Chapter 18
Virtual On-Line Classroom for Mobile E-Learning over Next Generation Learning Environment

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ABSTRACT
This chapter develops an environment for mobile e-Learning with interactive courses, virtual online labs, interactive online tests, lab-exercise training platform and the identification of learning information by next generation tag on the 4th generation mobile communication system. What the Next Generation Learning Environment (NeGL) promotes is “Knowledge Economy”. At present, inter-networking has become one of the most popular technologies in Mobile e-Learning for the Next Generation Networks (NGN) environment. This system uses various computer embedded devices to ubiquitously access multimedia information like smart phones and PDAs, and the most important feature is its greater available bandwidth. The future learning mode will include an immediate, virtual, interactive classroom with personal identification that enables learners to learn and interact. (Wu et al. 2008)

INTRODUCTION
The development of new approaches and technologies to support distance learning are undergoing now. Web-based and mobile asynchronous learning environments and virtual classrooms via the Internet have been adopted widely in particular. For the time being, the current trend of e-Learning is the static information as an instructional delivery method. Learners using these kinds of conventional learning methods are only able to browse through the mass static information and this is passive learning by reading online.

In the last decade, technologies enabling e-Learning have made the learning locations much more flexible and wireless communication technologies further increase the options for learning locations. Advances in wireless communication technologies have provided the opportunity for educators to create innovative educational models. With the aid of wireless communication technology, educational practice can be embedded into mobile
life without wired-based communication. With the more mobile, portable and individualized trend in educational media, the learning form is being modified in spectacular ways. (Gang et al. 2005)

In the third generation cellular system (3G) environment (like Universal Mobile Telecommunications System, UMTS), the data rate reaches 2Mbps while the user is standing and 384Kbps while the user is moving slowly. Multimedia streaming, video conferencing, and on-line interactive 3D games are expected to attract an increasing number of users. However, such bandwidth is not sufficient for these increasingly popular applications and would be the major challenge for wireless networks. The 3G bandwidth has great problems in interactive teaching. (Bos et al. 2001)

In the future, wireless network traffic is expected to be a mix of real-time traffic such as voice, music, multimedia teleconferencing, online games, and data traffic like web pages browsing, instant messaging, and file transfers. All of these applications will require widely varying and very diverse quality of service (QoS) guarantees for different types of offered traffic. (Dixit 2001)

The mobile devices have limited screen sizes, computation resources, bandwidth and interaction. The information often needs to be formatted, structured and translated before it can be displayed on the devices. Moreover, learners can use different devices to access learning servers no matter by fixed or mobile devices. The RuBee tag stores the personal’s identification to support adaptability with respect to available bandwidth in the query processing. It can classify the different types of queries specific and adaptability module which maximizes information transferred. Within RuBee tag technology to provide mobile users with flexibility for using. (Wu et al. 2008)

For these reasons, a 4th generation improving mobile communication system is unquestionably necessary. The 4G system can support more bandwidth than other systems and its advantages include authentication, mobile management and quality of service (QoS). Nevertheless, how to implement future distance learning environments for the 4th generation mobile communication system is the question. In this chapter, we distinguish four kinds of interactive courses: virtual online labs, Interactive online test and lab-exercises training platform to deliver over the 4th generation mobile communication system. The 4th generation mobile communication system can use various computer embedded devices to ubiquitously access multimedia information, such as smart phones, PDA; and most importantly, it offers more bandwidth to supply ubiquitous learning environment. (Girish et al.2000)

These new functions can improve the latency and location limits during transmission. Our proposed Next Generation Learning Environment (NeGL) offers learners the opportunities to use all kinds of mobile nodes that can connect to an Internet learning equipment system for access using All-IP communication networks and the Shareable Content Object Reference Model (SCORM) is used to compose information. Hence, as you can imagine, the condition of the future learning mode will be an international, immediate and virtual interactive classroom that enables learners to learn and interact.

ENVIRONMENTS FOR MOBILE E-LEARNING

Wireless communications technologies have enabled many conveniences in our lives. Ubiquitous access to information anywhere and anytime will characterize the whole new kinds of information systems in the 21st century and these characteristics are being enabled by rapidly emerging wireless communications system, based on WiMAX, cellular networks, wireless LANs, etc. Additionally, technologies enabling e-Learning have increased the flexibility of the learning locations and wireless communication technologies further increase