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Implementing New Interactive Video Learning System for IIUM

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ABSTRACT

Technology advancements and rapid telecommunications growth have had a profound impact on schooling. Using traditional educational approaches to attain academic institution goals is no longer an effective method. As a result, the use of technology in education has become increasingly widespread in recent decades. Interactive video learning has made its way into classrooms as the world shrinks and becomes one large confined town. It offers a lot of promise for further studies in higher education. The promise is that more possibilities for interaction will be provided, resulting in more effective learning than working alone. Virtual classrooms are taking their place as traditional classrooms are being demolished. Educators may develop interdisciplinary collaborations while enhancing student learning, interaction, and passion through interactive videoconferencing, which enables visual and vocal contact. Instead of using the old approach, many academic institutions now use interactive video as a means of communication between professors and students. Lecturers can deliver their courses from the comfort of their offices, and students can interact with them via video. We will give a detailed proposal and design for an interactive video learning system for a worldwide Islamic university in this study (IIUM). During this study, we will look into IIUM's current infrastructure and then propose changes that should be made in order to complete this important research.

KEYWORDS: Video conferencing, Interactive, IP, Network.

1. Introduction

Learning is a social process in which individuals actively develop new knowledge and understanding through individual learning as well as group and peer interaction. This suggests that communication is an important learning skill. For efficient collaborative learning, clear communication, effective communication tools, and channels are required. Dialogue is one type of communication (Burns). Dialogue encompasses not only exchanges between students and their teachers, but also interactions between students. The degree to which this occurs is determined by the subject matter, the overarching educational philosophy in which the contact takes place, the personalities of both teachers and students, and the nature and range of communication media available. The lines between distant, open, and traditional education are becoming increasingly blurred as a result of technological advancement. It's crucial to understand which of these contexts learning is taking place in and how video conferencing is being used (Howard, 2001). The line between traditional and distance education is blurring because of new communication technology. It could be useful in both scenarios. The most important pedagogical concern is determining where new technology will have a genuine impact on learning effectiveness. Interactive video conference can enhance the interactive between lecturers and students. The new system gives students the opportunity to ask questions and make comments (Reed, 1995). In Higher Education, video conferencing has a lot of promise for learning. The promise is in providing more opportunities for dialogue, which allows for more effective learning than working alone. As a result, dialogue might occur between tutors and students or among students, video conference has many features (O'Dowd, 2011):

- Video conferencing may be utilized to combine the best aspects of distant and traditional education. Video conferencing allows students and tutors to

meet in a central place, wherever that location may be.

- Because video conferencing does not offer open learning, students must still register for and attend classes at scheduled times and follow the course's pace.
- Video conferencing might pave the way for a dual approach by giving students greater responsibility for their learning, allowing them to work in groups, and completing assignments. All of these things would help traditional teaching, but video conferencing allows them to be implemented.

The technologies utilized to deliver video conferencing have a significant impact on the quality of communication that can be achieved. The critical thing in a video conference is how to achieve a clear picture. The quality of video services relies on the bandwidth and transmission media used (Meeting Face to Face, 2000). Therefore, below we will talk in detail about these issues because it will give us a clear idea about the technology that we need to use in this research.

2. Related Works

The interactive video is defined as "a non-linear, digital video technology that allows students to devote their full attention to instructional information and to revisit each portion of video as many times as they wish" in most studies (Dimou et al., 2009; Weston & Barker, 2001). When compared to linear video, Zhang et al. (2006) found that non-linear video produced greater learning results. In the recent decade, many innovative ways to interact with video material have been proposed. Schoeffmann et al. (2015) classify video interaction methods into the following categories in a recent review: the ability to annotate, tag, or label segments or objects in a video, the ability to interact synchronously with other users, the ability to interact with individual objects in the video, the ability to support navigation inside a video, the ability to filter video content, and the ability to generate a summarized view of the content.

According to Wouters et al. (2007), there are two levels of learning interactivity: The first level involves functional interactivity based on student actions (for example, feedback following a student's response). The second level is cognitive interactivity, which entails requests for behaviors that activate cognitive and metacognitive processes. A challenge to guess what will happen next in the film, for example, encourages students to pick and organize material and integrate it into their prior knowledge. These engaging actions appear to have a positive impact on learning (Wouters et al., 2007). The ability of interactive video to provide a platform for self-regulating learning settings (Chen, 2012; Delen, 2014; Hartsell& Yuen, 2006) is a critical feature. The ability to control individual speed, the provision of links that aid in avoiding cognitive overload (Chen, 2012), the ability to seek or overtake a specific portion of the video, and the ability to watch a specific portion of the video again if necessary (Zhang et al., 2006) all contribute to a useful self-regulated instructional context in which learners feel comfortable enough to learn new content (Pendell et al. 2013).

3. KICT CURRENT NETWORK DESIGN:

The Kulliyyah of information and communication technology (KICT), located in the main campus of IIUM. The new building consists of five floors divided into six blocks (A, B, C, D E, F) (htt). The UTP cat 6 optic cables used to connect LAN Rooms with each other. Moreover, the is gateway server room which contains the main servers and connects the KICT with ITD thought fiber optic cable. The diagram below gives simple description to the KICT network.

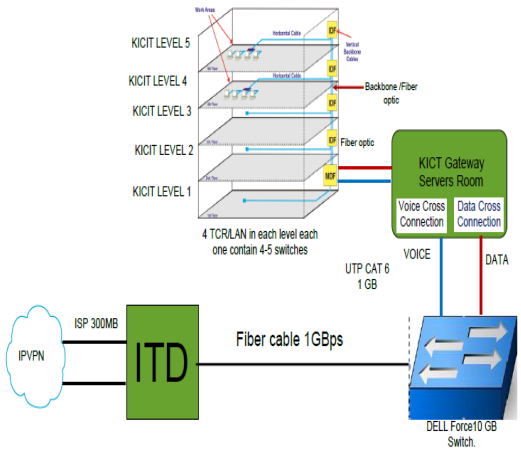

Figure 1: The network design of KICT

1. KICT INTERACTIVE VIDEO LEARNING NETWORK DESIGN:

The proposal of interactive video learning network design is as follows:

- Establish video center room in each floor, thus we have five video center rooms connect to the LAN room.
- 60 terminal videos (desktop) will for instructors to deliver their lectures through the video to their students. Most likely these terminal videos will be located in instructor rooms.
- 100 remote terminal video (classroom) enable students to receive their lectures which provided by lecture through interactive system (Dongsong Zhang a, 2005). These terminals will be distributed through all classrooms, labs, and halls.

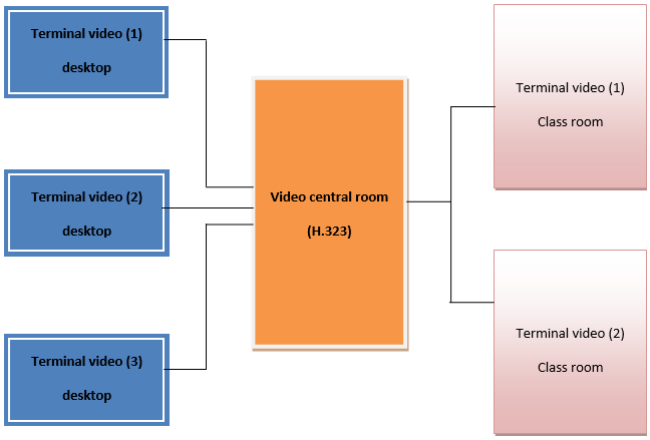

Figure 2: Shows general diagram of interactive video learning system in KICT

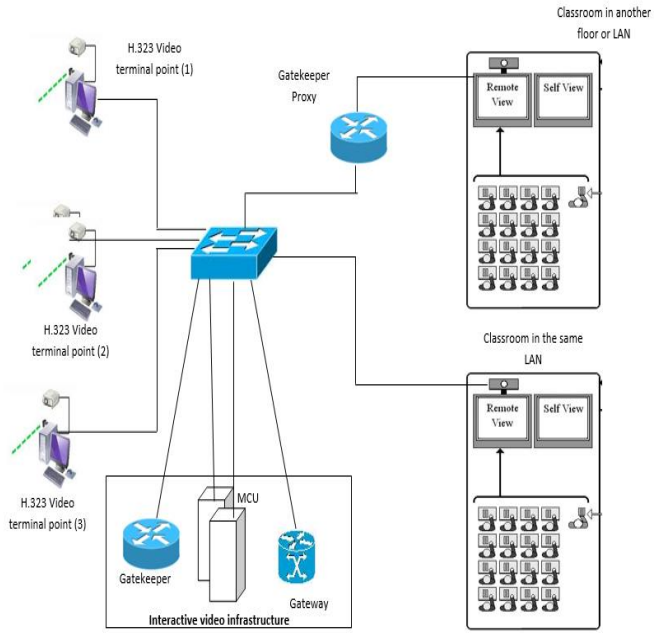

Figure 3: Interactive Video network design of KICT

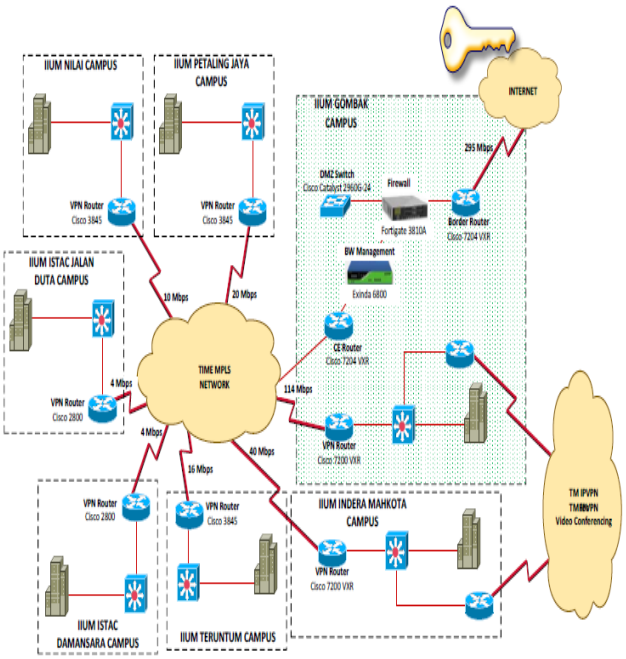

Figure 4: Current network design of IIUM

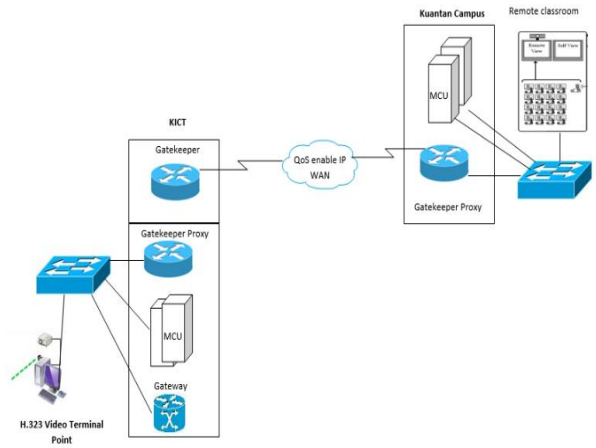

Figure 5: Interactive Video network design connecting KICT to Kuantan

4. IP ADDRESS CONFIGURATION

There are five departments in the KICT, Department of Information Systems (DIS), Department of Computer Science (DCS), Department of Library & Information Science (DLIS), CITA, and Dean's office. These departments are distributed in five floors which form the main building of kulliyyah. The Kulliyyah has a lot of classrooms, lab and halls. The number of IP address for all Kulliyyah was estimated by almost 1200.

To implement interactive video learning system, we proposed to provide each floor with video conference unit. Each unit consist of five components (switch, gateway, gatekeeper, MCU, and router), in addition to 60 terminal video points for instructors to deliver their lectures to students, most likely located in their rooms. For each unit we allocated 17 IP addresses (12 IP addresses for the video terminal points connected to the specific video central room and 5 IP addresses for the components of H.323). In addition to that, there are almost 100 terminal video point (classroom) where students can receive the services of interactive video learning system, these terminals included all classrooms, lab, and hall as well.

Table 1: The number of IP addresses for each unit

The unit	The number of IP address needed
Terminal Video points (desktop)	60
Terminal video points (classroom)	100
H.323 components (17 × 5) =	85
The total number of IVL	**245**

Additionally, we have a remote video unit located in Kuantan campus needed almost 10 addresses.

To this extent, the network has to be divided into at least 5 subnets. So, we need 5 subnets for KICT. Because of the various numbers of addresses we need in each subnet. Because this number is very huge and it is hard to manage it, so we will use subnet mask for the major network with prefix length 19. Subnetting KICT:

11111111	11111111	11100000	00000000

The new subnet mask is 255.255.224.0

5.1 The subnet values:

Table 2: IP address sub-netting values table.

160	40		0	0/19
1010 0000	0010 1000	000	0 0000	0000 0000
Subnet 0		000	0 0000 = 0	
Subnet 1		001	0 0000 = 32	
Subnet 2		010	0 0000 = 64	
Subnet 3		011	0 0000 = 96	
Subnet 4		100	0 0000 = 128	

5.2 Range of IP Address Values:

Table 3: IP address sub-netting range table

Department Name	Address	Range	Broadcast
Dean Office	160.40.0.0	160.40.0.1 ... 160.40.31.254	160.40.31.255
DIS	160.40.32.0	160.40.32.1 ... 160.40.63.254	160.40.63.255
DCS	160.40.64.0	160.40.64.1 ... 160.40.95.254	160.40.95.255
DLIS	160.40.96.0	160.40.96.1 ... 160.40.127.254	160.40.127.255
CITA	160.40.128.0	160.40.128.1 ... 160.40.159.254	160.40.159.255

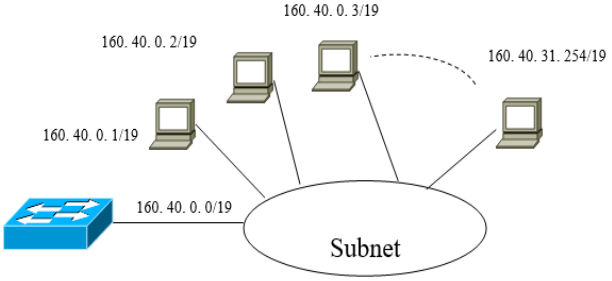

Figure 6: logical diagram subnet of dean office

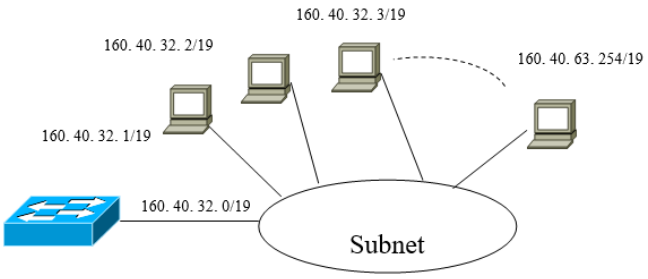

Figure 7: logical diagram subnet of DIS

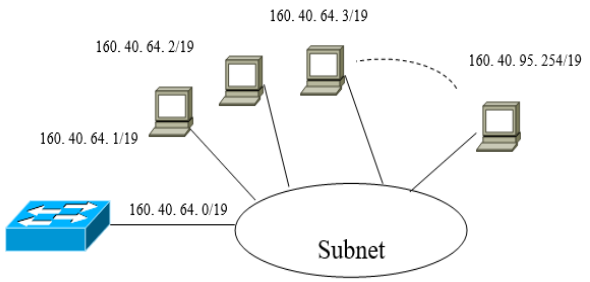

Figure 8: logical diagram subnet of DCS

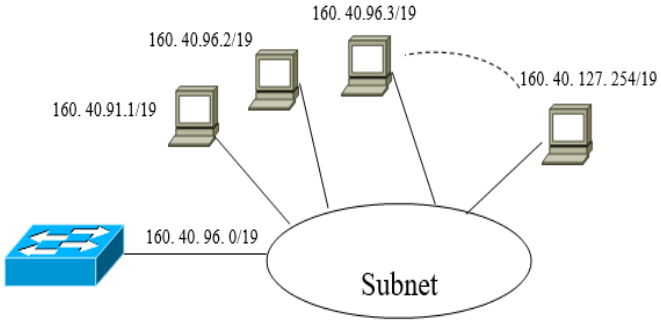

Figure 9: logical diagram subnet of DLIS

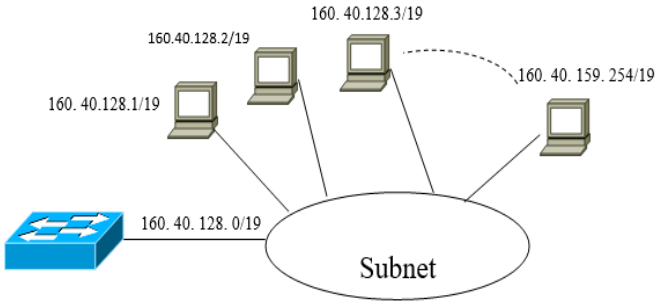

Figure 10: logical diagram subnet of CITA

5.3 Proposed Business Flow

The main objective of this research is to produce modern method of teaching by using the interactive video. The interactive video system which we are going to implement through this research is a good an opportunity for IIUM to solve the problem of shortage in academic staff. The new system enables one lecture to teach multi section at the same time in different locations or in any other campus. The system also enable student to interact with their lecture and discuss with him. Furthermore, by connecting system with other campuses, students and lecturers can participate in workshop, seminars or any event hold in these remotely without need to move there. Therefore, by implementing this research the movement between campuses will be reduced.

This research is very important for IIUM. It has all the elements of a successful, useful, and valuable research. If approved, it is going to be a huge leap forward in the quality and the efficiency levels of IIUM resources. This research is meant to serve IIUM staff and students in all the campuses. It will come up with full design model of video learning system connects the campuses with each other.

5.4 H.323 IP Addressing

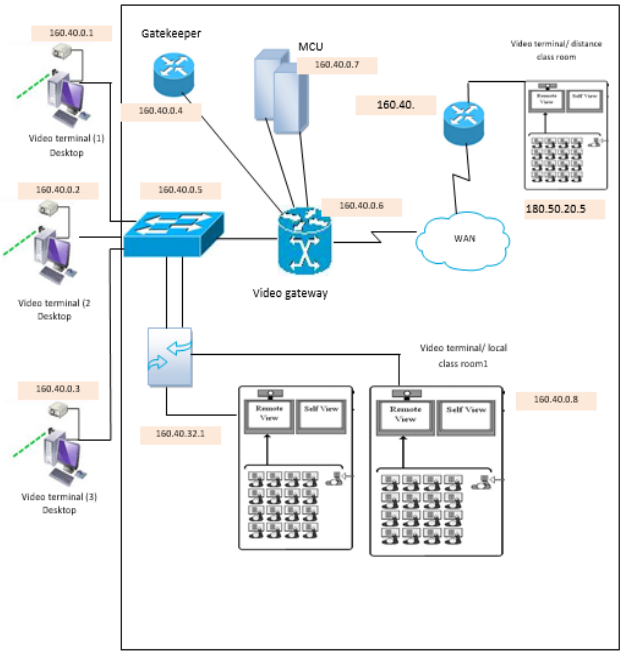

Figure 11: Shows the IP addressing of H.323 though LAN and WAN

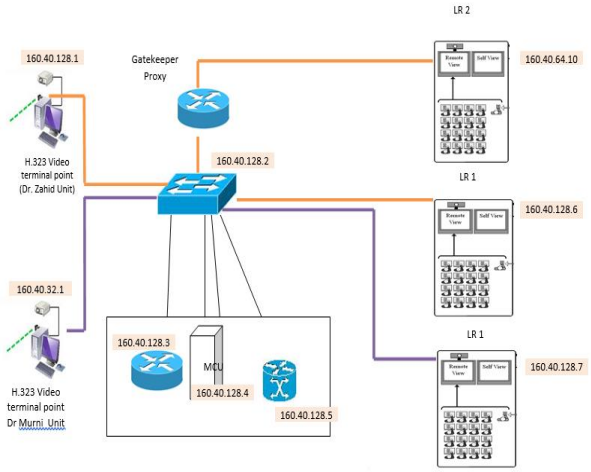

Figure 12: IP addressing of Interactive Video network in KICT

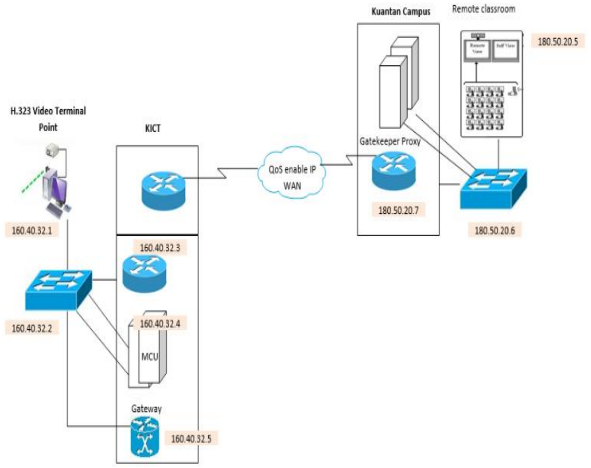

Figure 13: IP addressing of Interactive Video network design connecting KICT to Kuantan

6. CONCLUSION

We can summarize the benefits that will be resulted from this research like it will enables real-time and visual communication between students and instructors, as well as between students at different locations. Some courses are shared between some Kuillyahs; thus, these courses can be taught by one lecturer at the same time to all students while they are sitting in their class rooms. Moreover, the system will connect campuses together, therefore, some shared courses can be taught by one lecturer to many sections in different campuses at the same time. This research will support strategic plan of IIUM to be Research University by enriching the discussion between academic staff and staff and students as well. IIUM academic staff and students can get interactive communication with local and international universities and enables connection with experts in other geographical locations Campus. Video learning system saves time. The time for travel to another place will instead be used for work.

7. REFERENCES

1. (n.d.). Retrieved from http://iium.edu.my/kict
2. Agrawal, A. (n.d.). *Business process mapping of enterprise integration Infosys:Winter2005.* Retrieved from www.infosys.com
3. Burns, J. L. (n.d.). *Practical guidelines for teaching with video conferencing.* Retrieved 2020, from http://www.jtap.ac.uk/reports/htm/jtap-037.html
4. Dongsong Zhang a, *. L. (2005). Instructional video in e-learning: Assessing the impact of interactive video on learning effectiveness, Information & Management. *43*, 15–27.
5. Howard, D. (2001). Etiquette, Guidelines, Tips for Effective Videoconferencing, Videostreaming Webcasting, Audio conferencing. Retrieved from http://www.dianehoward.com/Dr._H._teleconferencing_videoconferencing_streaming_webcasting.htm
6. Meeting Face to Face. (2000). Retrieved from http://www.eventageous.com/planning_guides/meetingf2fplain.html
7. O'Dowd, R. (2011). Videoconferencing for Foreign Language Learning: An Introduction. Retrieved from http://www.geocities.com/Athens/Rhodes/8247/vcingarticle.html
8. Delen, E., Liew, J., & Willson, V. (2014). Effects of interactivity and instructional scaffolding on learning: Self-regulation in online video-based environments. Computers & Education, 78, 312-320.
9. Dimou, A., Tsoumakas, G., Mezaris, V., Kompatsiaris, I., & Vlahavas, L. (2009, June). An empirical study of multi-label learning methods for video annotation. In Content-Based Multimedia Indexing, 2009. CBMI'09. Seventh
10. Hartsell, T., & Yuen, S. (2006). Video streaming in online learning. AACE Journal, 14(1), 31-43.
11. Kleftodimos, A., & Evangelidis, G. (2016). An interactive video-based learning environment supporting learning analytics: Insights obtained from analyzing learner activity data. In State-of-the-Art and Future Directions of Smart Learning (pp. 471-481). Springer Singapore.
12. Lai, C. L., & Hwang, G. J. (2016). A self-regulated flipped classroom approach to improving students' learning performance in a mathematics course. Computers & Education, 100, 126-140.
13. Palaigeorgiou, G., & Despotakis, T. (2010). Known and unknown weaknesses in software animated demonstrations (screencasts): A study in self-paced learning settings. Journal of Information Technology Education, 9, 81-98.

14. Pendell, K., Withers, E., Castek, J., & Reder, S. (2013). Tutor-Facilitated Adult Digital Literacy Learning: Insights from a Case Study. Internet Reference Services Quarterly, 18(2), 105-125.
15. Schoeffmann, K., Hudelist, M. A., & Huber, J. (2015). Video interaction tools: A survey of recent work. ACM Computing Surveys (CSUR), 48(1), 14.
16. Weston, T. J., & Barker, L. (2001). Designing, Implementing, and Evaluating Web-based Learning Modules for University Students. Educational Technology, 41(4), 15-22.
17. Wouters, P., Tabbers, H. K., & Paas, F. (2007). Interactivity in video-based models. Educational Psychology Review, 19(3), 327-342.
18. Zhang, D., Zhou, L., Briggs, R. O., & Nunamaker, J. F. (2006). Instructional video in e-learning: Assessing the impact of interactive video on learning effectiveness. Information & management, 43(1), 15-27.
19. Chen, Y. T. (2012). A study of learning effects on e-learning with interactive thematic video. Journal of Educational Computing Research, 47(3), 279-292.