E Learning in Education Institutions: The emerging role of Open Source Software

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Abstract — Academic institutions in Africa, are not accruing the benefits of on line learning. The exorbitant cost of commercial e learning platforms has not helped matters either. African countries are not connected to the Internet backbone through undersea cables but through expensive satellite connections that are far from reliable. The above factors have combined to deny African countries a place in the global information society. The emergence of credible Open Source e learning software platforms provides educational institutions in Africa, a unique opportunity that has not existed before.

Index Terms — e Learning, Open Source Software, Internet.

I. BACKGROUND

This document proposes the introduction of e learning platforms using Open Source Software. Open Source is a development method for software that harnesses the power of distributed peer review and transparency of process. The promise of Open Source Software is better quality, higher reliability, more flexibility, lower cost, and an end to predatory vendor lock-in [1].

The introduction of e learning will provide complementary alternatives to the traditional teaching methods, and that students will arrive expecting that e-tools and practices will be in place to enhance and support their learning. E learning resources should be an amenity for staff and students, but not imposed on staff. Adequate staff, curriculum development and technical support will be indispensable for the success of such endeavors.

E-learning, e-education, or online learning refers to the way people communicate and learn electronically which has only recently emerged as a key source of competitive advantage in the information society [2].

In Uganda, over 50,000 students qualify for university education annually, however all the 22 Universities in Uganda are only able to admit 20 percent of the students who qualify. This is caused by inadequate physical facilities such as Lecture rooms, Laboratories, Academic staff, et cetera. The population of Uganda is increasing exponentially and this trend is not likely to be reversed in the near future. The danger of relying on classroom teaching is that as the student population increases the demand for more classroom space is not able to meet the supply. In Uganda, Makerere University, Uganda Management Institute, and Makerere University Business School, have introduced e learning into their programmes.

They have taken a slow approach where a few courses are posted on the e learning platform. The few courses which are posted on the platform are offered as complementary. Only one course Post Graduate Diploma in ICT Policy & Regulation qualifies as a fully-fledged e learning course. Assignments, lecture slides, notes are posted on this platform, but that is where the buck stops.

An e learning platform is able to offer more interactions between students and teachers, through chat, e whiteboards, instant chatting, and multimedia course demonstrations, thereby creating a digital learning environment. The introduction of e learning provides opportunities that have not existed before because of the high levels of richness and deeper levels of reach that Internet technologies offer. With e learning rich content can be added and yet it is able to reach a wider community at lower costs than any other method.

Why Use Open Source Software?

There a number of reasons why Universities should use Open Source Software: -

Cost: Most open source projects are available free of royalties and exorbitant license fees.

Flexibility and Freedom: The source code is available to everyone and a programmer is able to modify the software without infringing on the copyright

Audatability: A rarely-understood benefit of open source software is its auditability. Commercial software forces its users to trust the vendor when claims are made for qualities such as security, freedom from backdoors, adherence to standards and flexibility in the face of future changes. If the source code is not available those claims remain simply claims.

Bug Fixing: All software that is manufactured has bugs or errors. Development teams have only so much time in which to test a piece of before it is released which often leads to errors. Commercial software vendors are usually tied to targeted release dates, which often mean launching a product that is not ready [3].
Enhancements
You don't have to wait for the vendor to add features you need. If it is urgent, you can do it yourself.

Ownership
Users become stakeholders. Every one must succeed or no one succeeds. There is no adversarial relationship between vendor and client [4].

Benefits of e Learning
An e-learning course offers a flexi-time, flexi-location approach by changing the learning environment:

It enables learning to take place in a variety of different places, both physical and virtual. Learners now have a choice and increasingly wish to combine the options, choosing when and where they study and learn. For education providers, the preparation and integration of materials and services become a challenge, since it fundamentally changes the learning environment (OECD, 2001, p. 22)[5].

Students who have a full-time job and tight work schedules, who have young children, or disabilities and are unable to attend regular classes at a specific time and location often require and really appreciate a flexi-time flexi-location course like this. But such courses need self-motivated and independent learners (Mantyla and Woods, 2001) [6].

Available e Learning Platforms

<table>
<thead>
<tr>
<th>Commercial/Proprietary Software</th>
<th>Cost ($US)</th>
<th>Open Source Software</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blackboard</td>
<td>50,000</td>
<td>KEWL NextGen</td>
</tr>
<tr>
<td>FlexTraining</td>
<td>39,900</td>
<td>Moodle</td>
</tr>
<tr>
<td></td>
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<td>Spaghetti Learning</td>
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<td></td>
<td></td>
<td>ATutor</td>
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<td>Dokeos</td>
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<td></td>
<td></td>
<td>EduBuntu</td>
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<td></td>
<td>OpenUSS</td>
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</table>

Moodle e Learning Platform
Moodle is a course management system (CMS) - a free, Open Source software package designed using sound pedagogical principles, to help educators create effective online learning communities. It can scale from a single-teacher site to a University with 200,000 students. It’s being used in over 7 countries in Africa alone, and over 196 countries world wide [7].

Requirements for deploying Moodle

<table>
<thead>
<tr>
<th>Operating System</th>
<th>Windows 2000, /XP, Linux, Apple</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hard Disk space</td>
<td>160 GB or higher</td>
</tr>
<tr>
<td>Random Access Memory</td>
<td>512 Mega Bytes</td>
</tr>
<tr>
<td>Processor speed</td>
<td>2.0 Giga Hertz or higher</td>
</tr>
<tr>
<td>Database</td>
<td>MySQL</td>
</tr>
</tbody>
</table>

<table>
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<tr>
<th>Scripting language</th>
<th>PhP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Web Server</td>
<td>Apache</td>
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</table>

The above requirements are basic requirements, but its recommended to have much higher specifications for faster speeds. Moodle can be deployed on an intranet or online. The specifications for online hosting are much higher, than the above table indicates.

Human Resources needed to manage an e Learning site

<table>
<thead>
<tr>
<th>Title</th>
<th>Role</th>
</tr>
</thead>
<tbody>
<tr>
<td>E Learning Administrator</td>
<td>Create rights for Students and staff</td>
</tr>
<tr>
<td>Multi media content developer</td>
<td>Develop multi media content such as audio, and animations</td>
</tr>
<tr>
<td>Database Administrator</td>
<td>Maintain the database, and perform routine maintenance</td>
</tr>
<tr>
<td>Trainer</td>
<td>Train Students and staff on how to use the e learning platform</td>
</tr>
</tbody>
</table>

Challenges for Implementing e Learning in Universities:

- Most Local Area Networks in universities are not installed properly according to IEEE standards. There is little or no documentation on how the networks have been configured. It’s not rare to find 6 or more LANs in a single campus that can not communicate with each other.
- Most Computer laboratories are not well maintained, and these are usually desktops. Universities in Africa need to embrace thin clients which are easier to maintain and manage.
- Internet bandwidth in most African countries is usually low and can not be used for multi – media learning. Only light weight graphics and text can be used.
- They are very few prometric testing centers in Uganda. As such testing can only be done at the University premises.
- Highly skilled Software developers are in short supply. These are required to customize the e learning platforms to meet the specific needs of the academic institution.
- Most students join university with no prior computer knowledge. The Open International Computer Driving License (ICDL), or an equivalent should be made a prerequisite for admission into a university.

Projected results:

The introduction of e-learning in African academic institutions will lead to a creation of a better learning environment for both staff and students.

Students will be able to access learning materials at ease.
Students and staff members will be able to access study materials at a low initial cost.

The introduction of e learning and open source software will make the sharing and adaptation of courseware on a more equal basis possible.

**Conclusion**

The availability of quality Open Source Software provides African Universities with the opportunity to avail education to a greater number of students at lower costs through the establishment of a click Universities rather than the traditional brick Universities.

**REFERENCES**

[1] www.opensource.org


www.blackboard.com/

http://www.flextraining.com/licensing_fees.asp

http://moodle.org/stats/


**Appendix – Moodle Statistics**

There are 253 sites with more than 10000 users. The site with the most users is moodle.org with 49 courses and 404074 users. The site with the most courses is E-learning na VUT v Brně with 19223 courses and 41305 users.


**About the Authors**

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