

Mobile Technology in Open Learning System: Advantages, Challenges and Solutions

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ABSTRACT

Information and Communication Technology (ICT) has revolutionized the functioning of distance learning system to a great extent. The technological advances in Open and Distance Learning System (ODL) have become more prevalent and easily accessible to greater masses. ICT is thrusting its inclusion in every aspect of ODL system whether it is teaching learning process or administrative operations. It has become imperative to employ ICT for carrying out all the activities of the ODL System in an effective way to meet the requirements and expectations in a better way. Given the presence of ICT in the ODL System, it has become necessary to study changing technologies and the manner in which they can improve the functioning of ODL system. Mobile technology is one such area which has revolutionized every sphere of life. Mobile communication is being considered as the best way of communication as it bridges the gap between geographical distances. ODL can take the maximum benefit out of mobile technologies, if used properly. This paper focuses on how ICT especially mobile technologies can be used to improve the functioning of the Open & Distance Learning. The paper also presents the issues of a service in terms of information sharing its authenticity and access control so that the system can ensure the information transmission to the utmost satisfaction of its candidates. The paper discusses the various mobile architectures and gives special preference to hybrid technology in support of systems.

Key words: *ICT, Distance Education System, Open and Distance Learning System, DDE, mobile technology, Information Sharing, mobile architecture, hybrid technology.*

Introduction

Information and communication technology is group of technologies by virtue of which various support services shall be provided to the students at different phases of learning in distance education system [5]. In Distance Learning System, there is a great geographical barrier between the learners and the learned people (teaching faculty). In contrast to the conventional teaching learning process where the learners and teachers interact physically on day to day basis and follow the proper time tables to teach the courses, the distance learning system does not have such established time tables. To overcome these barriers, ICT is being used extensively throughout the globe. Last two decades has witnessed a great shift in the methodology of teaching learning processes, as teaching and learning process has been clubbed together with the technology for the better transmission of knowledge and administrative information from administration to the students. The Distance Education institutes does employ ICT for the better functioning of the institutes, but the use of ICT in ODL is still minimal. ODL is mostly using the ICT only for admitting the candidates to the distance institutes and in disseminating various notifications to the students through their websites which is a classical one. ICT and Mobile learning may be used to improve the functionality of the ODL in an efficient manner. Mobile Applications have drastically changed the discourse of information sharing and business processing throughout the globe.

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Evolution of Mobile Learning in ODL

Mobile learning is an emerging field of learning in distance education system. Mobile Learning can be defined as any sort of learning that happens when the learner is not at a fixed, pre-determined location, or learning that happens when the learner takes advantage of learning opportunities offered by mobile technologies [1]. As more and more people are switching towards the distance learning education system. Scientists are coming up with the new ideas and techniques to meet the demands of the distance learning system and Mobile learning is one of the important outcomes of the research being carried out in distance learning system with ICT as its frame of reference. Mobile phone has become the necessity of the life and is being carried out by almost 70% of educated fellows. It's the smartest way to reach any person irrespective of geographical distances. Mobile learning uses these devices to carry the information from the instructor to the learners. So mobile phone or smart phones can be used easily for educational purpose in distance learning system. Mobile Learning is a learning process where the learner and instructor need not to be seated at a same place. It enables the learners to learn at their own conveniences i.e. at a location they desire and the time they choose. There has been the evolution in the distance learning mechanism with respect to time and advancement in technology.

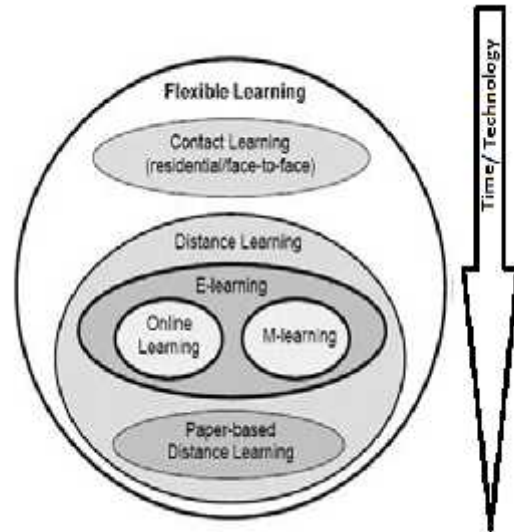


Figure 1: Evolution in Distance learning

In traditional distance learning system the information broadcast medium like (radio announcements etc.) were used to reach the distant learners for their respective course. But with the advancements in technology the electronic medium or ICT was involved in the educational sector to enhance the accessibility and become more and more reachable to masses via distance education system. Now the distance learners are using the mobile learning technology as a medium to achieve the education. Traditionally the information transmission from Distance education institutes was being achieved by way of print media only. Now a day, most of the distance education institutes are disseminating the information by means of the website, but the need of the hour is to switch to mobile technologies to reach to the learners instantly and effectively. It's very important to keep the pace with the changing technologies for the betterment of the society at large and ODL in particular. Figure 1. Broadly shows that the evolution in the learning process with time and changing technologies. The figure below traces the evolution in the process of learning from conventional class room oriented face to face learning to distance learning, which has also gone through a tremendous change in E-learning(Online Learning and Mobile Learning). Distance learning has been heavily encroached by online and mobile learning as indicated by a recent research.

The mobile learning has been enabled by many factors: The introduction of the cell phone and Personal Digital Assistants (PDAs) are probably the most significant. As advances are steadily being made in the small information appliance industry we expect to see them incorporated into the mobile learning paradigm; handheld devices, mobile phones, smart phones and iPods, etc.[3]. Mobile Learning achieved more features and flexibility by the development of Android Operating system which is built on the open Linux kernel. Android is an open source. The mobile learning applications will continuously evolve as the mobile learning software developers are working tirelessly to build innovative and on-demand mobile learning applications.

Importance of Mobile Applications in ODL

It is important to know the needs of mobile applications in the present education system. The future is running towards wireless system. E-commerce has been replaced by M-commerce [4]. There are mobile applications for banking, business and for almost every walk of life. So, in-order to keep distance education system upgraded with the present world, it has become obligatory to develop mobile learning environment. The information is useful only if it's being communicated to masses on time otherwise it's of no use. Mobile applications can help in transmitting the information instantly. The figure 2 shows the interaction of different actors viz: teachers, administration, learners in an ICT and mobile based environment. The figure 2 shows the scenario 1 as administration pushing the notifications to the server where the actual mobile application is hosted and the scenario 2 as the teacher pushing the assignments to the server through a web interface which is not shown in the figure. The learner/faculty after installing the application on his/her smart phone can get alerts as and when any notifications or assignments are being pushed to the server.



Figure 2: Interaction of different actors in a mobile based application

Advantages of ICT and Mobile Applications in ODL

It's imperative to discuss the prospective benefits of mobile technologies. To get in depth view of the benefits here are some important functionalities of the Directorate of Distance Education and their prospective improvements by using mobile technologies.

- The learner has to wait for a long time for selection list and has to call the directorate regularly for getting the update about the declaration of the selection list. Developing of android application may reduce the frequency of calling by the candidates as they can get the information in hand by just switching to the application on their mobile.
- Once the Admission/selection list is declared by the distance education institutes the candidate has to go through all the pages of the selection list to find his/her name, while as in mobile application the candidate may directly poll the application for knowing his selection.
- The learners of the Distance education institutes have to visit the concerned institute's website regularly from time to time for any notifications that may be issued, thus increasing the burden of the students. This burden can be eased up by going for a Mobile application which can alert the learners automatically as and when any notification is issued by the Distance institutes.
- Using the mobile application, distance learners can customize their intimation alerts according to their needs and can only receive the notifications and alerts of their interest, which is a distant dream in present system.
- The most important challenge that the learners face in distance education system is regarding the counseling of subjects they should opt for. Using the mobile application certain features can be made available for the learners before registering for a particular program (e.g., we can have one of the modules in mobile application as counseling guide module). So by using the counseling guide module of mobile application, the learners can beforehand decide which subject is best suited for them and can come fully prepared for the physical counseling session.
- The architecture of the application can be designed in such a fashion so that the mobile application can be scaled up as per the demand of the distance education system.
- Presently there is no system of run time announcements in the Distance Education system, for examples if there is a sudden change in the contact class schedules the learners are hardly reached on time. By having a mobile application we can notify all the learners instantly about any schedule change which can save the time, energy and certainly money of the learners.
- Presently if a teacher has to circulate any assignment or a piece of lecture, he/she has to circulate the hard copy among the learners physically. If a mobile application is implemented the same assignment can be circulated easily and instantly among all the learners, thus saving time and efforts.

Besides the above mentioned benefits there could be manifold benefits that will be achieved after the implementation of the mobile applications. Implementing the ICT especially Mobile applications will certainly improve the quality of work processes throughout the ODL. Apart from these advantages this application can be enhanced to include many other features on demand. This can be possibly done by using such an architecture which may be scalable.

Architectural Solution

Mobility has become a paradigm shift now a days and every sector is moving towards mobile application development in order to reach the majority of people. Before going to the implementation phase of the mobile application for Distance education Institutes, it is important to choose the suitable architecture and design for the application, in order to mitigate the downstream impact of poor architecture decision. There are many technology options available for mobile application development, and the main challenge is to choose the suitable mobile technology application development for distance education institutes. The three fundamental ways for developing mobile application are the native application, mobile web application, hybrid web application.

Native application runs on the specific device and operating system. These applications can be written in the native code only. It is costly and timelines can be long due to extensive hand coding. Web applications are built using standard web technologies like html, css, JavaScript. They run on a device with a web browser and are served from an application server. The main disadvantages of mobile web technology are that the developer doesn't have full access to devices native functionalities. Also the application developed in such environment can't be distributed via the app stores and it lacks in performance in a complex user interaction like animations and does not have support for native device features like Bluetooth, camera, GPS etc. [7]. So building an application using native technology or mobile web application for distance educational institutes may not be the option. Hybrid technology is a combination of native and mobile web technology. It has been designed to take the advantages of both the technologies. Hybrid application is a web application which is built using HTML5 and JavaScript which is then wrapped inside a thin native container that provides access to native features of a device like camera, bluetooth, file system etc. [2]. Hybrid technology has got some features which makes it a better choice for developing mobile application for distance education system. Its faster time to market, access to device native features, cross-platform portability can benefit the distance education institutes to reach the majority of the distance learner. This architecture is also scalable, thus has the better provision to meet the future demands of the distance education system. Figure 3 shows the high level architectural structure of the hybrid mobile application for ODL.

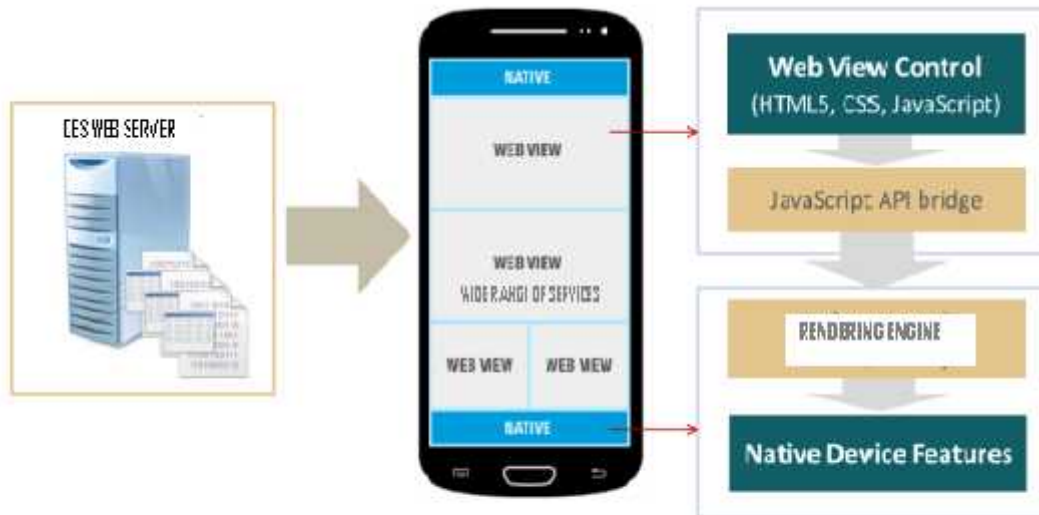


Figure 3: High level architecture of ODL using Hybrid Technology

Challenges

The main challenge in implementing the smart mobile applications in Open Distance Learning system is the problem of acceptance. There are two categories of people who encounter problems when they are asked to use mobile devices.

The first category is the lot of people who have been in the Directorate of Distance Education for long time now. They are used to traditional mode of working and are resistant to learn and switch to new technologies as compared to their younger counterparts who accept and upgrade to new technologies very easily. Switching to mobile learning seems to be an uphill task to this lot and they love to stick to their older tactics of working, thus providing a great challenge to mobile learning implementation.

Second category is the people of rural areas where the awareness is the main issue. This is a second serious implementation impendent. Interestingly, the second category contributes to more than 50 percent learner enrollment for the Directorate of Distance Education.

Another serious problem that should be considered is user data privacy and securities because of new technologies are more vulnerable of attacks by Intruders and question of authentication and authorization are critical for successful education and development of effective mobile learning system [6]. Hybrid technology has a lot of benefits as compared to the other but simultaneously has an issue of speed. It has slightly lower performance as compared to the native technology because the page has to render through multiple layers. Another challenge in developing mobile application using hybrid technology is that the development organization must develop, maintain and deploy multiple versions of native shell in order to support multiple operating systems.

Solutions

The challenges posed to the implementation of ICT by way of mobile applications can be easily dealt with timely up gradation of the human skills. The long time employees can be trained to use the new technologies by going for a time to time training sessions and programs. Skill up gradation shall be counted for the carrier advancement schemes so as to make this learning process more attractive. Extra perks may be given for attending the training sessions. Culture of best worker of the month may be incorporated in the Directorate which will throw an open competition between the employees for achieving the awards.

The second challenge can be neutralized by arranging some counselling sessions for the students at the time of contact classes. Each teacher may be asked to spend an hour on the usage and utility of the mobile applications in reference to the DDE. This will certainly make the rural learners aware of the benefits of the mobile application and will lead to the effective use of the mobile applications by the learners who are the main target users of the applications.

Security of the mobile applications shall be ensured by protecting the sensitive resources at network, system and the application domains. Some of the security parameters are authentication, access control, availability, confidentiality, integrity and non-repudiation. Violation in any of the parameter leads a breach in security. All these security parameters shall be enforced along with security policy on the ICT infrastructure being used in open distance learning.

Conclusion

This paper suggested mobile technology as one of the solutions through which education can be imparted to large number of learners in an efficient and effective way through open and distance learning system. The paper describes the mobile technology as need of hour for the teaching learning process in distance learning system. It describes the hybrid technology as the suitable architectural solution for the implementation of mobile application development for distance education system. The paper presented certain challenges and security issues which the ODL can face after adapting mobile technology but simultaneously suggests certain measures to overcome these difficulties.

REFERENCES

- Ally, Mohamad & et al (2014). Increasing Access through mobile learning. Commonwealth of Learning and Athabasca University.
- B Nripin B & B Arun (2013). Development of hybrid applications with Html, Mindteck.
- David Martel Johnson & Christina E. Erneling : The Future of the Cognitive Revolution, New York: Oxford University Press,1997.
- Keegan Desmond & Dublin, The incorporation of mobile learning into mainstream education and training; Ireland.
- Rao M Murali (2009). Web-enabled User Support Services System in Distance Learning, Proceedings of International Conference on Interaction Sciences: Information Technology, Culture and Human, Vol.I, 86-90.
- Korneliya Y: (2007). Mobile learning and integration of advanced technologies in education International conference on computer systems and technology, Compsystech,.