

IMPACTS OF ONLINE LESSONS ON ELEMENTARY STUDENTS' COGNITIVE ENGAGEMENT AND LEARNING ACHIEVEMENT

¹
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Abstract

Online lessons and texts in various subject contents have been launched and disseminated through out Thailand in favor of modern information technology advances. Yet, research studies on impacts of these high technology medium on learner's learning achievement and on their cognitive engagement, with consideration to their level of education and learning maturity are still lacking. This study examines how learners' levels of education, differences in ages and learning maturity affecting their cognitive engagement and learning achievement. Participations were 480 students at elementary school level. Descriptive statistical technique was utilized to examine dependent variables in the study. Discussions on how differences on learning characteristics utilized by participants could and could not contribute to their learning achievement, and to their cognitive engagement were also provided.

Background of the study

While instructor-based learning is normally emphasized, web-based instruction delivered through electronic applications and process is introduced and rapidly being implemented through - out middle school and primary school levels in Thailand. Although teachers and educators have witnessed widely utilization of web-based instruction as another instructional pedagogy, it is still considered as an innovation to be clearly defined, developed, evaluated, and disseminated for internalizing adoption.

Most Thai educators and teachers view web based learning as traditional computer based learning where content and information (the so call e-text, e-book, e-lesson ,etc.) to be learned is either being created, edited, or downloaded to a hard drive. At present such

pre designed e-learning products take place in a confined room-usually called computer laboratory, under instructor based instruction. Thus there is doubtful whether such an instructional method could be categorized as an alternative instructional medium or an innovation in education.

On the contrary, web based learning in this study puts emphasis on content and information being stored on a server where our learners can assess the stored information over a specific well designed web page. Three on-line subjects on Energy Education, Energy Conservation, and Energy Measurement with 35 lessons can be assessed anywhere at the learners' convenience time as long as they have subscribed, free of charge to the ERC (Energy Research Center under the Ministry of Energy) web page provider.

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Taking into our consideration, the various argument and debates concerning weaknesses of web based approach, special characteristics of a new technological pedagogy: *the learner - instructor actively interacting approach* have been created and used as framework for the development of our online courses in order to narrow down all the predicaments. Before getting to the initiated approach, let's briefly browse over some of the argument and debates. Eklund, Kay & Lynch (2003) argue that the World Wide Web learning approach in general is created in favor of cost effective business ventures rather than improving cognitive domain Blake & Standish (2000) also claim that provided content and knowledge is usually overlooked by the learners due to high technological fast speed of presentation with spectacular appeal of animations, and colorful designs (Tung and Deng (2006). However, Tung and Deng (et.al) note that although learners are initially enthusiastic about its appeal, such enthusiasm is decline gradually after a short period of study. Reeves (2008) considered computer based instruction as a predominately instructivist instead of constructivist since the pre packaged software is normally treated learners as a passive recipient under the prescribed lessons and discourages learners from working socially with their friends. Merriënboer, Bastiaens & Hoogveld (2004) strongly disagree the idea of limiting student learning activities to mere reading from computer's screen. Active tasks as well as socially interaction among learners, and between learners and instructor must be encouraged to solve the particular issue of

isolation learners from socialization. In order to avoid such issue, Thorpe & Godwin (2006) suggest that active engagement of learners in extra rich exercises and socially active tasks must be stressed to allow social construction of knowledge and cognitive skills.

All the 35 lessons have been designed so that an instructor actively interacts with the learners while they are engaged with their lessons. Real time chat - board and individualized exercises have been provided as open ended engaging activities. Learners can access each lesson at their convenience, with their own learning pace, and communicate with web instructors through e-mail and web board. In addition, colorful graphics, lively animations, and appeal exercises and academic games were carefully inserted into every lesson. Moreover, every lesson provided is backed by the suggestive web sites so that the learners can access to unlimited relevant information. This *learner - instructor actively interacting approach* has been initiated to steadily motivate the learners' enthusiasm on their study over their period of study whereas cognitive consequence of the subject matter is particularly emphasized. The following software were employed in order to carefully construct all lessons in the three subjects to assure the effectiveness.

The graphic below depicted the portal web- page provided online for learners.

| Part Number | Description |
|-----------------|---|
| Corporate | |
| 65075647AD01A00 | Captivate 5 Windows International English AOO License 1 USER |
| 65056452AD01A00 | Flash Pro CS5 11 Windows International English AOO License 1 USER |
| 65048691AD01A00 | Photoshop CS5 12 Windows International English AOO License 1 USER |
| 65075950 | Captivate 5 Windows International English DVD Set |
| 65055907 | Flash Pro CS5 11 Windows International English DVD Set |
| 65048761 | Photoshop CS5 12 Windows International English DVD Set |



Need for the study

At present e - learning in the form of either computer based approach where pre-packaged information and highly instructivist approach is being emphasized, or web based approach where learners can access to unlimited information and can socially interact with each other, has been widely utilized in the field of curriculum and instruction throughout both primary and secondary schools in Thailand. Furthermore a growing number of university courses are encouraged to carry out all courses via the university web page to enhance students' cognitive learning and experiences. However, there is not enough documentation to show the effectiveness of such technological pedagogy on neither the students' cognitive achievement, nor their sustaining enthusiasm over a long period of study. Most of the studies consistently indicate learners' satisfaction on high technological

media, and on extravagant interactive games. In addition to the information on learners' appreciation for the popular media, the researcher believe what we do need is the investigation on the impact of online curriculum and instruction on both cognitive knowledge and skill of our learners.

This research study empirically investigated the impact of online courses on learners' cognitive knowledge and cognitive skill based on learners at elementary educational levels. The finding of this study should help instructors and teachers develop more efficiency online courses for learners in such educational level.

Participants/ Population

This research examined 480 students at primary school level. All participants had subscribed to the ERC web provider during July-September 2011. Three subjects of study namely : Energy Education ; Energy Measurement ; and Energy Conservation with 10-12 lessons in each subject were provided to students. Each student was allowed to take any subject of individual interest as his or her own learning speed.

Instrumentation

Knowledge based tests and knowledge skill work – exercise in the form of knowledge applications in actual situation at the end of each lesson were utilized. Every test was designed and constructed to accurately measure the learning achievement in the so called content related evidence. A number of experts in the field of energy education were

invited to evaluate each test item against the content specifications to validate every test item. Such content - validity of all tests was emphasized to assure the coverage of both the cognitive and behavior domain to be measured. Pre-set pass scores was also used to evaluate learners' knowledge application. Well prepared learners must be able to demonstrate they could answer at least 70 per cent of the provided test correctly in order to achieve the passing grade. In addition, core competency of learners' knowledge application were being assessed through their ability to deliver the assigned exercises.

Data Analysis

All data obtained were analyzed using descriptive statistic technique. The research results on post-learning tests and on work-exercises accomplishment of learners at each educational level were described using frequency and percentage. In addition tabulated description, graphical description, and statistical commentary were used as a mean to depict differences scores and learning accomplishment of learners.

Research Findings

Knowledge tests and knowledge skill tests were utilized to investigate the learning impact owing to the provided online lessons on the learners in various subjects. Table 1. shows numbers of learners enrolled in each subject of study, whereas Table 2. depicted numbers of learners who completed all the course requirement and reached the pre-

determined criterion scores specified by the course instructors.

Table 1. Numbers of learners enrolled in each subject of study.

| Subject of Study | Primary School Level | |
|---------------------|----------------------|--------|
| | n=480 | % |
| Enrollment | | |
| Energy Education | 480 | 100% |
| Energy Measurement | 108 | 22.5% |
| Energy Conservation | 81 | 16.87% |

Table 2. Numbers of learners completed the course requirement, and reached the pre-determined criterion scores

| Subject of Study | Primary School Level | |
|---------------------|----------------------|--|
| | n=480/ % | |
| Energy Education | 1/ 0.02 % | |
| Energy Measurement | 2/ 1.85 % | |
| Energy Conservation | 1/ 1.23 % | |

Based on data collected and analyzed as in table 2, subject of study seemed to contribute significantly to the learners' competency to complete the course requirement. Energy measurement was the most completed course, followed by Energy Conservation. Surprisingly the Energy education was the least completed course by the students.

Table 3. Participation frequencies in each category of course engagement: knowledge content engagement; game engagement; chat board engagement; assigned work exercise engagement; and after lesson test engagement.

| | Knowledge content engagement | Game engagement | Chat board engagement | Assigned work exercise engagement | After lesson test engagement |
|-------------------------------|------------------------------|-----------------|-----------------------|-----------------------------------|------------------------------|
| Primary school level n=480 | 217 45.21% | 1920 400% | 2880 600% | 30 6.25% | 4 0.83% |

According to the data analysis, learners both at primary school level engaged in the Chat Board category the most, while engaged in the Test category the least. However, the online conversation carried on in the Chat Board was mostly socially chit-chatting and irrelevant to the subject content being studied. It was also worthwhile mentioning that the investigation on every engagement category did not measure any learning achievement, but investigate only how often the learners participating in the particular category.

Discussion

The research findings revealed that subject of study, as well as individual interest in the subject matters were the significant factors contributed to the learners' knowledge performance. Surprisingly, it was found that 4 learners at primary school level achieved the desired knowledge performance. Class observation technique had been used in order to explain such result. Data obtained from observation on the 4 selective learners at primary school level indicated that learners with time management, self - discipline, and learning consistency qualities were reported to have better knowledge performance.

At present there is a new educational policy issued by the Ministry of Education to launch online and computer based material such as e-text-books and e-exercises covering practically every subject of study on grade 1-2

students. However, our research study does provide support for the conclusion that in order to guarantee learning impact on primary school students, both the quality of e-content and efficient technological pedagogy as delivery media must be emphasized. Most of all, teachers and educators involved in the matter must be sure that the young learners are those with specific quality of self discipline, time management, and learning consistency.

References

Blake, N & Standish, P. (2000). (Ed.) In, *Enquiries at the interface: philosophical problems of online education*. Oxford: Blackwell Publishers

Eklund, Kay & Lynch, 2003. E-learning: emerging issues and key trends. Retrieved April 22, 2008 from www.flexiblelearning.net.au.

Merrienboer, JV; Bastiaens, T & A (2004), Instructional design for integrated e-learning. In, *Integrated e-learning: implications for pedagogy, technology and organization* (Ed): Jochems, W; Merrienboer, JV & Koper, R. London: Routledge Falmer,

Reeves, T. (2008). Evaluating what really matters in computer-based education. Retrieved July, 2 from <http://www.education.edu.au/jahia/Jahia/home/cache/offonce/pid/179;jsessionid=73DD1F7533DEEC60CD83E51CE13FB7A3?print=1>