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REVIEW ARTICLE

IMPLEMENTATION OF SAUDI UNIVERSITIES E-LEARNING CENTRE USING WIMAX TECHNOLOGY: SAMPLE APPROACH IN JAZAN UNIVERSITY, KSA

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ABSTRACT

One of the recent developments in E-learning is the introduction of wireless technology communications through Internet. Saudi Arabian education system is under stress to provide additional educational opportunities for increasing population and a desire to increase literacy rate. Internet offers a viable and cost effective alternative to formal classroom learning. All most all Saudi e-learning centre providing education with existing network connections through internet. This proposed research using WiMax technology, which maintains a high speed connection to an internet service provider. Also, this paper discusses the benefits and establishment of WiMax connectivity to e-learning centre. WiMAX has emerged as an exciting technology with promises to offer high throughput and improved quality of services, key requirements for video surveillance on public transport.

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INTRODUCTION

The Kingdom of Saudi Arabia spent hundreds of millions of dollars improving the nation's educational system, specifically higher education. These improvements include the construction of new state-of-the-art universities, which rival top institutions around the world. The new institutions have come with curriculum development and changes and the introduction of technology for educational purposes (Riyadh 2012). Electronic learning, or e-learning, is education based on modern methods of communication including the computer and its networks, various audio-visual materials, search engines, electronic libraries, and websites, whether accomplished in the classroom or at a distance. Generally speaking, this type of education is delivered through the medium of the World Wide Web where the educational institution makes its programs and materials available on a special website in such a manner that students are able to make use of them and interact with them with ease through closed or shared, networks, or the Internet, and through use of e-mail and online discussion groups (Riyadh 2012). The responsibility of e-learning centers on its being a learning method and a technique for the presentation of academic curricula via the Internet or any other electronic media inclusive of multimedia, compact discs, satellites, or other new

education technologies. The two parties participating in the educational process interact through these media to achieve specific educational objectives (Riyadh 2012). The grew an increasing interest in online learning in higher education fuelled by both the innovations in internet-related technologies and the desire for flexibility and convenience on the part of both students and instructors in Saudi Arabia. The need for this flexibility and convenience in the delivery of university education and other instructional/training courses across all levels of education has been identified by various initiatives in Arabia aiming at maintaining widening participation in education in all sections and across all ages in the Saudi society as well as sustaining professional development (Hamad Al-Dosari, 2011). Various technologies are used to facilitate e-learning. Most e-learning uses combinations of these techniques, including blogs, collaborative software, e-portfolios, and virtual classrooms.

- Audio
- Video
- Computers, tablets and mobile devices
- Blogging
- Webcams
- Whiteboards
- Screen casting

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The Internet connection providing enormous support on the e-learning system through wireless technology using wireless broadband network technologies such as local area networks

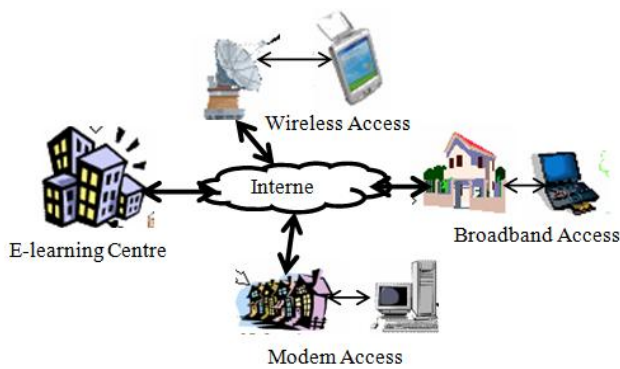


Fig. 1. E-learning centre

(WLAN), 2G, 2.5G cellular wireless networks. The mobile network suffers from limitations of low data rate and coverage area. The WiMAX technology provides broadband Internet access over large distance (typically over 30-50 km) with very high data rate (say 100 Mbps) and is an alternative to cable and digital subscriber line (DSL) (Charles Chittaranjan Patra *et al.*, 2010 and Ghosh *et al.*, 2006). In this paper Education networks is established through WiMAX network to connect school and school laboratory within a district, or country wide to exchange information from one institute to another. We also investigated the complexity related for establishing ICT in Bangladesh to run effectively e-learning technology. Depending on the observation we have proposed some recommendation to be considered before establishing e-learning technology (Charles Chittaranjan Patra *et al.*, 2010). The main purpose of this research is to be study increase of students' learning activity using WiMax for higher education in Saudi Arabia. Firstly, this study described literature review about theory and model that could be explained and predicted an acceptance in new WiMax technology. Secondly, it described significance of the research methods. Thirdly, it described the structure of sample approach of e-learning centre and WiMax. Then it analyse about benefits of the proposed model and conclusion shown in the final section.

Literature Review

Charles Chittaranjan Patra. Md. *et al.* (2010) Information and communication technologies (ICTS) are considered valuable tools in Bangladesh for education to ensure quality of education. This paper investigates models of Internet connectivity for educational institutes through WiMAX network to interconnect all the schools from even remote location to deploy e-learning technology in Bangladesh. This paper also analyzed the complexity for deploying the e-learning technology (Charles Chittaranjan Patra *et al.*, 2010).

Paul Pocatilu (2010) WiMAX technology is the only solution for isolated locations where e-learning distributed platforms need to be used. This paper focuses on security issues for e-learning solutions, especially when WiMAX technology is used (Paul Pocatilu, 2010).

Hamad Al-Dosari (2011) In Saudi Arabian universities, there is a tangible presence of Web-based curricular provisions within the traditional university known as blended

learning. The study also assesses the effectiveness of and preference for, web-based learning as perceived by faculty and students. Faculty and student responses were generally positive overall and indicated that learning improved in an e-learning environment compared to a traditional approach (Hamad Al-Dosari 2011).

Ahmad (2012) Here they proposed a new design a network test bed together with the e-learning portal and PRTG is used to monitor the traffic in Wi-Fi / WiMAX environment. The assessments involved in four different traffic types which are the web traffic, file transfer and multimedia traffic. The experimental result shows that the quality of traffic when the video application is being used in e-learning portal (Ahmad, 2012).

Abdulaziz Aljabre (2012) Distance learning is a growing topic in education. Studies have reported both benefits and drawbacks to the use of distance learning. Many higher education institutes have recognized the benefits that distance learning provides to its students and developed successful distance learning courses. This paper analyzes the current distance learning programs in three Saudi universities, as well as the need for the expansion of distance learning. Finally, the future possibilities of distance learning in Saudi Arabia are explored (Abdulaziz Aljabre 2012).

Ayman Bassam Nassuora (2013) Mobile learning is the next step in the development of distance learning. Widespread access to mobile devices and the opportunity to learn regardless of time and place make the mobile learning an important tool for lifelong learning. The research objectives are to examine the possibility of acceptance in mobile learning and study main factors that affect using m-Learning that focus on higher education students in Saudi Arabia (Ayman Bassam Nassuora 2013).

Need and Importance of the Research

The volume of students enrolling for e-learning courses is on the increase of entrusted e-learning centre in Saudi Universities. Though, it is responsibility of fulfilling and providing facility to the Saudi's learner. The existing e-learning centre in Saudi Universities, Still they are using broad band or DSL Connection. WiMax was designed from the get go as a "last mile" solution. There is a bandwidth limit and it will be offered by service providers to compete with remote locations that e-learning user can access the service anywhere. WiMax is a wireless wide area network that provides the high speed of DSL while also providing connectivity in every corner of its coverage area, and provides the suitability of Wi-Fi while not requiring hotspots and not having distance limitations. WiMax gives to wireless Internet connectivity what GSM has given to phones. In existing e-learning, VoIP service has much been hindered by the limitations of DSL broadband and wireless networks like 3G and Wi-Fi. If WiMAX is developed and matured, it will constitute an ideal platform for the deployment of VoIP applications and services. VoIP will therefore drastically thrive with WiMAX. Read more on VoIP and WiMAX. The following table will differentiate the effect of Wimax technology on e-learning.

Wireless comparison

Feature	Wi-Fi (802.11b)	Wi-Fi (802.11a/g)	WiMax (802.16a)
Primary Application	Wireless LAN	Wireless LAN	Broadband Wireless Access
Frequency Band	2.4 GHz ISM	2.4 GHz ISM (g) 5 GHz U-NII (a)	Licensed/Unlicensed 2 G to 11 GHz
Channel Bandwidth	25 MHz	20 MHz	Adjustable 1.25 M to 20 MHz
Half/Full Duplex	Half	Half	Full
Radio Technology	Direct Sequence Spread Spectrum	OFDM (64-channels)	OFDM (256-channels)
Bandwidth Efficiency	≤ 0.44 bps/Hz	≤ 2.7 bps/Hz	≤ 5 bps/Hz
Mobility	In development	In development	Mobile WiMax (802.16e)

Implementation Model

A wimax tower can connect directly to internet using a high-bandwidth, wired connection. It can also connect to another tower using a Line-Of-Sight, microwave link. The connection with other towers is referred as Backhaul established in Base station. From the base station, it can be extending to E-learning centre. In order to study the attitudes of students on the effectiveness of e-learning, The basic idea of multimedia streaming is transporting different types of desired media content to the user over a network, and displaying it to the user. Both, Live and interactive audio/video on the other hand, involve a client and two servers. WiMAX has the capability to deliver broadband speeds over 70Mb/s in an efficient manner. Theoretically believed, that WiMax technology provides range upto 50 KM. WiMAX technology can provide coverage in both LOS and NLOS conditions. NLOS has many implementation advantages that enable operators to deliver broadband data to a wide range of customers.

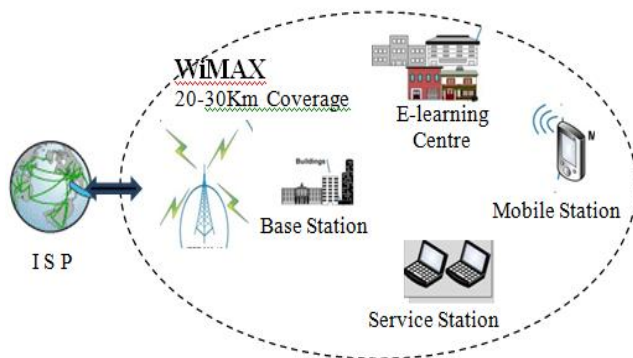


Fig. 2. E-learning centre connected with all users

WiMax Technology carries real augmentation to communications through which you can get benefit not only from voice but also video and data transmission to get quick response to situation. Through WiMax Technology a client can deploy a temporary communication services and speed up their network to support events and circumstances. The basic strength behind the WiMax Technology applications are high bandwidth, high quality services, security, deployment, full duplex including DSL and versus cable, and its cost.

Benefits of Proposed Structure

Propagate e-learning and distance education applications in university education institutions in accordance with accepted quality standards. The major findings of the study along with the recommendations are as follows:

- Organize meetings, conferences and workshops which will help to develop e-learning centre, e-learners and Administrator.
- It will help to Cooperate with other colleges, students, staff, administrator etc.,
- There are a number of advantages on use WiMAX; moreover the most important is the combination of low cost and flexibility.
- WiMAX broadband networks can be quickly built at relatively low cost by installing few wireless base stations providing coverage to the surrounding area with multifunctional application
- Wimax technology supports high-speed Internet, telephone service, voice and data transfer, and video applications.
- It is also help to high-speed voice and data transfer over long distances in remote and scarcely populated areas, as well as in densely populated areas.
- The wireless connectivity is not affected by the weather conditions, so administration work and e-learning work will progress at any cause.
- WiMAX offers potential for development, new applications and opportunities.
- Wimax technology will increase quality of the e-learning and also the commitment of the e-learners paving way for successful functioning of the concept of e-learning.
- The e-learners can access e-books, e-journals and other related materials from digital library connected with the administration.
- The WiMax technology supports good quality of graphics, animations included in the course materials.
- It will increase the teacher-student personal contact, using mobile communication apart from the class room session.
- WiMax is an interactive tool between the instructors and e-learners need to be made more user-friendly so as to help them achieve the intended purpose.
- WiMax enabling e-learners to contact administrator to solve their problems related to administrative issues.
- WiMax connecting all kinds of user like Mobile Station, Base Station, Subscriber station, So, It provides holistic approach to all concerned activities such as administrative issues, course contents, instructor support, viper sessions, grading and assessment etc.,

Conclusion

This Research proposal study is an attempt to enhance the quality of e-learning with help of WiMax technology. The e-learning programs offered by many universities in Saudi Arabia, this sample study approach proposed for the Jazan University, Kingdom of Saudi Arabia. The proposed model also revealed the existence of significant differences among

the Wireless, broad band connection and WiMax technology. WiMax technology giving suggestion regard to administrative issues, instruction materials, instructor support, grading and assessment etc., This study further insisting that, if the concept of WiMax technic will give better approach and perspective, the reach would be provide impressive progress.

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