A Design of the Infrastructure and Computer Network for Distance Education, Online Learning via New Media, E-Learning and Blended Learning

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Abstract—The research focusgu on study, analyze and design the model of the infrastructure and computer networks for distance education, online learning via new media, e-learning and blen ded learning. The collected information from study and analyze process that information was evaluated by the index of item objective congruence (IOC) by 9 specialists to design model. The results of evaluate the model with th e mean and stand ard deviation by the sample of 9 speci alists value is 3.85. The re sults showed that the infrastructure and computer networks are designed to be appropriate to a great extent appropriate to a great extent.

Keywords—Blended Learning, New M edia, Infrastructure and Computer Network, Tele-Education, Online Learning.

I. INTRODUCTION

THAILAND and the world are changing rapidly due to the changing social environment. There are many changes such as the economy or knowledge economy, politics, society and technology, and espe cially in the field of digital communication and co mputer technology to make the world smaller. Local communities become the world community and shortens the time to communicate to the system as we call real time and online. If there are any actions that occur from one hemisphere will affect all around the world. For example, the economic crisis in Europe and the United States will affect the economy to the world immediately, through communication systems and i nformation technology such as the internet, Facebook, Google, Twitter, YouTube, etc. Impact of change in information communication and technology (ICT) and new media [7], [9], the model of management education and learning changed enormously in the last decade, the classroom and laboratory to de velop into the virtual classroom, simulations and virtual experiments in teac hing distance learning and online systems or the b lended learning with no limit as to time and pl ace. It makes teaching the class was to learn online such as e-learning, and 100% online learning system in university of developed countries with more than 30% of all courses. There a re also many organizations that have developed a sys tem of distance education and o nline, including Khanaccademy.org. The development of learning through new media and the Internet, the world population has an education from elementary school to university. Courses are more than 1,000 stories and p rovide content knowledge database courseware materials and resources for learning. The system provides the r egistration system, exercises, quizzes, and assessment of learning for people around the world without time limit on q ualifications and seniority. Users or students can self-learning and does not cost a fee.

Nowadays, the distance education, online learning, and e-learning system were used instead of learning in a traditional school classroom would be even more. These are m ore affected by computer technology, communications and n ew media are developed a fast, easy, convenient to use, save time and money, flexible, virtualized and current. So, the students can study, an d learn endle ssly and forever by access to information and kn owledge base from system provided [5], [8], [11]. Thus, the sy stem of education and learn ing management systems of non-formal and formal, there are vital to keep pace with the development of such a change. And it requires developing and designing for distance education, online learning via new media, and e-learning. Otherwise, the education system learning and quality education of Thailand, it will no t grow up when compared to other countries in the world.

In Thailand, the output quality of education, there are several problems and was retained for the result to be pushed a law occurred, there are the National Education Act B.E.2542 (1999) and amendments (second National Education Act .B.E. 2545 (2002) are affect the study to adjust the educational system, including the organization since its management education with the focus on quality is clearly the grade level indicators and adopted the metric level (office of the national education commission, 1999), the process of education is set to hold the education and skills such as curr iculum development, the proportion of the cu rriculum content and local material clearly [2]–[4]. The process of learning that focuses on the research as part of the process and participation of local knowledge in the curriculum. The evaluation process is based on authentic instruments indicate the efficacy of the curriculum each year. (The law article no. 22, 23, 24, 26, 27, 28, 29 and 30) [6].

II. METHODOLOGY

A. The Study and Analysis

So explore the technology of computer systems and network infrastructure to support teaching and learning in the classroom, outside the c lassroom and distance education, will help to make the investment worth o f hardware and software

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and teaching effectiveness. At t his process, we will get the data that it use to e valuation with I CO by the sample group consisted of 9 members who are experts to sum up the index of item objective congruence for the study and analysis of the infrastructure and computer networks. The index value is greater than 0.5, only to be used in the design of the system.

B. Design Model

Design model can be applied by using information from the study and analysis process. This process is generating a model of the infrastructure and computer networks should be as in Fig. 1.
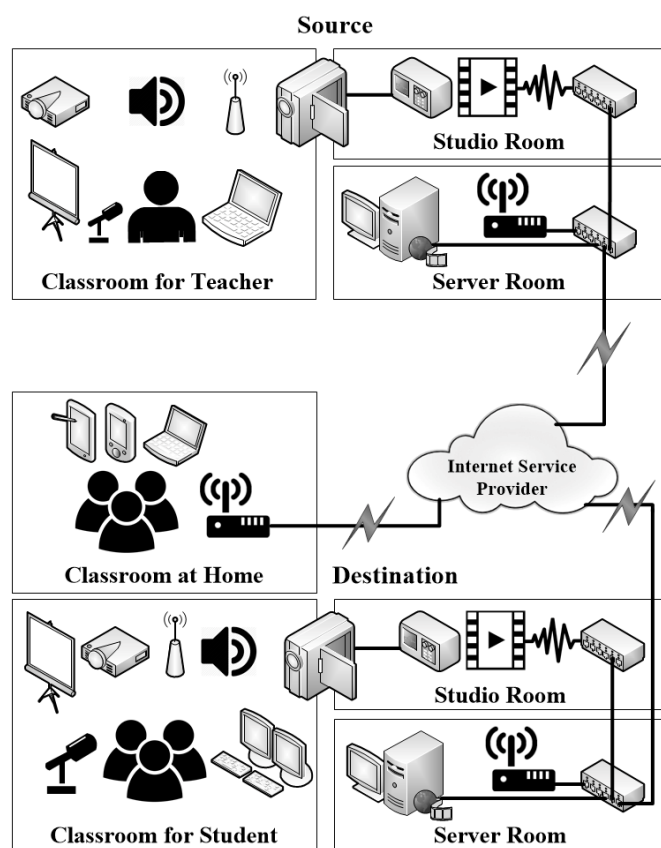

Fig. 1 The model of the infrastructure and computer network for distance education, online learning via new media, e-learning and blended learning

C. Verify Model

To verify the model of the infrastructure and computer network is designed by using a group of sampling with 9 specialists to evaluate this system with questionnaire of satisfaction survey. The mean value and st andard derivation value were used to verify and encourage the system design [1], [10]. In the interpretation of the mean scores according to the following criteria:

- 4.51 – 5.00   is the equivalent of Excellent
- 3.51 – 4.50   is the equivalent of Very good
- 2.51 – 3.50   is the equivalent of Good
- 1.51 – 2.50   is the equivalent of Fair
- 1.00 – 1.50   is the equivalent of Poor

If the form of m odel of the infrastructure and computer networks for learning in distance, Online learning system, new media learning and blended learning are the average scores in the medium. It has i mproved the accuracy of the system and computer network infrastructure for infrastructure and computer networks for learning in distance, Online learning system, new media learning and blended learning again.

III. RESULT

The results of evaluation the model by 9 experts who have knowledge and expertise that related to the learning of computer networking and new media, educational Innovation and technology design, networking, a computer-based learning on learning through distance education, online learning via new media, e-learning and the design and development of blended learning in higher education, the findings are as follows:

1. Based on studies and analysis of model of infrastructure and computer network can conclude from the analysis as below.

- Communication components for the infrastructure and computer network for distance education, online learning via new media, e-learning and blended learning include the following:

1) Information in this means the data suc h as the tex t, images, audio, video, interactive multimedia, data sent is encrypted. Then send the data to the destination.

2) Transmission unit (innovative learning) is a set of device used for sending signal to classroom such as speak ers, microphones, video cameras, computer screens, broadcast studio devices.

3) Receiver unit (learning center) is a d evice used for receiving signals from the data. For the receiver, such as speakers, microphones, video cameras, monitoring screens get a signal.

4) Transmission medium (Internet Service Provider), data transmission requires an intermediate virtual road transport data, vo ice, video, and slide from the source to the destination. For example, the internet service provider networking from source to destination signal.

5) Application (Web base) as a medium to connect between innovative learning and learning center can display source and destination image, audio, video, slide was the same either way.

- System components of the infrastructure and computer network for distance education, online learnin g via new media, e-learning and blended learning include the following:

1) Studios and classrooms, making room at university for the live transmission from the innovative learning to the class destination or learning center, it consists of slides, photos, audio and video content.

2) Class destination is a signal transmitted from the source contains audio slideshows and video.

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3) Classroom at home or at work, class for reviewing lesson content that has been recorded and student can review anywhere and anytime.

4) Classroom for teachers is a set of broadcast center that can be mobility and broadcast a signal at any time with an Internet connection.

5) Courseware online, lessons are recorded and stored in files in the library offers lessons catering for both offline and online media for different rooms. Everyone who uses the system can be exchange information.

- Administration and education system is installed on the infrastructure and computer network for distance education, online learning via new media, e-learning and blended learning include the following:

1) Course Management consists of a group of users is divided into three levels: students, teachers, and administrators. User can log in from anywhere at any time via the Internet. The system can support a number of users or students and teachers are not limited by dependent on hardware, software, and the system can accommodate the full range in Thailand.

2) Content Management includes tools to help create content. The system can be used both with lessons in the text-based and streaming media.

3) Test and evaluation system are consisting of a random test exam from data warehouse. Students must complete the test within the prescribed period and the exam results can be seen immediately whereas the instructor can check the test results of students such as statistics report score and the frequency of the use of students.

4) Course tools contain various tools used for communication between learners and teachers or learners and learners, for example web board and chat rooms can keep track of this information.

5) Delegation and tracking system (assignment) is a system that students can be upload files such as homework or assignment to the instructor and the instructor can track tasks assigned to students.

6) Course Management System (CMS) is a system that manages the courses offered.

7) Tele-Education System is a system of education that students and teachers are far apart. It can cause learning via the medium of instruction in the blended learning. By using various media, including video files, such as textbooks, charts or using electronic devices to help in the spread of education to those who wish to learn broadly around everywhere.

Then the researchers used data from the study and analysis for model of the infrastructure and computer network for distance education, online learning via new media, e-learning and blended learning. The contents are prepared and conducted by the index of item objective congruence (IOC) evaluation. The 9 experts will evaluate a system design. The IOC values were defined as follows:

-1 means disagree, if the experts do not agree that model of the infrastructure and computer network for distance education, online learning via new media, e-learning and blended learning should look like this would give a value of -1.

0 means deemed reasonable experts that a model of the infrastructure and computer network for distance education, online learning via new media, e-learning and blended learning should look like this to the value 0.

1 means that if experts agree that a model of the infrastructure and computer network for distance education, online learning via new media, e-learning and blended learning should look like this to the value 1.

The evaluation of the IOC from the experts, consistent with values from 0.50 up to a summary of the infrastructure and computer network for distance education, online learning via new media, e-learning and blended learning as follows:

TABLE I
THE EVALUATION RESULTS OF MODEL OF THE INFRASTRUCTURE AND COMPUTER NETWORK FOR DISTANCE EDUCATION, ONLINE LEARNING VIA NEW MEDIA, E-LEARNING AND BLENDED LEARNING

Evaluation topics	Mean	Standard deviation
1) Terms of use		
1.1 Formed infrastructure and computer networking. Are appropriate to the application sufficiently and thoroughly blended.	3.89	0.33
1.2 Formed infrastructure and computer networking. To respond in an integrated instructional services.	3.89	0.33
1.3 Formed infrastructure and computer networking. The quality and potential of blended learning. Competitive universities in the country and abroad	3.78	0.44
Total	3.89	0.36
2) Innovation and learning		
2.1 Formed infrastructure and computer networking. Contribute to the learning and development of teachers and learners.	4.11	0.33
2.2 Formed infrastructure and computer networking. Help to improve and develop teaching and learning to keep pace with new technologies.	4.11	0.33
Total	4.11	0.33
3) Its value for the investment.		
3.1 Formed infrastructure and computer networking. Are worth the investment. The installation and expand its use to promote the teaching blended.	3.56	0.53
3.2 Formed infrastructure and computer networking. I should be a model for the investment to develop and improve continuously.	3.56	0.53
3.3 You were satisfied with the infrastructure and network is designed.	3.89	0.33
Total	3.67	0.48
Grand total	3.85	0.43

1) Computer server
2) Clients computer/Mobile device
3) Operating system software for computer servers
4) Operating system software for client
5) Live control system for audio and video streaming
6) Camera Video Recorder/Camcorder
7) Monitor (big screen)

8)   Microphone
9)   Speaker
10) Network and structured cabling network
11) Place a studio and classroom of origin
12) Classroom or learning center
13) Computer serverroom
14) Broadcast networking devices
15) Network devices connected to the internet
16) Internet access

2.   The results of the analysis data with evaluation of the IOC from the 9 experts were used to design a model and system requirements. Then a system design was evaluated for satisfaction survey by 9 experts or specialists, the values of evaluation were defined in level of rating scale as follows:

5 is the equivalent of Excellent
4 is the equivalent of Very good
3 is the equivalent of Good
2 is the equivalent ofFair
1 is the equivalent of Poor

The results of an evaluation to determine the effectiveness of the system in terms of use, innovation and learning, and its value for the investment were used to calculate by statistical software to analyze the mean value and standard deviation [1] is presented in Table I.

Table I shows the results of the evaluation for the model of infrastructure and computer network by 9 experts, it can say the following.

Evaluation of terms of use, the mean value was 3.85 and standard deviation was 0.36. The model has been designed with the appropriate level is good.

Evaluation of innovation and learning, the mean value was 4.11 and standard deviation was 0.32. T he model has been designed with the appropriate level is good.

Evaluation of the value for the investment, the mean value was 3.67 and standard deviation was 0.48. The model has been designed with the appropriate level is good.

Evaluation of the overall, the mean was 3.85 and a standard deviation was 0.43. The model has been design ed with the appropriate level is good.

It is concluded that model of the infrastructure and computer network for distance education, online learning via new media, e-learning and blended learning is designed to be appropriate level is good.

IV. CONCLUSION

The researchers conducted a stu dy and analysis of information about the infrastructure and computer network for distance education, online learning via new media, e-learning and blended learning. At this stage, that information will be evaluated to determine the IOC value of the system model by using the sample is 9 specialists. The IOC value must be greater than 0.5 in order to desig n of model of the infrastructure and computer network. The model was designed has to e valuate the satisfaction survey in terms of use, innovation and learning, and the value of the investment. The summary of evaluation from 9 specialists, the mean value was

3.85 and a sta ndard deviation was 0.43. So, the model has been designed with the appropriate level is good.

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