

A Study on the Delivery Systems of Teaching and Learning Contents for Education System Reform of Developing Countries

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ABSTRACT

The world has witnessed a phenomenal growth in information and communication technologies (ICT). The development of new broadband communication services, convergence of telecommunication with computers and recent developments in the field of communication protocol have fostered challenges as well as offerings in the wide-ranging use of ICT to support the creation of dynamic and interactive teaching and learning environment. By emergence of ICT, most of education and training institutions are struggling to integrate ICT and education and training systems. It is so important to apply proper delivery systems for utilization of the computerized teaching and learning contents in the classrooms. It will be a preliminary activity for building open and flexible distance teaching and learning systems in developing countries. In this paper, we would like to suggest and recommend the proper delivery systems for utilization of the computerized teaching and learning contents in the classrooms for education sector reform in developing countries.

Key words: Delivery Systems, Teaching and Learning Contents, Educational Software System

1. RATIONALE

Distance teaching and learning is an education and training system that focuses on the integration of pedagogy, ICT, and instructional system designs that aim to deliver education to students who are not "physical site" in a traditional classroom. It has been described as "a process to create and provide access to learning systems when the sources of information (teaching and learning contents) are

separated from the sinks of information (destination) for the learners by time and distance [1,2].

The blended teaching and learning systems approach the combination of Face-to-Face Instruction and Computer-Assisted Instruction (CAI) in the classrooms. It also applies ICT with the assistance of educational technologies using Computer, Cellular or Smart Phones, Satellite Television Channels, Video-conference and other emerging e-Media. Learners and teachers work together to improve the quality of teaching and learning, the ultimate aim of blended learning being to provide realistic practical opportunities for learners and teachers to make learning independent, useful, sustainable and ever growing [3,4]. The teaching and learning materials by means of delivery systems as parts of educational software systems are focal points of educational sector reform. More practically, most of developing countries are suffering from inconsistency and impropriety of the delivery systems for teaching

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and learning materials in the education and training institutions [6,7].

In this paper, with these kinds of underlying environments of teaching and learning contents delivery systems in developing countries, we would like to answer, verify and consult the following questionnaires of the delivery systems for computerized teaching and learning contents as educational software systems:

- (1) What is the scope of education software system?
- (2) What kinds of delivery systems can be used for computerized teaching and learning contents in classrooms?
- (3) What kinds of delivery systems are most effective to use computerized teaching and learning contents according to types of materials?
- (4) Suggestion and recommendation in term of delivery systems for educational software systems

2. The Scope of Educational Software Systems

The scope of the educational software systems is composed of four factors such as (1) the educational software development tools, (2) developed teaching and learning materials, (3) delivery systems, and (4) players, browsers, drivers, processors, and presenters as depicted in Figure 1.

There are so many kinds of educational software systems such as (1) instructional presentation materials, (2) children’s learning and home

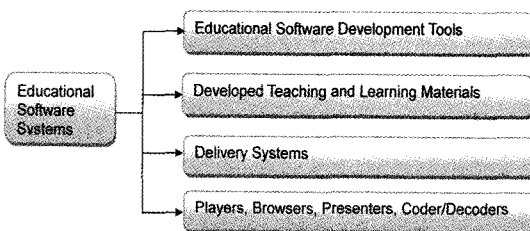


Fig. 1. The Scope of Educational Software Systems.

learning materials, (3) multimedia contents for teaching and learning, (4) courseware, (5) computer games and simulators for learning, (6) web-based e-teaching and learning systems, (7) e-textbooks, and so on, which have been developed by teachers and software designers and developers of the software industry [7].

3. Possible Delivery Systems for Teaching and Learning Contents in Developing Countries

Multimedia teaching and learning contents require that the presentation of the information - also called “delivery” or “play out” - to the final users be controlled by multimedia computers from information sources to information sinks as shown in Figure 2.

In practice, multimedia delivery systems involve a multimedia computer or a set of computers with peripheral equipments such as auxiliary/external storage devices (USB, Exterior Hard Disks, SD Cards and others) and displaying devices (beam projector and screen, e-board system, monitors, speakers and microphones, and others) to present information to and possibly interact with the end-users [5-7].

Recently smart phone has become an excellent delivery system for teaching and learning as extension of classroom teaching and learning through Internet and base stations of communication service companies.

We propose four (4) models which are most likely effective delivery systems for computerized teaching and learning contents in developing countries among possible delivery systems [6] depicted in Figure 2.

3.1 Web CD/DVD-Computer (Web Browser)-Monitor/ Projector (WCBM Model)

It is most simple delivery system based on the standalone computer systems equipped with

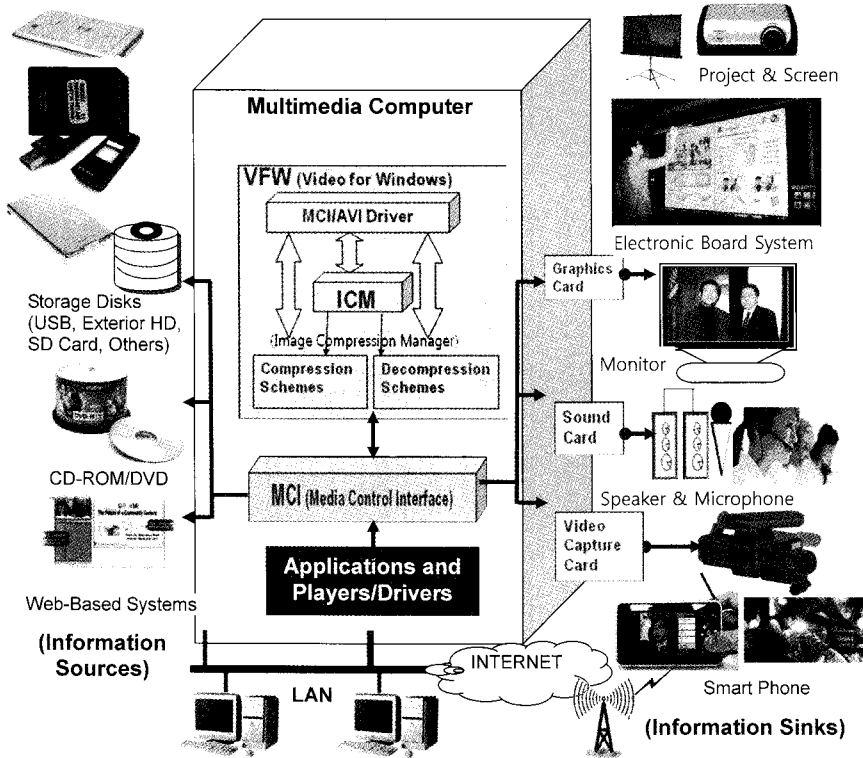


Fig. 2. The Structural Concept of Delivery Systems from Information Sources to Information Sinks based on Multimedia Computer.

monitor, speaker, CD/DVD devices, projector and screen as shown in Figure 3. The teaching and learning contents which are developed in the format of web CD/DVD will be delivered through web browsers. The characteristics of WCBM model are summarized in Table 1.

3.2 Web-Based Systems-Computer (Web Browser)- Monitor/Projector (WSBM Model)

This delivery system based on networked computer systems equipped with monitor, speaker, projector and screen, and web/DB server as shown

Table 1. Characteristics of WCBM Model

Area	Particulars
Development Methods	Video Capturing and Editing + Web Document Preparation + CD/DVD Title Production
Development Tools	1. Web Camera or Video Camera for Video Capturing 2. CBI tool for Web Document production 3. PowerDirector for CD/DVD Production
Development Cost	Inexpensive except development tools
Distribution/Dissemination	Easy (by CD/DVD Titles)
User Convenience	Users can play out simply by web browsers
Efficiency of Teaching and Learning	most efficient framework showing teacher Face View and full Presentation View
Compatibility of Contents	Compatible (these Contents can be stored in web sites)
On/Off Line	Off-Line

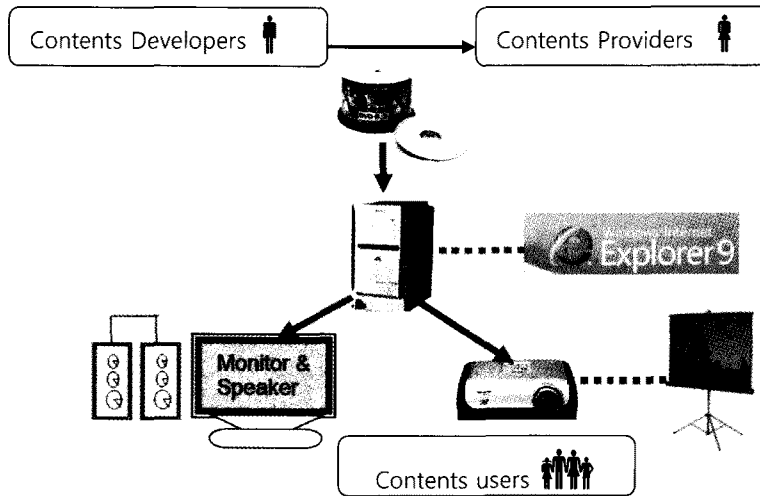


Fig. 3. The Concept of WCBM Model.

in Figure 4. The teaching and learning contents which are developed into a website of web-based teaching and learning system will be delivered through web browsers. The characteristics of WSBM model are summarized in Table 2.

3.3 Multimedia Contents-Computer (Players)-Monitor/ Projector (MCPM Model)

MCPM delivery system based on multimedia computer system equipped with monitor, speaker,

CD/DVD devices, projector and screen as shown in Figure 5. The teaching and learning contents which are captured by video camera or web camera, edited by multimedia tools, and stored in any auxiliary storage, will be delivered through multimedia contents players. The characteristics of MCPM model are summarized in Table 3.

It is necessary to develop the multimedia teaching and learning contents by multimedia tools such as multimedia production, multimedia editing and multimedia authoring in this delivery system.

Table 2. Characteristics of WSBM Model

Area	Particulars
Development Methods	Video Capturing and Editing + Web Document Preparation + Storing Contents to Web Server System
Development Tools	1. Web Camera or Video Camera for Video Capturing 2. Adobe Premier for Video Editing 3. Web Editor (Namo) for Web Document Preparation
	or 1. Web Camera for Video Capturing 2. CBI tool for Web Document production
Development Cost	Inexpensive
Distribution/ Dissemination	Easy (by Web Site)
User Convenience	Users can play out simply by web browsers
Efficiency of Teaching and Learning	most efficient showing with teacher Face View and full Presentation View
Compatibility of Contents	Compatible
On/Off Line	On-Line

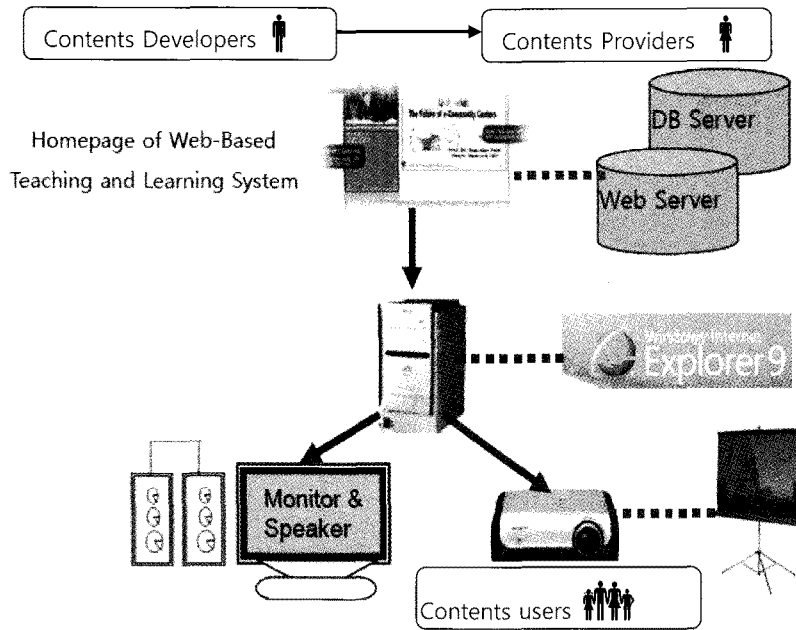


Fig. 4. The Concept of WSBM Model.

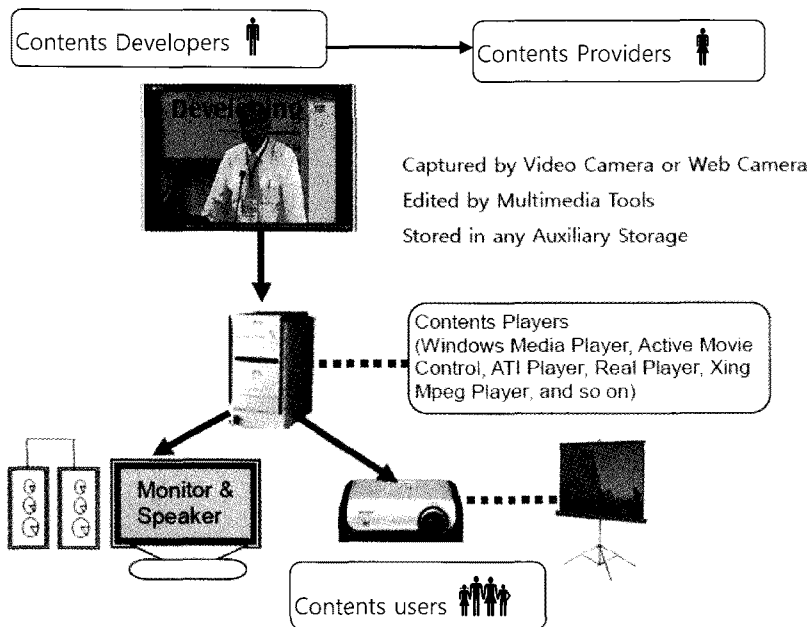


Fig. 5. The Concept of MCPM Model.

3.4 Developed Courseware-Computer-Monitor /Projector (DCCM Model)

DCCM delivery system based on computer system equipped with monitor, speaker, CD/DVD

devices, projector and screen as shown in Figure 6. The teaching and learning contents are developed by authoring tools, and stored as executable modules in any auxiliary storage such

Table 3. Characteristics of MCPM Model

Area	Particulars
Development Methods	Video Capturing and Editing + Storing files to Portable Storage (USB, Exterior HD, CD/DVD)
Development Tools	1. Web Camera or Video Camera for Video Capturing 2. Adobe Premier for Video Editing or 1. Web Camera or Video Camera for Video Capturing 2. Camtasia for Recording, Editing and Producing Video Contents
Development Cost	Inexpensive
Distribution/ Dissemination	Easy (by Portable Storage)
User Convenience	Users can play out simply by Players
Efficiency of Teaching and Learning	Efficient but cannot show both full Presentation View and teacher Face View
Compatibility of Contents	Compatible (Can be used for hypermedia)
On/Off Line	Off-Line

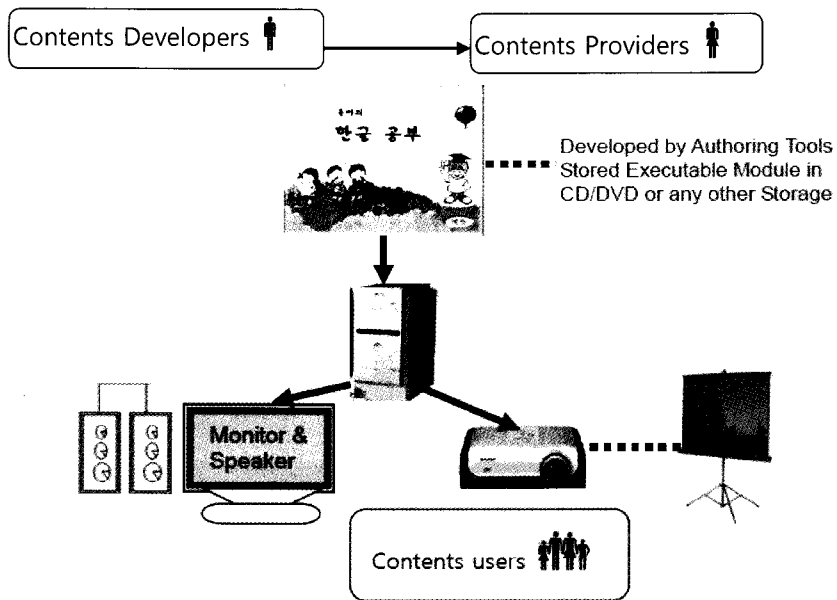


Fig. 6. The Concept of DCCM Model.

as CD/DVD, portable hard disk, USB, SD cards, and so on. The characteristics of MCPM model are summarized in Table 4.

4. Effectiveness Comparison of Delivery Systems in Developing Countries

With the effectiveness survey of these four (4) models which are utilizing in the classrooms

among developing countries according to their characteristics in development methods, development tools, development cost, distribution, user convenience, efficiency of teaching and learning, and compatibility with other contents, we would like to analyze their strength and weakness to seek most effective delivery systems as shown in Table 5.

We have suggested most possible delivery sys-

Table 4. Characteristics of DCCM Model

Area	Particulars
Development Methods	Story Boarding with Curriculum + Generating graphics, animation, and synthesized image materials +Authoring with interaction between System and Students
Development Tools	1. Adobe Illustrator, Photoshop and Flash for generating graphics, animation, and synthesized image materials 2. Macromedia Authorware or Director for courseware production
Development Cost	Inexpensive except courseware development tools
Distribution/ Dissemination	Easy (by Portable Storage)
User Convenience	Users can execute executable module by click
Efficiency of Teaching and Learning	Very efficient with interaction between system and students
Compatibility of Contents	Compatible
On/Off Line	Off-Line

Table 5. Effectiveness Comparison of Four Delivery System Models for Considering Mongolian School Situation

Model	Strength	Weakness
WCBM "Web CD"	1. By use of simple web camera and CBI tool, we can produce most efficient web-based teaching and learning contents showing teacher Face View and full Presentation View 2. Easily distribute by CD/DVD titles 3. Also developed contents can be stored	
WSBM "Web-Based Systems"	1. By use of simple web camera and CBI tool, we can produce most efficient web-based teaching and learning contents showing teacher Face View and full Presentation View 2. Also developed contents can transmit to web server 3. Easily operate by web site for on-line distance learning	1. Without web server (web site) under internet /intranet connectivity, it is unable to use contents.
MPCM "Multimedia Contents"	1. By use of digital video camera and multimedia production and editing tools, we can produce dynamic multimedia lecture contents. 2. It is easy to play out multimedia lecture contents by use of players. 3. It can be easily converted to WMV (Windows Media Video) file and stored to web server for web service.	1. Needs of Most Multimedia Development Tools and Equipment 2. Needs of Professional Skills to use Multimedia Tools
DCCM "Courseware"	1. Courseware is most interactive learning contents under story building and curriculum 2. It is easy to play out courseware which is executable file. 3. It is desirable to use for kindergarten and primary schools students due to storytelling, dynamic graphics and interactivity.	1. Needs of Professional Skills to use Authoring Tools

tems for teaching and learning contents in the classroom of the education and training institutions

in developing countries. It is not possible to recommend uniformly the delivery system which is most

effective way to utilize in the classrooms for education sector reform but we can select the delivery methods according to classroom environment with education software systems and related facilities in consideration of strength and weakness.

5. Conclusion and Recommendation

By emergence of ICT, most of education and training institutions are struggling to integrate ICT and education and training systems. With this technological environment change, it is so important to apply proper delivery systems for utilization of the computerized teaching and learning contents in the classrooms. It will be a preliminary activity for building open and flexible distance teaching and learning systems in developing countries [6].

Therefore we would like to suggest and recommend the followings to apply proper delivery systems for utilization of the computerized teaching and learning contents in the classrooms as an objective of the Education Sector Reform Project:

- (1) We recommend the WCBM model ("Web CD") and DCCM model ("Courseware") as delivery systems in initial stage to develop and distribute e-teaching and learning contents to schools.
- (2) We recommend WSBM model ("Web-Based Systems") and MPCM model ("Multimedia Contents") as delivery systems for middle-term stage to expand ICT capacity in the schools.
- (3) We suggest that it shall be commenced urgently the cultivation of master trainers for development of e-teaching and learning contents.
- (4) We suggest the provision of the multimedia computers (possibly networked multimedia computers) with related network and multi-

media equipments to use educational software development tools and teaching and learning contents to ICT education centers and schools.

- (5) And we suggest the provision of the multimedia development software tools to develop computerized teaching and learning contents to ICT education centers and schools.

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