LMSs. In particular, it suggested 'that it might not so much be the 'hard' infrastructural constraints that are holding back the expansion of e-learning in Africa, but rather the 'softer' dimensions of management, training, and the development of appropriate levels of expertise in e-learning design that are the most important factors that require attention' (Unwin, 2008, p.9). For e-learning to be effective, it is crucial that integrated systems are introduced that can maximize the access that students and learners can have to organized packages of learning resources. This is particularly so in the context of the development of shared and open educational resources, as well as the provision of distanced based learning.

3. Survey design and sampling strategy

The present research was therefore fundamentally designed to dig beneath the general insights gained in the wider survey of e-learning across Africa and to explore the present usage of LMSs in the continent, focusing on six

main areas: their use by teachers; their use by learners; the sources of information and amounts of training received in the use of LMSs; the perceived qualities of LMSs available for African needs; constraints in the use of LMSs; and information about respondents.

3.1 Questionnaire design

One of the most important findings from our earlier survey (Unwin, 2008) was that it is critically important to make the questions as simple and easy to understand as possible. Our LMS questionnaire therefore consisted very largely of closed questions in the form of tick boxes, with the responses gained from our earlier survey being used to specify the choices available for respondents to answer. As an example, the closed list for people to indicate which LMSs they had heard about was drawn directly from the responses given to an open question in our earlier survey of e-learning in Africa, albeit with an 'other' option. The questionnaire itself was divided up into six main sections, reflecting the overall focus of the survey noted above (Figure 1).

Five important aspects of the questionnaire design warrant some attention here. First, where respondents were given an option to comment on the quality of an aspect of a LMS they were given a choice of five options, such as strongly agree, agree, disagree, strongly disagree, and unsure. Second, the majority of responses were simply invited in the form of tick boxes. Indeed, where respondents were asked to rank sources of information about how to use LMSs, very many either did not respond (38%), or failed actually to rank them as requested from 1-5. Third, respondents were also given the option to add additional comments or 'other' factors for most questions, but very few ever chose to do so. Fourth, two means were used to try to check on consistency of responses: a non-existing LMS (Sapientia³) was included in the list, and the ordering of similar lists within questions varied. Only 9 respondents (2.5%) mentioned that they had used

³ Although at the time of the survey, there was a South African company called Sapientia (now known as Consilium) it confirmed with the authors that it did not have a LMS called Sapientia.

the non-existent Sapiencia LMS, therefore suggesting that the vast majority of responses are probably quite reliable. Finally, the last section was designed to provide information about the characteristics of users, with the intention that these characteristics, particularly age, gender, occupation, and place of residence could be used to help analyse and explain variations in the answers given by people from different backgrounds. Interestingly, some 39% of respondents did not answer the question about the country in which they are currently living, and 50% did not mention which LMS they used most frequently, even though many of these actually answered the next set of questions about LMS use. As will be seen later, despite our best intentions to ensure simplicity of use and ease of understanding, it is clear that not all respondents found the survey as easy to complete as we had hoped. We suggest that this may in part be because many users were relatively unfamiliar with the concepts and usage of LMSs. This was strongly reinforced by one respondent who commented that *'People around here cannot differentiate between browsing the Internet, chatting on Yahoo etc and using a Learning Management System'*.

The questionnaire was prepared in hard copy, digital (Word .doc), and online format (using SelectSurvey.Net hosted on the Royal Holloway, University of London servers) so that people could respond to the survey in a variety of ways. Because of the large number of closed options included for each question, the questionnaire in hard copy was quite long at 10 sides of A4, but in practice it usually took respondents only around 15 minutes to complete in any of the formats.⁴ In order to try to ensure that the questionnaire was as easy to interpret and complete as possible, it was first piloted amongst members of the ICT4D Collective (<http://www.ict4d.org.uk>) and then redrafted in the light of comments received. Further comments were then solicited from collaborating partners in Ghana, Kenya and Mozambique, and a final version was then prepared,

⁴ One of the really interesting aspects of the responses completed in hard copy or Word, was the difference in the means through which people responded, using a range of highlight colours, ticks, crosses and bold blocks. Although beyond the remit of this paper, the ways in which people physically respond to this questionnaire will be explored in a future paper.

which was made available in both English and Portuguese

3.2 Sampling strategy and mode of delivery

This research deliberately chose a range of different sampling methods and delivery modes in order to try to reach as diverse a group of respondents as possible. In the first instance, the primary source of responses had been intended to be from the partner institutions involved in this project based in five different African countries. All are involved in ICT4D (Information and Communication Technologies for Development) programmes, and all place particular emphasis on the use of computers in learning. It had been hoped that by focusing on particular institutions, and encouraging as many staff to respond as possible, whether or not they were regular users of LMSs, we would overcome the usual biases that result from sending the survey only to those who are already committed users. Unfortunately, very few responses were received from this route. In one of our partner institutions, for example, 120 questionnaires were distributed, but only 17 were returned. As the colleague responsible commented, 'most people in **** have not had any exposure. This may explain the general reluctance'.

Three alternative modalities for gaining responses were therefore employed: an invitation was sent through the Association of African Universities to all African member Vice Chancellors inviting their staff to complete the on-line survey; invitations were disseminated through our various networks, notably those of the ICT4D Collective, and also the 750 strong ICT4D Group on Facebook; and ultimately the e-Learning Africa team who had been involved in our original survey also distributed the digital version of the questionnaire as well as an invitation to complete the on-line survey to everyone on their mailing lists. It is not possible to know definitively how respondents came to hear of the survey, but the plethora of responses that came in immediately after the e-Learning Africa invitation was submitted suggested that this was by far the most important route through which people came across the survey.

3.3 Respondent characteristics

A total of 358 responses to the survey were received. Where these were submitted in hard copy or in a digital form of the questionnaire (90 responses, 25%), these were then uploaded manually into the online survey for subsequent ease of analysis.

The vast majority of those who gave information about their profession (167 responses; 70% of those who answered this question) were from universities, with 75% of these claiming to be learning providers of some sort, rather than managers, learners, or support staff. Some 31 responses (13% of those who answered this question) were from civil society, 30 from schools, 27 from government, 26 from the private sector and 24 from teacher training institutions. This last figure is of particular interest, since the low number of respondents from teacher education institutions, which are of absolutely central importance if LMSs are to be used in the roll out of school-based digital learning in Africa (Unwin, 2005), suggests that they may as yet be very unfamiliar with their usage.

The age distribution of respondents was approximately normally distributed, with the modal population age decade being 30-39 (37% of respondents answering this question), followed closely by 40-49 year olds (31%), and then 50-59 year olds (18%) and 20-29 year olds (10%). Of those stating their gender, 33% were female and 67% male. Some 50% of those answering the question on employment location (115 respondents) were working in capital cities, with 25% working in other main cities, and only 3% in villages or rural areas. The dominant highest qualification level achieved was a University Master's degree (47% of respondents answering this question), with some 27% having gained a PhD, and 19% having attained up to a Bachelor's qualification at university. The typical respondent can thus be seen to have been a 30-39 year old male with a Master's qualification, teaching in a university located in a capital city.

Unfortunately, 139 respondents (39%) failed to complete the question indicating their current country of employment, and it is therefore difficult to comment in detail on their different national perspectives. The survey

nevertheless gained responses from 25 African countries, with the greatest numbers coming from Kenya (41, 11%), South Africa (32, 9%), Nigeria (31, 9%) and Mozambique (20, 6%).

4. LMS Usage

This section provides an overview of the main themes resulting from our survey, beginning with some of the critical comments we received, and then moving on to an exploration of respondents' familiarity with LMSs, their training in LMS usage, their knowledge about how to use different aspects of LMSs, the reasons why they use them, and the access that institutions make available for external users to access their resources, before concluding with a discussion of the factors limiting the use of LMSs.

4.1 Beyond the euphoria

One of the fundamental problems with many previous surveys of LMSs, particularly when undertaken online, has been that they have only attracted responses from people who are already committed to their use and have the technical ability to respond. As a result, they tend to be heavily biased towards positive responses about such usage (Unwin, 2008; see also Ipson MORI and JISC, 2008). As a counter to such overly optimistic accounts, it is important to begin this analysis with an overview of the comments of those who responded to the survey, but did so without completing the questionnaire.

One of the most telling comments was received from one of our partner institutions in Africa. As outlined above, it had been our original intention to work with partner universities in Ghana, Kenya, Mozambique, Senegal and Tanzania to implement the LMS survey. In response to our invitation for colleagues to distribute the questionnaire survey, one responded as follows:

'firstly, we have only a bit less than 100 teachers.

Secondly, 99 of them are not using any LMSs. I'm the

only one using a LMS. That won't change very fast either, as we don't have enough computers for students to use (for LMS, Internet, or any other purpose.)'

This was from a university that has ambitious plans to become a leader in the use of ICTs for development within Africa, and reflects a pragmatic realisation that there are serious infrastructural problems that need to be addressed before e-learning can become at all widespread across the continent.

Such views were also reflected in other responses to the survey, not only within university institutions, but also across the private sector as well. One private sector respondent, involved in building and distributing e-learning content, thus commented that

'...we have struggled to find an LMS that is suitable for the typical small to medium client in Southern Africa, where an entry level product is all the client can afford and in fact is all that is needed in most cases'

This respondent went on to comment that

'My main point is that content is still king for most people in Southern Africa, and the LMS is only a means to an end – and they're right in my opinion. The sooner there's a free portable, generic, robust easy to use LMS available the better'

Interestingly, this respondent had experimented with using the Open Source Moodle LMS, but reported that the lack of infrastructure and expertise available outside South Africa meant that this 'solution' was not ideal. Another respondent provided a more damning indictment of the corporate learning environment, even in South Africa which is widely seen as being at the forefront of such technology use in the continent:

'Just one general observation on the SA corporate learning environment ... It is immature in comparison to Europe and the USA. Even large corporations – with a few exceptions – are still locked in a classroom based, instructor led training mindset. The use of LMS is limited and online learning is viewed with scepticism;

Within the University sector, another respondent was vehement in his reasons as to why LMSs are not used at present:

- 1) *'too expensive - \$100 might mean nothing to you but it is a year's salary for some people here*
- 2) *frequent power outages*
- 3) *no server – we have a server but our IT staff are simply too incompetent to set it up over a year now*
- 4) *Internet – current speed 56 Kbps for the entire university (try and send an email out when the Internet labs are full!). Frequent outages plus costs – over \$1000 per month (we use a satellite dish). We are supposed to use an on-line system with this bandwidth?*
- 5) *users – many do not have a computer and even fewer have access to the Internet (which is very costly). How would they access on-line material'*

This is the harsh reality of much African higher education, and is a stark reminder that the optimism reflected by respondents to the online survey is by no means universal. Costs of Internet and Intranet connectivity must be reduced dramatically, and reliability likewise enhanced, if LMSs are to be used effectively across Africa, either for the support of institutionally based blended learning solutions or for digital distance-based offerings. The costs of commercial LMSs are themselves also prohibitive in many instances. The University of Education, Winneba, in Ghana, for example was recently quoted a price by a LMS provider of \$20 a year per student, with the conditions that this would be for 7 years and a minimum of 15,000 students. The total sum involved was thus \$2,100,000, and in such circumstances the potential benefits of Open Source solutions such as Moodle or Chisimba become self-evident.

At the school level, the situation is even worse. A teacher in Zambia thus commented

'The project I work for supports the computer education

projects at four schools in Lusaka, Zambia. None of these schools has a large enough number of computers or a fast enough internet speed to make LMSs practical, even if the training was sufficient for everyone to learn how to use LMSs effectively. I look forward to the day when LMSs can be used at the school level in Zambia, but I think that day is a long way off.

4.2 Familiarity with and usage of LMSs

The level of reported familiarity with, and usage of LMSs was high, albeit given that the sample was one that would be expected to have familiarity with these technologies. 174 respondents (49% of total sample) affirmed that they had used a LMS for teaching in the previous 12 months, and 185 (52%) had used one for learning. The overall awareness of LMSs (Table 1) was also high, with 62 respondents mentioning that they were aware of other web-based LMSs than the 14 main ones listed in the survey. Two environments dominate: Blackboard (particularly when the figures for WebCT which it took over in 2006 are added), and the Open Source Moodle alternative. This dominance is even more noticeable when responses to the question of which LMS is used most often are considered. Between them, Blackboard (74), Moodle (58) and WebCT (43) account for 37% of all the responses to the question asking which LMS is used most for teaching, and they likewise account for 63% of responses in the context of learning. There is some evidence that particular LMSs tend to be used specific countries. Thus Sakai/Vula is used by respondents almost exclusively from South Africa, and those who had knowledge of KEWL or KEWL.NextGen were mainly from South Africa and Tanzania. In contrast, usage of Moodle and Blackboard/WebCT was distributed much more broadly across the continent.

(Table 1 here)

Although knowledge about LMSs would appear to be quite high, their level of usage is distinctly low. Forty-six % of respondents who said that they

used LMSs for teaching uploaded material less frequently than once a month, and only 9% claimed to do so on a daily basis. Amongst learners, this pattern was different, with 28% claiming to access their LMS on a daily basis, and only 35% doing so less frequently than once a month.

4.3 Training in LMS usage

Along with the infrastructural constraints, one of the reasons we thought that people might not use LMSs more frequently could have been because of a lack of training. The survey provides some evidence to support this, with 25% of respondents who answered the question on this subject noting that they had received less than 2 hours of training in LMS use. Forty-five % of the sample nevertheless claimed to have had more than 2 days of training, and there was no obvious correlation between the amount of training received and frequency of use of LMSs (Table 2). If anything, those who claimed to have received between 2 and 5 hours seemed to be more frequent users than those who had received either more or less training

(Table 2 here)

It had been hoped that a question asking respondents to rank five different sources of information through which they find out about how to use LMSs would give further insights into their learning processes. However, only 63% (227 respondents) replied to this question, and many of those that did failed to differentiate between the various options, often ranking them all equally. While not too much reliance should therefore be placed on these figures, the most popular source of information about LMS usage was seen as being people's own reading about the subject, followed by the training courses people had attended. There is some anecdotal evidence that people actually learn most from their friends and peers, but this was actually deemed to be the least popular source of information. Among the additional means through which respondents mentioned that they learnt about how to use LMSs, the most frequent responses were that people learnt how to do it when they were visiting institutions outside Africa, or that they were self-taught. As

one respondent commented, *'I just experiment with the system – especially Moodle which I use most. I'm self-taught, I'm an experienced computer user, and it isn't complicated'*.

4.4 Knowledge about different aspects of LMS usage

It is evident from this survey that even amongst quite experienced users, most only actually use a relatively small number of the features available in their local LMSs, either as teachers or learners; far more claim to know how to use such features. Table 3 provides a broad overview of the different aspects of LMS usage that people claimed to be knowledgeable about as either learners or teachers. Three important things should be noted about this: first that 34% of respondents did not answer the question, possibly because they were actually unsure of how to use these features; second, that learners were across the board less knowledgeable than teachers; and third that more than half of those surveyed claimed to know how to use most aspects of most LMSs. In general, teachers claimed to be most knowledgeable about user management, glossaries, document delivery, e-mails, quizzes and tests, presentation delivery and digital libraries. Such claimed knowledgeability stands in contrast to our experiences of the practical usage that most teachers in most higher education institutions across Africa actually make of LMSs.

(Table 3 here)

We therefore also asked questions about the aspects of LMSs that people would like to learn more about. Some 67% (240 respondents) replied in the affirmative to this, and the high levels of response on certain questions suggested that knowledge about LMS usage was perhaps not quite as high as some claimed. In particular, the aspects of LMSs that people most wanted to know more about were video content delivery (mentioned by 39%), audio content delivery (37%), digital libraries (37%), LMS management (32%) and databases (31%). This indicates, at the very least, that there remains a strong real need for further high quality training in LMS usage across Africa.

4.5 Why do people use LMSs?

In this context, it is interesting to explore the reasons why people used LMSs in their teaching and learning. Respondents were invited to grade their agreement with a range of different possible reasons, drawn from comments received to our previous surveys, according to a five-point scale from 'strongly agree' to 'strongly disagree', with a mid-point of 'unsure'. Strongest affinity was with the statement that 'It saves me time' (48% 'strongly agree'), followed by 'It provides students with higher quality learning opportunities than with traditional methods' (45% 'strongly agree'), 'I find it easier to teach using a LMS than with traditional methods' (45% 'strongly agree'), and 'It enables distance-based students to participate in my courses' (45% 'strongly agree'). Student demand and institutions requiring teachers to use LMSs were the least favoured reasons for LMS use.

A somewhat different pattern emerged among learners, where the two most popular reasons for LMS usage were 'I enjoy using it' (47% 'strongly agree'), 'It provides me with better learning opportunities than traditional means of learning' (46% 'strongly agree'), and 'It saves me time' (41% 'strongly agree'). Again, being required to use it by one's institution was seen as being the least important reason.

At first sight, these are very positive responses, suggesting that teachers and learners do indeed choose to use LMSs primarily for the benefits they offer in terms of quality of learning and ease of access. Whilst some respondents did indeed argue that they were required to use it by their institution (33% of teachers strongly agreed with this assertion), this was by no means the most important factor influencing their use. Nevertheless, these questions were answered by only 77% (as teachers) and 64% (as learners) of the total sample, and it may be that these responses focused particularly on those who were already familiar with and committed to the use of LMSs.

4.5 Access to content and Open Educational Resources

In order to gauge the extent to which African institutions are making their content available to people who are not registered specifically for their courses, a question was asked about access to learning materials and licensing arrangements. It is widely argued that Open Educational Resources (OER) provide one important way forward for African higher education (see for example, <http://www.oerafrica.org>, <http://www.wikieducator.org>, <http://oerwiki.iiep-unesco.org>, accessed 4th May 2009; Kawooya, 2008; Kanyengo, 2009). However, despite the inherent appeal of developing shared resources, the reality across much of Africa is that many such initiatives have as yet failed to gain traction. The much-vaunted African Virtual University (AVU) (<http://www.avu.org>, accessed 4th May 2009), for example, has had to be restructured several times, and is now a very different kind of organisation from that which was originally conceived at its foundation in 1997 (Juma, 2004). As yet, the AVU has had remarkably little success in developing shared open resources for use across the continent, and although it has a section of its site devoted to OER, there were no actual resources contained within it in May 2009.⁵ Our own much smaller initiative, funded by Edulink (<http://ict4dconsortium.rhul.ac.uk/elgg/>, accessed 4th May 2009), has also encountered significant difficulties in jointly developing shared digital resources, not only because of limited bandwidth availability in some countries, but also because of the lack of tradition and experience in African higher education institutions of developing such resources.

Our present survey has thus shown that even where African institutions do indeed have functional LMSs, very few of them make content available beyond their institutional boundary. Thus, 74% of respondents to the survey confirmed that access to learning materials on their LMS was only available to registered users in their institution. Only 10% made all material freely available to guest users, and 7% made content available through a licence, such as the Creative Commons suite of licenses (<http://creativecommons.org>,

⁵ Although, elsewhere on the AVU's site there is a place where students can access the AVU Francophone Library – this is apparently the only access that the AVU currently makes available to actual digital learning resources.

accessed 4th May 2009). Whilst much of the impetus for OER in Africa has stemmed from South Africa (see for example the innovative work done at University of Western Cape <http://freecourseware.uwc.ac.za/>, accessed 4th May 2009), it was interesting to note from our survey that those that made some of their content available freely came from a wide variety of countries including Nigeria, Malawi, Uganda, Kenya and Ethiopia, as well as South Africa.

4.6 Factors limiting the use of LMSs

In order to understand the reasons why not more people are using LMSs in Africa, we asked a series of questions concerning both the factors that respondents saw as limiting their usage thereof and also information about the types of ICT to which they had access. The results reflect considerable diversity of opinion, and are not easy to interpret.

Overall, the main factors people saw as limiting their use of LMS were low connectivity speeds to the Internet (56% stating 'very much'), unreliable connectivity (45% stating 'very much') and lack of e-learning policy in their institution (44% stating 'very much'). Factors that were seen by most people as being not at all important included the lack of their own computer (47% stating 'not at all important'), lack of computers in their institution (37% stating 'not at all important') and visual appeal of the software (30% stating 'not at all important'). This should not, though be taken to be consistent across all respondents, since 24% of respondents said that the lack of their own computer did very much limit their usage of LMSs, and 14% said that the lack of an e-learning policy in their institution was not at all a constraint. Other factors that the majority of respondents claimed limited their usage of LMSs 'very much' were unreliable electricity (36%), lack of training for themselves (34%) and others (43%) in the institutions, and lack of technical support (40%). These findings, therefore, suggest that in general respondents claimed that it was primarily the technical and infrastructural aspects of LMS provision that are seen as the main factors preventing their wider roll out. This stands in contrast to our earlier findings (Unwin, 2008) where we argued that it was the

softer, human, dimensions of e-learning skills acquisition that were the biggest constraint. It must, though, be recalled once again that the present survey by concentrating primarily on those already committed to the use of LMSs, may well have exaggerated the significance of these factors; only 67% of respondents actually chose to answer this question, and these are likely to have been those with least interest in their usage.

One of our most striking findings is that without any doubt the most important factor that appears to influence usage of LMSs is access to a personal laptop computer. As Table 4 highlights, 35% of the total sample (126 respondents) used this means of learning or teaching using LMSs, with 34% (121 respondents) also making use of computer labs at work. In particular, it was those who had access to their own laptops who appeared to respond most positively to the majority of their questions. Other striking features of Table 3 are the wide diversity of other ICTs to which respondents had access. Sixty-one % of the total number of respondents said that they had a mobile 'phone, and 57% had radios and televisions. Somewhat surprisingly, traditional ICTs were still seen as means of learning and teaching: 11% of respondents said they used radios for these purposes, and 14% used televisions. Some 16% of respondents also claimed to use their mobile 'phones for teaching and learning, and given the significant spread of mobile telephony across Africa it would in future be useful to know more about the precise usages to which these are put.

(Table 4 here)

5. Case studies from Mozambique and Kenya

The above results may be biased towards those who are familiar with, and supportive of, the introduction of digital technologies within African learning environments, because an online survey was used to elicit many of the responses. We therefore distributed copies of the questionnaire by hand within two of our partner universities in Mozambique (Eduardo Mondlane University) and Kenya (Maseno University), to try to gain a more balanced

understanding of the usage of LMSs in what might be seen as ‘typical’ African universities. Even so, it should be stressed that both of these universities see themselves as placing considerable emphasis on the use of ICTs in teaching and learning. As noted above (Section 3.2), the return rate of these questionnaires was very low (16% in Maseno University) which we take as further evidence of the lack of commitment to, and usage of LMSs in Africa; 19 responses were received from Mozambique and 17 from Kenya. Moreover, very few of the respondents actually completed all of the questions, and many were left blank, which may be another indication of lack of understanding of, or interest in, the pertinent issues.

The evidence from these two universities strongly supports the view that while there may be some keen advocates for the use of LMSs in African universities, they are the exception. The average level of LMS use is very much lower than the previous sections of this paper would suggest. None of the respondents used their LMS daily as a teacher, and 56% of the sample used their LMS only once a month or even less frequently; 53% had not used a LMS in the last 12 months. Learners used LMSs more frequently, with 16% stating that they did so daily; 41% had nevertheless not used a LMS for learning in the last 12 months. Moodle was by far the predominant LMS used, and levels of satisfaction with it were quite high. The amount of training in the usage of LMS varied considerably, even within the same institution: 19% had received less than 2 hours training, whereas 37% had received more than 2 days of training. There were slightly more women present in this sub-sample (38%) than in the overall survey, and many of these were apparently enthusiasts for the use of digital learning technologies.

The general comments made by some of the respondents indicate frustrations with the present levels of technology use in these institutions. Although it was recognised that LMS can contribute to enhanced learning, respondents commented in particular about the low levels of connectivity and access to the Internet. Several respondents would have liked to have received more training in the use of LMSs, and the proliferation of viruses was also seen as being a particular issue that required attention. Interestingly,

and particularly in Maseno University, there was a strong view that whilst e-learning can offer useful means of content delivery, it should continue to be integrated as a supplement to existing teaching methods, rather than being used as an end in itself. The reality, as a colleague at Eduardo Mondlane University put it, is that although they have developed Chisimba as an easy to use low-bandwidth requiring LMS, only one course in the university at present makes use of it. We suggest that this is a common feature across Africa. Many universities have a small number of enthusiastic and committed staff, eager to develop and utilise LMSs, but as yet there is actually very little real and effective use made of them for learning and teaching.

6. Conclusions

This paper has sought to shed light on the use of learning management systems in Africa, based on a survey of 358 respondents in at least 25 African countries. Although there are undoubted problems resulting from incomplete responses to the survey, it is nevertheless possible to draw five important conclusions. First, it is evident that whilst there are some ardent advocates on the use of LMSs across Africa, they are in a small minority. Most African educationalists and learners have little access to or interest in the use of such digital learning systems. Whilst the advocates indeed appear to use a wide range of tools within such LMSs, including video, audio, glossaries, wikis and discussion fora, alongside more traditional text and slide delivery mechanisms, this technology has simply passed the vast majority of people by. We hope that this paper therefore provides a large dose of reality with which to confront the overly-hyped claims of many of those involved in e-learning in the continent. With one or two notable exceptions, the reality on the ground when visiting most African universities and schools is that computer labs remain largely empty, and where LMSs are used at all they are only utilised in the most basic of ways. We continue to believe that the data received in response to some of the questions in our survey presents an exaggerated picture of knowledge about aspects of LMS. For many in Africa today, Learning Management Systems still mean access to the Internet, and

the use of e-mails for sharing information.

Second, it is evident that there are still huge infrastructural hurdles to be overcome, most particularly in terms of connectivity and electricity provision. Limitations in bandwidth and very high costs of Internet access remain prohibitive constraints to the effective use of e-learning across Africa. Nevertheless, despite bandwidth and connectivity limitations, careful planning and appropriate allocation of scarce resources can enable educational institutions to develop their own effective LMS-based digital learning environments. For example, the creation of a sound intranet on a campus is something completely within the control of the university's management, and does not rely on external Internet access. Much can therefore already be done in terms of sharing content within an institution using a LMS, providing there is a reliable supply of electricity. Of course Internet access provides the means for engaging with the wealth of information available globally, and a way to contact people off campus, but an effective intranet should remain a very high priority for all African universities.

Third, despite some of the claims reflected in our survey results, it is evident that levels of training in the use of LMSs are generally very low. People are unaware of the full functionality of such systems, and do not have the practical experience to implement them effectively. For students to gain real benefits from using LMSs, it is crucial that university staff are given effective and appropriate training, as well as the opportunity regularly to practice using such systems. There is a real dearth, for example, of appropriate training manuals and even expertise within universities in precisely how to use most aspects of LMSs. We are also cautious about the apparent levels of understanding expressed in our survey results with respect to the different aspects of LMS usage. Our practical experience across several African universities suggests that most staff therein actually have very little understanding of most aspects of LMSs, and that while there is undoubted excellence to be found, we suggest that some of the responses may well have reflected a desire for the respondents to appear as being progressive learners and teachers.

A fourth, more subtle concern highlighted here has been the general lack of effective shared content and open educational resource development in Africa. Despite the enormous enthusiasm for the benefits of OER for Africa among advocates, many of whom are actually not themselves from the continent, there remains relatively little indigenous African content development, particularly of an 'open' nature. Much more research is required into precisely why this is so, especially given the communal traditions so prevalent in many aspects of African culture. Possible reasons for this state of affairs nevertheless include the conservative nature of many African universities, the persistence in academics' beliefs that they can profit individually from 'their' content, systems whereby universities and individuals make personal profit from selling content, a belief that 'free' content cannot be valuable, and the lack of time people have actually to develop shared content together.

Finally, though, we remain optimistic. As the respondents to our survey have highlighted, effective use of LMSs can provide huge benefits for African higher education, and we wish to conclude by emphasising just four of these:

1. They enable students and learners to gain access to vast amounts of *useful content*, organised and delivered in ways that are designed to be helpful and informative. In particular, they enable distance-based students to participate in many aspects of learning that are otherwise unavailable to them. This requires commitment and dedication on behalf of the teachers, but the rewards for learners are indeed significant.
2. They provide a useful means whereby teachers can *organise and structure their teaching materials*. Many respondents to our survey emphasised that it actually also saved them time in preparing their teaching – although not all of us as authors would necessarily agree with this sentiment!
3. Where access to the Internet is indeed available, and we recognise that this is still very limited across Africa, well-designed digital learning

systems can provide access to very *high quality resources* from across the world at prices that are indeed affordable. Very much quality content is already freely available, which in itself may be one of the reasons why there remains such little African content development. Moreover, there are several initiatives, not least the International Network for the Availability of Scientific Publications (INASP, <http://www.inasp.info>, accessed 4th May 2009) that seek to make the highest quality scientific research available to those who can least afford it.

4. Given the pace of learning technology development in the richer countries of the world, it is crucially important that learners in Africa's poorest countries are also able to benefit. Otherwise, the introduction of such learning technologies will serve merely to increase inequalities rather than to reduce them. It is therefore critically important that effective training schemes are introduced into African learning institutions so as to enable teachers to be able to utilise these resources effectively for the benefit of learners (Unwin, 2005).

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References

- Downes, S. (2007) Models for sustainable Open Educational Resources, *Interdisciplinary Journal of Knowledge and Learning Objects*, 3, 29-44
- Eaves, M., Maclean, H., Heppell, S., Pickering, S., Popat, K and Blanc, A (2007) *Virtually There: Learning Platforms*, Scunthorpe: Yorkshire and Humber Grid for Learning Foundation / Chelmsford: Cleveratom.

- Hylen, J. (2006) *Open Educational Resources: Opportunities and Challenges*, Paris: OECD (<http://www.oecd.org/dataoecd/5/47/37351085.pdf>, accessed 2 April 2009)
- Ipsos MORI and JISC (2008) *Great Expectations of ICT: how Higher Education Institutions are Measuring Up*, London: Ipsos MORI
- Juma, M.N. (2004) *African Virtual University: the case of Kenyatta University*, London: Commonwealth Secretariat (Commonwealth Case Studies in Education)
- Kanyengo, C.W. (2009) Managing digital information resources in Africa: preserving the integrity of scholarship, , *The International Information and Library Review*, 41(1), 34-43
- Kawooya, D. (2008) An examination of institutional policy on copyright and access to research resources in Uganda, *The International Information and Library Review*, 40(4), 226-35
- Morgan, G. (2003) *Faculty use of course management systems*, Boulder: Colorado: Educause Center for Applied Research
- Ndume, V., Tilya, F.N. and Twaakyondo, H. (2008) Challenges of adaptive elearning at higher learning institutions: a case study, *International Journal of Computing and ICT Research*, 2(1), 47-59.
- Paulsen, M.F. (2003) *Online education and Learning Management Systems: Global e-Learning in a Scandinavian Perspective*, Oslo: NKI Forlaget.
- Rodrigues, J.A. and Muliaro, W.J. (2008) tertiary ICT education in the East African Community (EAC): human capital and curriculum development, *International Journal of Computing and ICT Research*, Special Issue 1(1), pp.76-84.
- UNESCO (2002) *Forum on the Impact of Open Courseware for Higher Education in Developing Countries, Final Report*, Paris: UNESCO (<http://www.wcet.info/resources/publications/unescofinalreport.pdf>, accessed 2 April 2009)
- Unwin, T. (2005) Towards a framework for the use of ICT in teacher training in Africa, *Open Learning: The Journal of Open and Distance Education*, 20(2), 113-129
- Unwin, T. (2008) *Survey of e-Learning in Africa based on a questionnaire survey of people on the e-Learning Africa database in 2007.*

(<http://www.gg.rhul.ac.uk/ict4d/workingpapers/elareport.pdf>, accessed 2 April 2009)

Unwin, T. (ed.) (2009) *Information and Communication Technologies for Development*, Cambridge: Cambridge University Press.

Weller, M. (2007) *Virtual Learning Environments: Using, Choosing and Developing Your VLE*, London: Routledge.

Figure 1

Structure of survey on Learning Management Systems in Africa

A. *Use of LMSs as a teacher*

- Whether used as a teacher
- Frequency of use for uploading materials
- Familiarity with 14 different LMSs
- Reasons for use (9 options)
- Access available to users (including licensing and freedom to guests)

B. *Use of LMSs as a learner*

- Whether used as a learner
- Familiarity with 14 different LMSs
- Frequency of use as a learner
- LMSs used for learning
- Reasons for use (7 options)

C. *Information about how to use LMSs*

- Sources of information (5 to be ranked in order)
- 18 features of LMSs that users know how to use
- 19 aspects of LMS use about which users would like to know more

D. *Quality of the LMS used most frequently*

- The LMS used most often
- 20 aspects of LMS use

E. *Constraints on the use of LMSs*

- 13 possible constraints

F. *Respondent Characteristics*

- Occupation
- Gender
- Age
- Location of main place of work (5 choices from village to capital city)
- Country of current employment
- Access to 10 types of ICT and use for learning/teaching
- Amount of formal training received

Table 1
Awareness and usage of most frequently cited LMSs

LMS	Frequency used as a teacher			Frequency used as a learner	
	Heard of	Used	Used most often	Used	Used most often
Blackboard	204	103	74	90	49
Moodle	186	99	58	91	59
WebCT	169	68	43	48	25
KEWL or KEWL.NextGen	89	20	6	23	10
ATutor	59	17	4	12	7
Sakai/VULA	44	9	6	6	3

Sample size = 358

Notes:

Respondents were given a choice of the following LMSs: Moodle, Blackboard, WebCT, Fronter, KEWL, KEWL.NextGen, Sapientia, Sakai/VULA, Dokeos, Claroline, Atutor, ILIAS, eCollege, Scholar 360. In addition, 74 respondents mentioned that in their capacities as teachers they had heard of other LMSs, namely: Acolad and Ganesha, Active Learner, Alado, Elluminate, amazon.co.za, AngelLearnTegrity, bridge by eKnowledge, Chisimba, Digboard, Compass, Construct LMS, EKP (Skillsoft), eLeap, itslearning, Firstclass, Exe-learning, Fomare, InWEnt's Global Campus 21, CPORTAL, Joomla, Mindleaders, Macromedia, MS PowerPoint, Mindleaders, Macromedia/Adobe Flash, myUNISA, Open Learning System, Plateau, Sum Total, SABA, IntraLearn, SAP, Siguvantage, Skill Vantage, Spiral, Study Space, Teletop, TUSK, Univ-rct, Waheeb, our own systems.

Table 2
Amount of training received, and frequency of uploading material by those who teach using LMSs

Frequency of uploading	Amount of training received in usage of LMSs ¹				
	< 2 hours	2-5 hours	1 day	2 days	> 2 days
Daily	5 (12%)	2 (8%)	-	1 (11%)	7 (10%)
Once a week	9 (21%)	3 (12%)	6 (35%)	1 (11%)	10 (14%)
Twice a week	1 (2%)	5 (20%)	1 (6%)	1 (11%)	10 (14%)
Twice a month	1 (2%)	-	2 (12%)	-	12 (17%)
Once a month	1 (2%)	-	-	1 (11%)	1 (1%)
Less frequently	11 (26%)	10 (40%)	5 (29%)	2 (22%)	17 (24%)
No answer	14 (33%)	5 (20%)	3 (18%)	3 (33%)	14 (20%)
Total	42	25	17	9	71

Note:

1. Percentages do not always total 100% because of rounding with small numbers

Table 3
Knowledge of LMS features by teachers and learners

	% of teachers who claim that they know how to use this feature	% of learners who claim that they know how to use this feature
Content delivery – documents	56%	43%
Content delivery - presentations	55%	40%
Content deliver – audio	52%	41%
Content delivery - video	51%	43%
Content deliver – games	45%	46%
Links to web-based sources of content	54%	42%
Discussion forums	54%	42%
Chats	54%	44%
Calendars	55%	43%
Quizzes/tests	56%	42%
User management	64%	34%
Wikis	51%	46%
Glossaries	57%	40%
Databases	53%	42%
Blogs	52%	46%
RSS feeds	51%	44%
e-mail	56%	43%
Digital libraries	55%	43%

Sample size: 358 (122 users did not respond to this question); percentages are of total sample size.

Table 4
Access to ICTs by survey respondents

Type of ICT	Respondents who have access to this ICT - percentage of row respondents and (frequency)	Respondents who use this ICT for learning or teaching - percentage of row respondents and (frequency)
Own (or family) radio	85% (204)	15% (38)
Own (or family) TV	81% (205)	19% (49)
Own (or family) fixed land-line 'phone	83% (149)	17% (31)
Own mobile 'phone	79% (219)	21% (58)
Access to communal mobile 'phone	80% (41)	19% (10)
Own laptop computer	61% (193)	39% (126)
Own (or family) desktop computer	67% (153)	33% (75)
Computer lab at work	60% (170)	40% (121)
Internet café	75% (124)	25% (42)
Own personal digital assistant (PDA)	76% (52)	24% (16)
Other ICT	51% (15)	49% (14)

Sample size: 358 (122 users did not respond to this question); percentages are of row totals – different numbers of people responded to each row question.