

Design of Mobile Learning Content with a Mobile-Based Live Multimedia System



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Abstract

With the rise of world progress, information technology and telecommunications to the Internet have become a top priority. These advancements mark a watershed moment in mobile learning, or "mobile learning," as it is known (m-learning). M Learning has some extra learning capacity that can be accessed by anybody, at any time, from anywhere. The issues still exist in m-learning, including a shortage of hardware and platforms required by the system architecture and accessibility. In order to become comfortable for the user, a thorough examination of each component dealing with existing m-learning is also required. This research aims to address the problem by employing multimedia as a material that can provide more precise and detailed information. Multimedia m-learning services necessitate an internet connection, excellent access, and adequate hardware to benefit from the overall bias with good services provided by phones that offer mobile multimedia facilities. The study's primary goal is to create m-learning with multimedia services, and the expected results are a software-based content provider.

Keywords : Internet, m-learning, multimedia.

1. Introduction

Communication technology is growing and advancing rapidly in line with current needs. Almost every activity process cannot be separated from the use of communication technology. Current technological developments are directed to be able to simplify the process of activities. In this case, IT (Information Technology) breakthroughs for learning are still very intensively developed continuously. Mobile internet is one of the methods that is currently being developed in the world of education so that it can be used as a facility for learning by learners with its flexibility and convenience that allows learning using the mobile method or better known as mobile learning (m-learning). Multimedia is something that continues to be a concern and developed by the internet industry [1]. The reason is, by using multimedia facilities, the learning process using m-learning can increase user satisfaction. From the



internet user's perspective, it is not easy to get the satisfaction of enjoying quality multimedia if the content, multimedia delivery method and internet access speed are still small. The WCDMA cellular communication system has been used as a 3G communication technology with high speed and large bandwidth to access the internet [2].

Multimedia

Multimedia is the use of computers to create and combine text, graphics, audio, moving images (video and animation) by combining links and tools that allow users to navigate, interact, be creative, and communicate [3]. Multimedia makes activities dynamic by giving new dimensions to words, words in multimedia applications can be triggers that can be used to expand the scope of texts to examine a particular topic more broadly. Multimedia also brings text to life by including sound, images, music, animation, and video [4]. Computer and video or audio are combined to create multimedia. Generally speaking, multimedia is a mix of three elements: sound, picture, and text. Having at least two input or output media from data, such as audio (sound, music), video animation, text, graphics, and photographs, constitutes multimedia. With the use of multimedia, presentations may be made that are dynamic and interactive that incorporate text, graphics, animation, music, and video.

M-Learning

Mobile Learning (m-learning) is the development of e-learning. The term mobile learning (m-learning) refers to the use of handheld and mobile IT devices, such as PDAs, mobile phones, laptops, and tablet PCs, in teaching and learning. M-learning is a unique learning because students can access learning materials, directions and applications related to the course anytime and anywhere. M-learning (mobile learning) is a type of learning that makes use of technology and mobile devices. The gadget in this example might be a PDA, mobile phone, laptop, tablet PC, or other similar device [5]. Users may access learning information anywhere and at any time with mobile learning, eliminating the need to attend a certain location at a specific time. As a result, consumers may access instructional information regardless of their location or time. Mobile learning, according to this definition, is a learning approach that makes use of information and communication technologies. Mobile learning benefits from the availability of instructional resources that can be accessible at any time and the depiction of fascinating content in this learning idea [6]. The capacity to link to other equipment, particularly computers, the ability to provide learning material, and the ability to actualize communication between teachers and students are all crucial qualities that m-learning learning aids must give.

Mobile Multimedia

Multimedia on Mobile is a data technology in the form of multimedia files that can be run on mobile devices [7], in the form of video, audio, animation, data files that can be run directly waiting for the download access process to finish first. The process of designing multimedia content has several steps as follows:

1. The content is prepared according to the minimum capabilities of the mobile phone (resolution, file size, easy to access, and attractive)
2. Compresses the file but retains almost the same quality as the input file taking into account the codec.

3. The content is tested on a mobile phone by testing several sample content before it is ready to be uploaded to the database via the internet.
4. Test content via internet access (browse and download).
5. Playing multimedia content on a mobile phone.

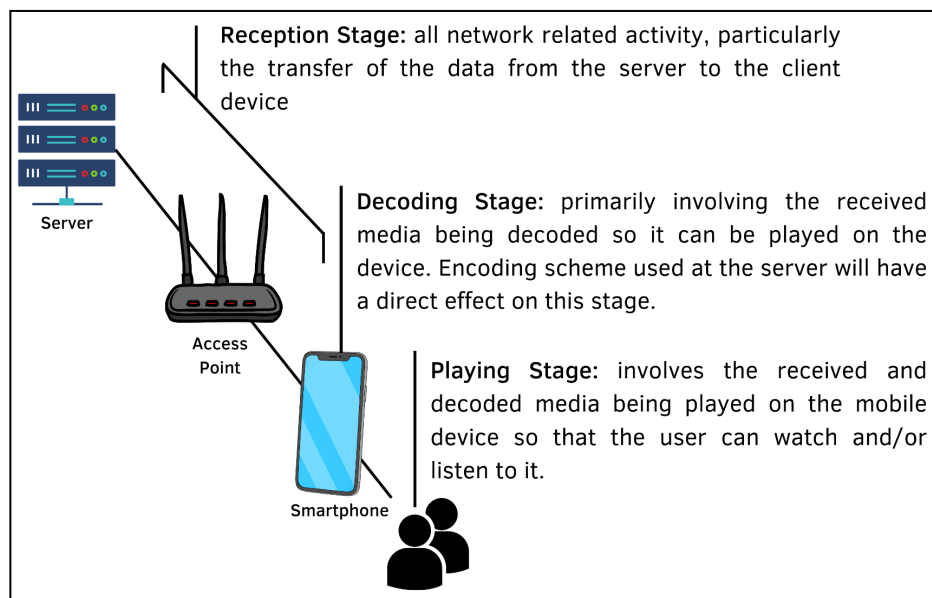


Figure 1. Multimedia access process

Codec

Codec is short for coding/decoding. Codec, in the context of video, is a method or algorithm contained in an access player whose function is to perform the process of compressing and decompressing video media files [8]. Codec Science is a digital art. Many things must be considered if you want to do the compression-decompression process of media files.

The application will be made using the Java2 Micro Edition (J2ME) programming language. Making this application using a visual MIDlet, the goal is to simplify the design for beginners. The visual way of making a form is in the form of a form that is compiled by connecting the prepared form and then all you have to do is provide information, data and content to be provided [9]. Media creation with the help of Software NetBeans 6.1.

The result of this system is a website, wap-site, and an interactive m-learning application. The materials prepared are English learning materials and Communication System materials using multimedia. The multimedia files used are video, audio, and text. The video that is run is in the form of a simulation video on how to learn effectively with instructors for English language material and video material related to Communication Systems, using video formats (.3gp, .flv, .mp4) for HTTP and WAP concepts. The material in the form of text is made in the format (.pdf, .doc, .ppt) [10].

2. System Requirement Specifications

In the system requirements specification, the software and hardware system requirements (client and server) that can support the manufacture and operation of the system are reviewed.

2.2 Client Specification

The specifications that the client must have in the implementation of this application program are as follows:

1. Hardware requirements, minimum mobile phone with WAP browser facilities (minimum wap 1.2), but ideally for the m-learning system to use a smartphone or at least a mobile phone that supports GPRS with VideoPlayer and Quick Office facilities, for PC (Personal Computer) Intel Pentium or AMD with a clock speed of 233 Mhz and a minimum of 512 MB RAM or better specifications.
2. WAP browser is a mobile emulation program that allows you to view a WAP site, and the Nokia WAP browser from the Nokia N79 was employed in this study's testing. WAP 1.2.1 - WAP 2.0 XHTML implementations can utilize the browser. Microemulator from MicroEmu was utilized in the WAP media pictures [11]. The internet web browser web site may then be utilized automatically by mobile phones that have WAP browser capabilities (at least version 1.2) or those that already have 3G capabilities and support XHTML.

2.3 Server Specification

The following are the server specs for implementing this application program:

1. Windows XP Service Pack 2 is the operating system.
2. Apache server is used for the web server, while MySQL server version 5 is used for the database server.
3. PHP, WML, and XHTML are used to create applications.

2.3 M-Learning System Design

The following is the design of an m-learning application system that can operate to overcome platform compatibility and interoperability by supporting 3 media, namely HTTP running on a PC or Laptop, WAP on small memory devices, and Web 2.0 on today's devices or better known as smart phones.

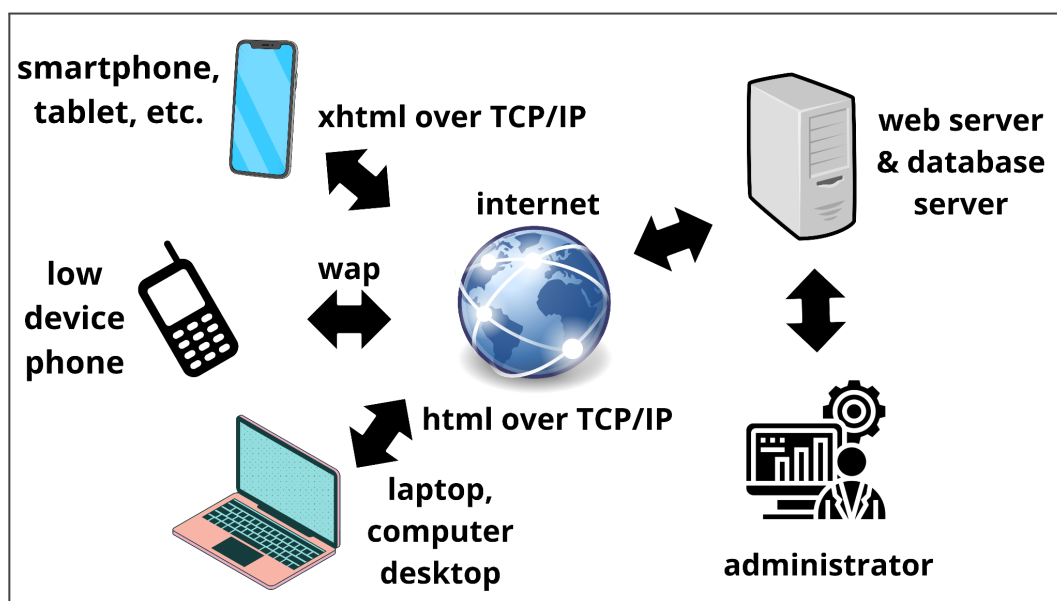


Figure 1. M-Learning system design

To get to it, the user uses a mobile phone browser to go to the accessible URL address. The user may then browse and use the multimedia features accessible on the web and wap sites. If the user wishes to use the content without having to go online, he or she must first download it. Video files, online texts, Ms.office texts, and j2me apps are among the multimedia content types available (installed on mobile phones) [12]. Depending on the capabilities of each mobile phone, each content presentation is unique.

3. Results

3.1 Design Results

The result of the system is a web-site, WAP-site, and an interactive m-learning application. With the facilities that contain general English learning materials and Communication System lecture materials, it is hoped that good learning feedback will occur. Each sub-website, WAP-site, and Java m-learning application's display design is described below. But first, we'll go through the web-site, WAP-site, and m-learning apps' implementation and system requirements.

3.2 System Requirement Specification

The software and hardware system requirements (client and server) that may enable the construction and operation of the system are evaluated in the system requirements specification section.

3.3 Specification Server

The specifications on the server in the implementation of this application program are as follows:

1. Operating System using Windows XP SP 2.
2. The web server uses Apache server and the database server uses MySQL server version 5.
3. Applications are made using PHP, WML and XHTML programming.

3.4 System Testing

System testing is testing done in accordance with software requirements or standards. This test is often conducted using requirements that are manually and impromptu assessed. The findings of this test may be inconsistent and unclear since it lacks defined methodologies and criteria. The testing of application programs used in the mobile electronic learning system will be detailed in this step using the WAP-site mlearning and the m-learning website to support the application [13]. With this test, the error rate in data processing and the system as a whole should be reduced.

3.5 Implementation of Mobile Learning Web-site with HTTP

The term "Web 2.0" refers to a system's look and design as complete, without any page compression or reduction [14]. The user can access and use multimedia resources that correspond to the lesson topic from the online menu above. Video streaming services may be used to consume content on web pages.

3.6 WAP-Site Implementation

WAP, also known as the Wireless Application Protocol, is a messaging service protocol that enables a digital mobile phone or mobile terminal with WAP capabilities to see or read the main content of an internet site in a particular text format. The WAP-site's operating system is essentially the same as that of the mlearning website, with the exception that WAP is a medium that serves as a technique for connecting the internet to cellular phones [15]. The cellular phone in question has GPRS and GSM capabilities, but if it also has 3G or XHTML Parsing capabilities, the website, in this example www, will be shown immediately by the browser.

3.7 WAP-site Page

Users can access material by registering first from the wap menu display. This website is designed primarily for phones with restricted hardware capabilities [16]. This page simply shows the most important aspects of the website. The given content may be viewed and used immediately on a mobile phone. By filling out the questionnaire data form, you may contribute to this website and WAP site [17]. The system's flaw is that the WAP-site page can't immediately run multimedia files; to work around this, the multimedia files must first be downloaded and then run on the mobile phone. An m-learning web-site application, which can be accessed with a mobile phone that supports a complete HTTP browser, is used as an alternative to executing all multimedia files.

4. Conclusions

The following conclusions may be taken from the design of mlearning multimedia content:

1. M-learning apps that incorporate multimedia material may be created using PHP, WML, and J2ME technologies.
2. Multimedia material can already run on HTTP and WAP protocol media; however, the display results are dependent on each mobile phone's capabilities.
3. In m-learning multimedia, the value of the material given and the convenience with which the application system is accessible are the most important factors.
4. For information managers, such as instructors, students, or other parties, the Mobile Learning application can make it simpler to search for and disseminate learning-related information, particularly for students majoring in computer and network engineering.

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