AN INITIAL COMPARISON OF EDUCATIONAL TECHNOLOGY COURSES FOR TRAINING TEACHERS AT MALAYSIAN UNIVERSITIES: A COMPARATIVE STUDY

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ABSTRACT
Introducing a course in educational technology is vital especially to pre-service teachers in establishing early interest and long term habits. The initial disclosure and guidance in educational technology will determine the technique of beginning teachers at integrating ICT into their teaching-learning activities. Educators should feel comfortable in the utilization and deployment of proper instructional techniques. This is to ascertain the continuity of knowledge and skills obtained during the training program and consequently transfer in the real teaching situation. Institutions of higher learning that offers an undergraduate degree in education will include at least a course in the foundation of educational technology. However, the contents and emphasis of the curriculum differs from one institution to the next. Thus, there should be a standard or an indicator that essential areas of educational technology be met by pre-service teachers. This paper reports a small part of a larger ongoing research on the standards of ICT training curriculum and strategies for pre-service teachers throughout Malaysia. Specifically the curriculum and strategies at four local universities will be compared to the revised International Society for Technology in Education's (ISTE's) 2008 National Educational Technology Standards for teachers (NETS•T). An analysis of the extent of training curriculum in which the program adhere to the standards and the development of the field will be discussed.
Keywords ICT, educational technology, pre-service teacher

INTRODUCTION

Over the past couple decades the development of media technology has seen changes in the tendency of using and incorporating various available technology in schools over the world. In Malaysia, educators are strongly encouraged to utilize these media technology (in particular computers) since the government has injected billions of ringgit in the expenditure of restructuring the school technology infrastructure besides providing appropriate equipment including computers, software, courseware, and training since the early 1980s. Now, Information Communication and Technology (ICT) in schools has gained prominence and this can be observed globally as the movement of educational media shifts from educational radio to educational TV and to computer-based instruction. The incorporation of ICT in the classroom is deemed essential and one is expected to decide, explore, apply, and evaluate information efficiently.

With proper equipment in place, teachers are expected to utilize these media technology in their teaching. However, teaching with technology requires knowledge in the area of educational technology. Thus, pre-service teachers (or student teachers) should have a foundation of what this demands. The Association of Educational Communications and Technology (AECT) defines Educational Technology as "the theory and practice of design, development, utilization, management, and evaluation of processes and resources for learning" (Seels & Richey, 1994). This definition has been principally used by educators worldwide. As seen by many practitioners, educational technology is a complex field but can be simplified to mean the method of applying apt instructional approaches (such as direct, indirect, interactive, and experiential) in delivering education with the proper use of medium or tools (such as models, charts, videos, and computers).

It is irrefutable that much research has looked into the success of pre-service teacher programs and many have concluded that several institutions of higher learning have failed to appropriately prepare pre-service teachers with positive experiences and an insight into the potential of educational technology (Becker, 1999; Gunter, 1999; Gunter, 2001; Roblyer & Edwards, 2000).

At institutions of higher learning the exposure to the foundation of educational technology and in turn, ICT, a sub discipline, will have been introduced in any Bachelor's degree in education. As defined by UNESCO (2006-2008), ICT refers to "forms of technology that are used to transmit, store, create, display, share or exchange information by electronic means. This broad definition of ICT includes such technologies as radio, television, video, DVD, telephone (both fixed line and mobile phones), satellite systems, computer and network hardware and software; as well as the equipment and services associated with these technologies, such as videoconferencing, e-mail and blogs."

The preliminary training on ICT—that is found in any educational technology foundation class—will establish the habits of beginning teachers in integrating ICT in their teaching and learning activities at schools. Besides, strategies and curriculum may differ from one institution of higher learning to the next. Consequently, the relevance of the curriculum provided by these institutions of higher learning with respect to the development of ICT in education should be scrutinized.

Therefore, the intent of this paper is to report a small part of the larger ongoing research under Universiti Sains Malaysia's short term grant on the standards of ICT training curriculum and strategies for pre-service teachers throughout Malaysia. Specifically, the curriculum and strategies used at four local universities, Universiti Sains Malaysia (USM), Universiti Kebangsaan Malaysia (UKM), Universiti Putra Malaysia (UPM), and Universiti Malaysia Sabah (UMS), will be compared to the International Society for Technology in Education (ISTE) 2008 National Educational Technology Standards for teachers (NETS•T).

International Society for Technology in Education (ISTE) National Educational Technology Standards (NETS)

ISTE is the professional education organization responsible for recommending guidelines for accreditation for programs in educational computing and technology teacher preparation in the United States. The ISTE NETS•T was first established in 2000 that focuses on pre-service teacher education and provides a framework for implementing technologies in teaching and learning. Conversely, the first ISTE NETS for students' (NETS•S) framework was issued in 1998 and has been widely used by 45 U.S. states (Devaney, 2007). However, in 2007, the ISTE NETS•S was refreshed to meet demands of advancing technology as well as a changed economy; that include societal, learning, technological and economic landscapes evolvement. In turn, it is inescapable that the NETS•T should be revised as well. ISTE released the new NETS•T during the 29th Annual National Education Computing Conference (NECC) at San Antonio in July of 2008.

Briefly, NETS•T and Performance Indicators 2008 guideline emphasizes five areas in which teachers should:

1. Facilitate and Inspire Student Learning and Creativity
2. Design and Develop Digital-Age Learning Experiences and Assessments
3. Model Digital-Age Work and Learning
4. Promote and Model Digital Citizenship and Responsibility
5. Engage in Professional Growth and Leadership

(Adapted from the ISTE NETS for Teachers, 2008)

The NETS•T hopes to ensure that teachers have the set of skills that should transfer over to students. In consequence students will perform and benefit in using technology in appropriate ways.

With the standards for students specified, teachers are more aware and have the responsibility to ensure that the standards are met. Before that can happen they themselves need to be apt at using, applying, and integrating technology into their classrooms. For pre-service teachers, they will have to go through a basics course in educational technology especially in their education program to better equip them when they are in the field.

Preliminary Research Questions

The preliminary research questions include:

a. To what extent is the ICT training program for pre-service teachers conducted at universities in Malaysia comparable to ISTE 2008 NETS•T?

b. Is there a knowledge and skills gap between pre-service teacher training programs conducted at universities in Malaysia with the ISTE 2008 NETS•T?

c. What is the training strategies used to train pre-service teachers in the field of ICT in education at these four universities?

METHOD

Sampling

Even though Malaysia has a total of twenty public universities, only nine universities were identified that offers a Bachelor degree in Education including: USM, UPM, UKM, UM, UMS, UniMAS, UTM, UPSI, and UUM. Data were gathered for all these universities but for this paper, only four institutions, randomly chosen, USM, UKM, UPM, and UMS were analyzed (a sample size deemed appropriate, 44% of the population). These institutions offer at least one educational technology core course and have similar objectives at providing ample experience in understanding, learning, applying, and integrating educational technology into their pre-service teaching practices respectively.

Data Collection
Data collection started between March and September 2008 and were collected from document analyses, i) review of documents related to ISTE 2008 NETS•T education guideline and ii) documents of ICT based course curricula and course outlines for pre-service teachers from faculties of education at the four universities.

Interview Session
Five course coordinators were interviewed (each from USM, UKM, UPM, and two from UMS) to elicit course content, structure and delivery method as well as for triangulation purposes. An interview protocol was administered with a few open-ended questions posed to seek further clarification when deemed necessary. The summarization from the interview and content analysis are reported in the findings.

FINDINGS
Extent of ICT training program for pre-service teachers at the Malaysian universities comparable to the ISTE NETS•T 2008

All four universities offers a three credit hour course on specifically Educational Technology that combines the theoretical and practical aspects of the field. Table 1 shows a snapshot of NETS and a brief description of parts of the course content of the four local universities that meet the standards laid out by ISTE. The extent of ICT training for pre-service teachers in all cases ranges from basic to intermediate knowledge and skills. Hands-on project varies at the universities emphasizing different aspects.

The ICT training program at USM offers one mandatory course for all pre-service teachers pursuing a Bachelor degree in education (excluding Bachelor of Education—TESOL and Interactive Multimedia students). The program considers an overall approach that includes the theoretical aspects of educational technology and emphasizes intermediate skills on Microsoft Office application software. On the application side, major projects include a PowerPoint presentation (designed for a two period lesson) and a website on blogging.

In contrast, UMS has two mandatory courses for their pre-service teacher pursuing a generic Bachelor degree in education program. The courses are designed so that pre-service teachers establish contacts and a strong rapport with the state education resource centre. Their pre-service teachers also need to develop a courseware that requires the pre-service teachers to learn skills in various aspects of multimedia development. However, this university separates out the theoretical component which is emphasized in one course, *Technology and Educational Resource Centre,* from the more computer focused course, *Computer and Multimedia in Education* course.

Similar to UMS, UKM offers a course in *Computer Education* and *Educational Technology* for their BEd degree. One interesting finding is that the technique of using and designing transparencies is still prevalent although digital modes of presenting are taught. Likewise, UPM too find the necessity to maintain the importance of transparencies but a special emphasis is given to charts. This is because many schools throughout Malaysia are still using these medium and the need exist.

Knowledge skills gap between pre-service teacher training programs at Malaysian universities with the ISTE NETS•T 2008

Skills obtained during pre-service teacher training program at the four universities are seen to be highly in line with the older ISTE NETS 2000 but only at an average to the newer ISTE NETS•T 2008. The first component, Facilitate and Inspire Student Learning and Creativity, all four universities met this standard with varying performance in preparing their pre-service teachers. However, there is a lack on part of component two, Design and Develop Digital-Age Learning Experiences and Assessments. The educational technology curriculum lack in providing students with multiple and varied formative and summative assessments except in theory, but these can be found in other core or elective courses. Component three, Model Digital-Age Work and Learning, is highly met since the skills and knowledge they gained during the education technology class is incorporated and demonstrated in other new technologies and applied in other courses throughout their study. Promote and Model Digital Citizenship and Responsibility, the fourth standard is stressed throughout the whole course. The fifth component, Engaging in Professional Growth and Leadership, pre-service teachers have yet to participate in local and global learning communities to ensure creative applications of technology to improve student learning apart from the UMS curriculum.

Training strategies use to train pre-service teachers in the field of ICT in education

Strategies used are lecture-based, hands-on, and practical applications. Students are given the opportunity to apply the theoretical aspect they learn in parts of their tutorial assignments. As an example, students are taught to create lesson plans and create a simple one or two class period on a subject of their choice (preferably their major or minor) using a presentation tool. At USM it is a requirement that students present their PowerPoint presentation at the end of the semester. Similarly, at UKM and UMS students are required to build a simple courseware. UMS uses experiential learning especially in their *Technology and Educational Resource Centre* course. Others use direct, indirect and interactive approaches. But all pre-service teachers are required to undergo practical teaching to gain real world experience and each individual will have to integrate technology in their classroom eventually.

NETS•T (2008)	USM	UKM	UPM	UMS
Facilitate and Inspire Student Learning and Creativity	Embedded in tutorial sessions. Pre-service teachers' skills and knowledge are demonstrated in their products that range from desktop publishing, developing web page, blogging, PowerPoint presentation (that include embedding video clips and audio), designing a database, completing selected tasks using spreadsheets. Collaborative knowledge construction is encouraged as seen in group work.	Embedded in tutorial session. Pre-service teachers are taught to think creatively by using hand phones to replace digital cameras to take pictures and insert them in their respective assignments. They are given the option to use any presentation software to create a courseware.	Embedded in practical session of the core course. Emphasis is given on digital photographic techniques and the integration of instructional media.	Pre-service teachers are taught computer graphic, animation, video clipping, audio recording production, screen and interface design, and authoring method and principles. Collaborative knowledge construction enhanced in group work.
Design and Develop Digital-Age Learning Experiences and Assessments	Pre-service teachers have to apply instructional design model (like ADDIE) to plan and design their lesson taking into consideration the available digital and non-digital resources besides diverse needs of learners. The theoretical aspects of choosing & selecting suitable strategies in teaching and to develop technology-enriched setting are accentuated.	The ADDIE model is emphasized in assisting pre-service teachers to plan and develop their lesson.	Pre-service teachers are guided to prepare and develop learning materials like posters and charts. They are required to apply the ADDIE model in creating their own instructional projects. Student teachers may opt to search for digital picture via the Internet.	Pre-service teachers have the opportunity to do hands-on work especially during their library/resource centre project. They begin with the selection of a design model and plan according to students need and available resources. They learn to locate technology resources.
Model Digital-Age Work and Learning	Each mini project has to be designed and developed that includes a lesson plan. Thus these pre-service teachers had to select appropriate strategies to maximize student learning.	Pre-service students are taught to adapt new technology. They can demonstrate fluency in technology systems and transfer to new situations.	One topic on ICT is included in the course but the application is found elsewhere in other courses. Student knowledge creation skills and reflective learning is integrated in parts of the course.	Since these pre-service teachers are required to produce a courseware at the end of the semester, curriculum plans with proper strategies had to be integrated throughout the course.
Promote and Model Digital Citizenship and Responsibility	Legal and ethical use of digital information especially copyright, fair use, and intellectual property are emphasized throughout the course.	Legal and ethical use of digital information especially copyright, fair use, and intellectual property are emphasized throughout the course.	Legal and ethical use of digital information especially copyright, fair use, and intellectual property are emphasized throughout the course.	Legal and ethical use of digital information especially copyright fair use, and intellectual property are emphasized throughout the course.
Engage in Professional Growth and Leadership	Students are required to search and critique current research on educational technology. The concept of lifelong learning is touched on.	The application of existing and emerging tools are highly encourage in the class.	Pre-service teachers are given the opportunity to select specific topic during the 14 week period and choose to present in small groups the material/topic creatively.	Shared decision making is required druing the resource centre project.

Table 1. ISTE NETS for Teachers 2008 standard in comparison to USM, UKM, UPM, and UMS

CONCLUSION

All five components of the ISTE NETS•T 2008 for teachers are either somewhat directly or indirectly taught at varying degrees of proficiency. However, with the know-how and hands on activities prepared for these pre-service teachers, it is hope that their skills will transfer and that these future teachers become models in facilitating and inspire student learning when place in the real world. Establishing early habits is essential and

could make them feel more confident in their ability to conduct classes especially to teach with technology and to consistently model digital citizenship and responsibility highly.

The finding shows that these universities use different approaches with some similarity in course content in conveying what entails educational technology (including, ICT). In comparison to the ISTE NETS•T 2008, all components would have been met exceptionally well by all four universities to the older ISTE NETS•T 2000. The curriculum at all four universities need to emphasize more on the digital-age learning experiences and engage in professional growth and leadership. It is imperative that faculty/lecturers guide pre-service teachers to teach with technology in the actual classroom and to provide them with skills that will enhance their technology abilities especially taking into account the emphasis on digital-age learing experiences. It is no longer sufficient to pre-service teachers with skills and knowledge but the practical aspect has to be integrated so that these teachers will feel comfortable using technology. Although the knowledge skills gap do not seem to exist within the four cases, other factors should be considered so that the courses offered can be further strengthened. It is also very important that other higher institutions around the world be conscious with evolving technology by revising their curriculum often (at least once every 3-5 years) to meet societal needs and expectation to move towards a higher quality of human capital.

Since this is a preliminary finding, a matrix can be sketched to look at further similarities and differences in the final analysis of the whole project. This project can also stretch out to other curriculum by comparing their own curriculum to existing standards or match it up to world standards.

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