E-LEARNING ON COMPUTER PROGRAMMING 2 FOR DMMMSU INSTITUTE OF COMPUTER SCIENCE

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Abstract

The advent of new technologies and the Internet has opened-up a whole new range of opportunities for enhancing learning. The integration of ICT into education and training (e-learning) has been recognized as a powerful tool for improving learning at the highest political level. Many schools, universities and training colleges are rising to this challenge, integrating ICT, transforming their processes and implementing organizational change. The Institute of Computer Science is continuously improving and developing its instructional delivery through carrying out and integrating IT tools.

The study focused primarily on the design and development of the e-learning courseware that serves as a supplementary tool in learning Computer Programming 2. The design and development processes were supported by instructional design using the ADDIE model which has five (5) phases namely analysis, design, development, implementation, and evaluation. I carefully analyzed and incorporated the instructional goals, learning objectives, assessment modules and course content using variety of learning style presentations to keep the learners engaged, to enrich the learning experience and to maximize the course’s impact. The e-learning is designed with features of a variety of learning presentation elements that cater to the needs of visual, kinesthetic, and auditory learners.

Key words: e-learning, Computer programming 2, learning style, presentation elements

Introduction:

Since the start of rapid advances in technology, delivery of knowledge in education and industry has been supported by electronic tools. The training field is undergoing an evolution from a craft based to a technology-supported training to manage and deliver instructional solutions. One of these technology solutions is the development and establishment of e-learning tools.

As one of the important components of higher learning, Sacchanand (2008) stressed that e-learning is considered a new way of teaching and learning, and an imperative strategy in the educational reform that creates new borderless learning environment and opportunities and brings dramatic changes in the global educational landscape. E-learning facilitates the access of greater number of learners and improves student learning outcomes. It has the potential to contribute to their lifelong development and their well-being which is the ultimate purpose of education.
In a global setting, many universities and colleges have started adopting e-learning in the delivery of their instructions. From the report entitled “Regional Report 2008 on ASEAN University-Level e-learning”, Charmonman (2008) presented different universities and colleges that take initiatives on e-learning.

The College of Internet Distance Education of Assumption University of Thailand is the only ASEAN member of the Sloan Consortium (Sloan-C), an international organization that promotes excellence in e-learning. For the university level, it was reported that the United States of America has the most advanced application of e-learning with Jones International University as the first accredited virtual university. The University of Phoenix offers the e-learning degree programs to the largest number of students. Similarly, Canada has established the Canadian Virtual University. The United Kingdom government originally allocated pound sterling 62 million for the UK e-University (UKeU). However, the universities such as Middlesex in London, continue e-learning development on their own. The Universiti Tun Abdul Razak (UNITAR) of Malaysia became the first virtual university in the region, and Assumption University of Thailand established the first and only Doctor of Philosophy in E-learning Methodology program.

The Universiti Brunei Darussalam (UBD) of Brunei hosted the e-learning Information Day on August 13, 2008 to report that the e-learning project has progressed successfully with almost 50 members of the Brunei academic community actively involved. There were three key milestones achieved namely, the delivery of strategic study report, the completion of requirements study for the Learning Management System (LMS), and the delivery of the authoring tool.

In the Philippines, the government has set the priorities and necessary support for the promotion of e-learning as an innovative tool in developing knowledge-based society. These efforts have been legalized and concretized in the passage of relevant laws, regulations, and policies. Specifically, the creation of the Information Technology E-Commerce Council (ITECC) that unifies all government and private sectors efforts in making the country an electronically enabled, capable of participating and contributing to the global new economy.

The Republic Act 8792, otherwise known as the Electronic Commerce Act, defines the government's policies on electronic transactions and provides the legal framework for the country's participation in e-commerce. The Act clearly articulates the role of the government, line agencies, other instrumentalities, and the private sector in the use and application of the technology in the government's operations, processes and services. Likewise, focus is being emphasized in determining and exploring e-learning in the delivery of education and training, a concern being addressed by the ITECC Human Resource Committee. (Padolina, 2002)

According to Padolina (2002), the ITECC Human Resource Committee has laid its plans for the exploration of e-learning in the country which includes the creation of an e-learning environment by actively promoting it at all educational levels; organizing a national conference on e-learning; enabling more schools to teach ICT courses and encouraging the sharing of ICT faculty, libraries, computer facilities, and the like; and promoting the sharing of e-learning centers and the collaboration of schools in the development of e-learning programs and instructional materials.
In addition to the advantage of using better technology, the Commission on Higher Education (CHED) outlines the requirements that enable tertiary schools to offer ICT-related degree programs in Computer Science, Information Technology and Information Management. To catch up with this new and fast growing trend on e-learning, CHED published the Memorandum Order No. 35 to help ensure the quality of education that people would receive through e-learning and to assure future employers that the education and trainings meet appropriate quality standards.

The CHED through the Technical Committee of Reviewers for the Delivery on Open Learning and Distance Education has been developing a number of approaches to ensure quality e-learning. The institution has issued a Memorandum on the “Updated Policies and Guidelines on Open Learning and Distance Education” which specifies the standards for the offering distance education program. Specifically, the memorandum requires institutions to prepare well-written, well-structured, well-tested developmental and appropriate instructional materials for each course. In addressing these requirements, qualified subject matter specialists with appropriate graduate degrees, instructional design specialists, course writers, and production design specialists are a must. Course content is referred to the technical panel for specific disciplines while the delivery is reviewed by the Technical Committee of Reviewers for the Delivery of Open Learning and Distance Education.

According to Manzano (2004), there are lots of advantages of using e-learning in the in-school and off-school settings in the Philippines. The interactivity between the lesson and the learner is manifested that creates a good mood of individualized learning. He also emphasized that cost-effectiveness can be seen on it since the reproduction and distribution of learning materials are considered to be inexpensive. Its innovation allows the learners to deal on interesting lessons involving them to become well motivated and receptive to ideas provided. The integrity of each lesson can be maintained since the computer allows the delivery of uniform information in a sequential manner based on the needs of the learners, anytime and anywhere.

Educators should be aware of how people obtain and preserve skills and how they access information to help them progress. Hiltz (1993) indicated that a primary goal in studying a new medium of communication for educational delivery must be the identification of its impact on learning. Students may benefit from understanding their own learning style by taking measures to adjust the way they acquire knowledge (Cowley, et al., 2002).

Learning styles are simply different approaches to learning. The most commonly known learning styles are visual, auditory, and kinesthetic. The implications for online learning when measured against these different types of learners extend to each of the three areas of focus. Students learn the course content based on the methods of presentation and a learners predisposition to learn in a predominant modes of learning.

In response to the educational opportunities made available by dramatic technological innovations in education like the use of e-learning, the Don Mariano Marcos Memorial State University embraces this new method of delivering instruction to help the next generation of learners to be better educated and better prepared for the evolving demands of the country’s economy.
The institute aims to discover new knowledge and expand existing ones in Information and Communications Technology through the conduct of research. It also aims to improve the quality of education through production and use of instructional materials. Part of its plan is to encourage collaborative efforts in developing strategies and distributing e-learning tools.

**Materials and Methods**

The study focused on the design and development of e-learning tool which serves as a supplementary tool in teaching Computer Programming 2. The existing course syllabus utilized by the university in teaching the course was used as a basis in the e-learning course content. The design of the course content and its presentation were considered and accomplished through gathering the survey responses on the appropriate presentation elements for each topic of the course based on the students’ preferences. Using the VAK (Visual, Auditory, Kinesthetic) learning style approach, a survey comprising of one hundred ten (110) students was conducted to assess the students’ preferred presentation elements appropriate for each topic in the course. The results helped to appropriately choose the web-based materials suited for each topic in the course. Furthermore, the courseware is intended to implement in a LAN-based environment that runs through the networked computers of DMMMSU Institute of Computer Science.

**Results**

The increasing amount of knowledge requires efficient and improved learning activities in all educational settings. E-learning can be very useful for various learning activities. There is no doubt, however, that the modern, computer-based learning support must go far beyond simply delivering learning content in a one-fit-for-all approach to students. From the teacher’s perspective, didactic aspects must be considered by flexible sequences of learning assets or more generalized by a flexible chain of learning activities. From the student’s viewpoint, preferred learning styles, and learning media must be adequately considered for personalization purposes built on context sensitive and fine-grained user profiles. Thus, it is very essential that the quality of the content must be modified to suit the preferences of the learners for them to use effectively and to achieve the maximum benefit of the e-learning system.

The e-learning courseware offers different media presentation elements that are tailored toward the learning preferences of the students that cater the need of auditory, visual and kinesthetic learners.

Based on the data presented, it shows that the students prefer visual presentation in presenting most of the topics in Computer Programming 2 (Figure 1-5). It also indicates that majority of the students are visual learners. Most of the students prefer to view the lessons using visual presentation elements, which cater for learners who understand the material best by reading or looking at it. It comprises rich text formatting of web pages with supported images and diagrams. It also makes use of the annotated source code sections and highlighted key concepts. Figure 6 shows a sample of visual presentation elements that were adopted to accommodate learners who prefer information represented in a pictorial fashion. This is achieved by supplementing text with illustrations, figures, and program listings.

Likewise, some topics of the course are presented using kinesthetic learning presentation elements which cater the learners who prefer to explore hands-on approach on sample java programs. Figure 7 shows an example of kinesthetic presentation elements that were adopted to
accommodate learners who prefer information to be learned in a hands-on approach. This is achieved by supplementing text with links to sample Java programs. The learner needs to download a source code and explores it by himself.

Figure 1: Chapter 1 – Methods and Polymorphism Survey

Figure 2: Chapter 2 – Classes Survey Results

Figure 3: Chapter 3 – Inheritance Survey Results
Figure 4: Chapter 4 – Exception Handling Survey Results

Figure 5: Chapter 5 – File Systems Survey Results

Figure 6: Visual Presentation Elements on Java Methods
Few of the students prefer auditory presentation elements in learning the topic for the course. Nevertheless, the courseware provides minimal video and audio feedback to cater these types of learners. This is achieved by supplementing the content with links to video tutorials on the concepts of the course. Figure 8 shows an example of “auditory presentation elements” that presents the content using video and verbal feedback. The concept is viewed to the learner as a video and supported with audio discussions. The learner can pause the video, scroll back and forth on the navigation bar to navigate within the video.
Discussion:

Creating systems that provide quality education for all, even when demand outstrips human and capital resources, is a challenge. But there is an urgent need to provide education that goes beyond teaching basic literacy and numeric skills. Education must help to build higher order cognitive abilities, strengthen processes of inquiry, enable collaborative problem solving and prepare people to become globally competitive. No single solution exists to address these immense challenges. New approaches and strategies for change are needed and computers, mediated communication, and related educational technologies are an important part of this approaches and strategies.

The students enrolled in Computer Programming 2 prefer the topics to be presented using visual presentation elements which include text, images, diagrams, drawings, charts and pictures. In addition, the e-learning project is designed with features of a variety of learning presentation elements that cater to the needs of visual, kinesthetic, and auditory learners. The site management features include user administration feature, faculty access feature, student access feature, logs and reports feature, and backup and restore facility. The security and control features of the e-learning courseware include the network domain access, restricted system access thru username and password, LAN-Based implementation and compliance with laboratory room rules and policies.

To conclude, the preferred presentation elements in each topic in Computer Programming 2 are using visual learning presentation elements. The features that shall be considered in the design of the proposed system would incorporate secured LAN-based learning management system.
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References:


FUTURE LEGENDS

Figure 1: Chapter 1 –Methods and Polymorphism Survey Results
Figure 2: Chapter 2 – Classes Survey Results
Figure 3: Chapter 3 – Inheritance Survey Results
Figure 4: Chapter 4 – Exception Handling Survey Results
Figure 5: Chapter 5 – File Systems Survey Results
Figure 6: Visual Presentation Elements on Java Methods
Figure 7: Kinesthetic Presentation Elements of Java Program Codes
Figure 8: Auditory Presentation Elements on Java Methods