A Study to Analyse Economic Benefits of Cloud-Based Open Source Learning for Australian Higher Education Sector

Raj Sandu

Academic, Higher Education, Kent Institute, Sydney, Australia
Corresponding author's E-mail: raj.sandu@kent.edu.au

Abstract

The radical progression in the information and communication technology (ICT) is changing every aspect of human life including the education system. Easy and inexpensive accessibility of internet is also allowing students, teachers, and educational institutes to explore new possibilities of learning through modern devices and ICT. Cloud computing is an essential technology in ICT today and can be applied in different sectors including education industry. The Cloud based open source learning is the result of such exploration and this practice of learning is improving with the time. The concept of this kind of learning had been introduced in the early 1990s but the arrival of the internet took it to the new level. Now, latest technologies like smart mobile devices, Cloud computing, and wireless internet connectivity are opening new opportunities for open source learning for more and more people all over the world. In future, the capabilities of this practice are expected to increase further but the question is what would be next development in this field. The aim of this paper is to review the literature on open source Cloud based learning and analyze its economic benefit of this practice for Australian higher education sector. Paper suggests that with the application of Cloud-based open source learning in Australian higher education sector will reduce cost as well as improve productivity. Also, machine learning and artificial intelligence technologies can make open source learning system more efficient and need to integrate these technologies in Australian education sector.

Keywords: *Open Source Learning, Economic Benefits, Cloud Computing, Australian Higher Education Sector.*

1. INTRODUCTION

Learning is a complicated process which involves the interaction of people, sharing of knowledge and proper guidance from a mentor. Educational institutes are trying to create a favorable environment for learning for different groups of people. These institutes have provided this world lots of genius mind and contributed a lot to the modern development in the world. Although, universities, colleges, and schools are essential for learning there is a large number of people who can't enroll in these institutes but they are eager to gain knowledge and learn new skills. Electronic learning, powered by ICT, is providing a fine way for these people to take classes and get certificate remotely. It is not enough but most e-learning programs are managed by educational institutes and they charge the registration fee. Open source learning is a promising solution to this problem. This type of learning is inexpensive, effective and flexible (Olla, 2012). The concept of open source learning is as old as the commercial internet but its application is relatively new (Edwards, 2001). Open source learning management system (OS LMS) is one application of this type of learning which is gaining immense popularity all over the world. Open source mobile learning is another application of this practice (Hidayat and Utomo, 2014). Open source learning can provide many benefits to Australian education sector in many different ways, apart from improving efficiency and reducing cost. Cloud based service application can improve organisation efficiency by reducing the cost of infrastructure as well having access to on demand service (Gide and Sandu, 2015b).

Khedr and Idrees (2017) mentioned that with the increasing number of education contents and resources, students, services had become problematic. Furthermore, he asserts that educational institutes are facing challenges in providing Information technology support for research and development activities. Cloud computing enables the institute to run the application as service on Internet proving scalability and enabling educational institutions to support their own infrastructure without requiring technical expertise for it. Also, Cloud computing can provide on-demand service to deploy tools that are scalable and provide a cost saving to the different industrial sector (Gide and Sandu, 2015a). This research paper will examine those future capabilities and economic benefits of open source learning for Australian higher education sector by reviewing literature in this field.

2. LITERATURE REVIEW

Open source learning practice is already playing a vital role in the success of learning management system of lots of educational institutes all over the world (Olla, 2012). The next step was open source mobile learning which allows people to interact with each other and share knowledge of their interest. The interaction of people is the best way to learn anything. The importance of one to one interaction in the process of learning is far more than hi-tech devices and modern technologies. These devices and technologies can facilitate this interaction and make it possible for people in remote areas to find people of similar interest and share knowledge effectively (Bai and Smith, 2010). Therefore, experts recommend one to one interaction between student and teacher which is becoming extremely difficult due to increasing number of students in classrooms (Singh and Holt, 2013). Olla (2012) states that Technology can make it possible for every student to have a personal teacher or mentor. The concept of machine learning can be used to train a machine to act as an instructor on eLearning platforms. These virtual instructors or teachers can help students to learn different skills efficiently (Hidayat and Utomo, 2014). Digital data of different formats can be used in open source learning platforms (Maican and Lixandroiu, 2016). Now, three-dimensional videos can be recorded easily. These videos can help a lot in explaining complicated concepts to e-learners. Videos are also very popular in open sour e-learning environment because learners can watch them in their spare time and these videos can also help them visualize different concepts. Some popular video streaming websites like YouTube allow users to upload, share and watch millions of video for free. These websites monitor users' activity and make recommendations on the basis of those activities. This feature can be added to the open source learning platform (Yousafzai et al., 2016). These activities can be analyzed using different parameters and then some recommendations can be provided to the learner or instructor to make the learning process more efficient. Kleftodimos and Evangelidis (2016) mention that for instance, if a learner has seen some videos on one topic and someone upload or shares something new related to that topic then the system will recommend learner to take a look at it. Similarly, this feature can also help in the evaluation process but there is need to work thoroughly on this capability of the open source system.

Open source learning is also making difference is the software industry. Several high profile software tools and operating system are open-source as anyone can see their source code and modify it for their personal usage. Moodle for high education is one of those tools which allow educators to make and manage their own online learning system. According to Costello (2013), there are two types of open source forums on the internet including education related and non-education forums. The non-education open source forums can also be used for learning some skills like software development and programming. Singh and Holt (2013) indicate that open source learning is not limited to education-related platforms. Non-education platforms can also be used to create awareness about different academic, economic, and social issues.

Now students don't want to acquire certificates and degrees only. They want real valuable knowledge which can help them to improve their lifestyle. Open source learning can offer them exactly what they want. This practice has the capability to even produce professional engineers and doctors. Olla (2012) states that learning-centric students can use cutting edge ICT and smart devices to complete different courses. There is one limitation of this practice; students will not be able to perform practices. Students can complete small practical projects with the guidance of their mentor but some experiments require supervision of an instructor, appropriate environment, suitable security and expensive equipment. This

deficiency can also be eliminated by offering regular attendees and highly active participant a chance to perform some experiments in their nearby facility. Australian education institutes, entrepreneurs and other related entities like publishers and e-library owners need to work together on the commercial level to make it possible for learners to have at least every virtual resource. A mobile application can be developed which allow users to read popular books and journals online. Hidayat and Utomo (2014) mention that this app will be like iTunes of apple where users can listen to thousands of songs in just a few bucks and copyright act is also not violated. Su et al. (2016) show the application of new hybrid fuzzy multiple criteria for decision making model to examine the Cloud based e-learning services for improving e-learning innovation performance. When a student has easy and cheap access to reading materials, instructors and peers he will learn from the core of his heart which will make the learning system more valuable not only for the student but also for his community and next generation of open source learners (Kleftodimos and Evangelidis, 2016).

Cloud computing offers student and university worker access to different resources and application through the internet, quickly and at minimal cost. Cost can be reduced by educational institute by reduction of ICT infrastructure cost of managing hardware, software and licenses cost. Resource and maintenance cost can be reduced due to a flexible aspect of Cloud computing by reducing ICT staff and eliminate high operational costs. Thus the Main benefit of Cloud computing for Australian higher education is financial. According to Almajalid (2017) just like other industries, the educational institution will be able to reduce the cost association with ICT infrastructure including energy consumption, labor cost, licensing, as well as hardware cost due to virtualization that comes with Cloud computing. Furthermore, Cloud computing will enhance the user experience, learning can be retrieved from a central point and can be accessed from anywhere and anytime without relying on the local server. With centralized learning resources, staff can focus on high quality learning experience rather than managing inefficient systems.

3. RESEARCH LIMITATION AND FUTURE WORK

This research is based on secondary source and focuses on Australian higher education sector only. Similar research can be replicated in other sectors and different countries. Future research will focus on Quantitative and Qualitative research. The survey would be sent to random education institute to understand the factors affecting adoption of Cloud based open source learning as well as an interview with the decision maker in the education sector will provide deep insight on advantages and challenges of adopting this services.

4. CONCLUSION

Open source learning is relatively a new concept but it is already making difference. This practice is making learning easier, inexpensive, equitable, accessible, and adaptable. The future of open source learning is bright as it has the potential to produce professionals. There is a need to integrate modern ICT with this practice in order to take it to the next level using Cloud computing in order to improve productivity and reduce cost. Machine learning and artificial intelligence technologies can make open source learning systems more efficient and there is a need to make serious efforts in integrating these technologies in Australian education sector. Entrepreneurs can also work with Australian educational institutes, publishers and other digital asset owner companies on the commercial level to add more value to this type of learning.

5. REFERENCES

Almajalid, R. (2017). A Survey on the Adoption of Cloud Computing in Education Sector. *arXiv preprint arXiv:1706.01136*.

Bai, X. & Smith, M. B. (2010). Promoting Hybrid Learning through a Sharable eLearning Approach. *Journal of Asynchronous Learning Networks,* 14**,** 13-24.

Costello, E. (2013). Opening up to open source: looking at how Moodle was adopted in higher education. *Open Learning: The Journal of Open, Distance and e-Learning,* 28**,** 187-200.

Edwards, K. (2001). Epistemic communities, situated learning and open source software development. *Epistemic Cultures and the Practice of Interdisciplinarity*.

Gide, E. & Sandu, R. (2015a). A study of the current situation of adoption of Cloud based services in Indian SMEs. Global journal of information technology. Cyprus: Academic World Education & Research Centre, Vol. 5, no. 1 (2015), p. 18-24 7 pages Refereed 2301-2617

Gide, E. & Sandu, R. (2015b). A Study to Explore the Key Factors Impacting on Cloud Based Service Adoption in Indian SMEs. e-Business Engineering (ICEBE), 2015 IEEE 12th International Conference on, 2015b. IEEE, 387-392.

Hidayat, A. & Utomo, V. G. (2014). Open Source Based M-Learning Application for Supporting Distance Learning. *TELKOMNIKA (Telecommunication Computing Electronics and Control),* 12**,** 657-664.

Khedr, A. E. & Idrees, A. M. (2017). Enhanced e-Learning System for e-Courses Based on Cloud Computing. *JCP,* 12**,** 10-19.

Kleftodimos, A. & Evangelidis, G. 2016. Using open source technologies and open internet resources for building an interactive video based learning environment that supports learning analytics. *Smart Learning Environments,* 3**,** 1-23.

Maican, C. & Lixandroiu, R. (2016). A system architecture based on open source enterprise content management systems for supporting educational institutions. *International Journal of Information Management,* 36**,** 207-214.

Olla, P. (2012). Open Source E-Learning Systems: Evaluation of Features and Functionality. *International Journal of Open Source Software and Processes (IJOSSP),* 4**,** 33-43.
Singh, V. & Holt, L. 2013. Learning and best practices for learning in open-source software communities. *Computers & Education,* 63**,** 98-108.

Su, C. H., Tzeng, G.-H. & Hu, S.K. (2016). Cloud e-learning service strategies for improving e-learning innovation performance in a fuzzy environment by using a new hybrid fuzzy multiple attribute decision-making model. *Interactive Learning Environments,* 24**,** 1812-1835.

Yousafzai, A., Chang, v., Gani, a. & Noor, R. M. 2016. Multimedia augmented m-learning: Issues, trends, and open challenges. *International Journal of Information Management,* 36**,** 784-792.