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THE EFFECTIVENESS OF THE WEB-BASED LEARNING SYSTEM ON '*TEKNOLOGI DALAM PENGAJARAN DAN PEMBELAJARAN*' COURSE IN INSTITUTE OF TEACHER EDUCATION IPOH CAMPUS

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THESIS SUBMITTED IN FULFILLMENT OF THE REQUIREMENT FOR THE DEGREE OF PHILOSOPHY OF EDUCATION (INFORMATION AND COMMUNICATIONS TECHNOLOGY)

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ABSTRACT

The aim of this study was to identify the instructional principles and strategies used for the *Teknologi dalam Pengajaran dan Pembelajaran* course in a web-based learning environment that helped guide the development of a Web-based Learning System (e-IDRaj). The learning system was then evaluated to determine its effectiveness, usability, and learning strategy dimensions. This study employed the quantitative research methodology using the experimental pretest-posttest control group design. The sample of the study comprised 60 teacher trainees, who were equally divided into an experimental group and a control group. Four research instruments were used to measure the effectiveness, usability, and learning strategy dimensions of *e-IDRaj*. Pre-testing, interventional treatment, and post-testing spanned eight weeks. Both descriptive and inferential statistical procedures were performed on the collected data. The findings showed that the experimental group significantly outperformed the control group, clearly highlighting the better performance of the *e-IDRaj WBLS.* In addition, the usability and the learning strategy dimensions of the *e-IDRaj WBLS* were highly rated, further reinforcing their positive impacts on student learning. Overall, the research findings indicate that such a novel learning system can help teacher trainees learn more efficaciously, which will result in better learning performance.

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KEBERKESANAN SISTEM PEMBELAJARAN BERASASKAN WEB DALAM KURSUS TEKNOLOGI DALAM PENGAJARAN DAN PEMBELAJARAN DI INSTITUT PENDIDIKAN GURU KAMPUS IPOH

ABSTRAK

Kajian ini bertujuan untuk mengenal pasti prinsip-prinsip pengajaran dan strategi yang diguna untuk kursus Teknologi dalam Pengajaran dan Pembelajaran dalam persekitaran pembelajaran berasaskan Web serta membantu bimbing pembangunan Sistem Pembelajaran berasaskan Web (*e-IDRaj*). Sistem pembelajaran ini kemudian dinilai untuk menentukan keberkesanannya, kebolehgunaan, dan dimensi strategi pembelajaran. Kajian ini dengan pendekatan kaedah kajian kuantitatif menggunakan eksperimen ujian pra-pasca reka bentuk kumpulan kawalan. Sampel kajian ini terdiri daripada 60 orang guru pelatih, yang sama dibahagikan kepada satu kumpulan eksperimen dan kumpulan kawalan. Empat instrumen kajian telah digunakan untuk mengukur keberkesanan, kebolehgunaan , dan dimensi strategi pembelajaran IDRaj. Praujian, rawatan intervensi, dan pasca ujian telah dirangka dalam tempoh lapan minggu. Prosedur, statistik deskriptif dan inferensi telah dilakukan pada data yang dikumpul. Dapatan kajian menunjukkan kumpulan eksperimen berjaya mengatasi prestasi pencapaian kumpulan kawalan, jelas mempamirkan prestasi yang memberangsangkan dengan penggunaan Sistem Pembelajaran *e-IDRaj WBLS*. Disamping itu, kebolehgunaan dan dimensi strategi pembelajaran *e-IDRaj WBLS* telah dinilai tinggi, mengukuhkan pencapaian pembelajaran pelajar yang positif. Secara keseluruhan, dapatan kajian juga menunjukkan bahawa sistem pembelajaran terbaru ini serasi serta dapat membantu guru-guru pelatih guru menguasai pembelajaran dengan lebih baik, sekaligus menghasilkan prestasi pembelajaran yang lebih baik.

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CHAPTER 1

1.1 Introduction

The Teacher Education Department, Ministry of Education (MOE) is under ever-growing pressure to produce enough qualified teachers to meet the teacher-students ratio demands (Education Planning and Research Unit, 2003). According to Chau (2011), this strain warrants immediate attention by all quarters. Initial response has seen an increased numbers of student admissions into Institutes of Teacher Education (ITEs) (Embi, 2011). This increased student mass has led to a greater variety of student backgrounds demanding greater flexibility in the delivery of higher education courses (Chau, 2010). To accommodate the greater mass of learners and demand for flexibility, there seems to be a need for ITEs to deliver many of their courses through the Internet.

In 2007, there were already three programmes J-Qaf (Jawi, Quran, Arab and Fardhu Ain), Program Pensiswazahan Guru (PPG) and Pensiswazahan Guru Sekolah Rendah (PGSR) which were partly online courses delivered by ITEs. Presumably, students enrolled in ITEs are likely to encounter an online learning environment in some form or another in their study. The integration of online learning (or e-learning)

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into ITE courses is not showing any signs of slowing while allowing opportunities to reach a broader community of learners, and is often accompanied by claims of increased 'flexible learning - any time, any place, any path, any pace'. As stated by Ullmann (2009), a course does not have to occur at a particular hour on a particular day.

There is increasing expectation that learners will be able to use the Internet to assist their studies through activities that include accessing their course information online, utilising online communication tools and accessing online library services. There is also increasing expectations that students entering ITE will have to possess substantial computer literacy competencies to meet entry requirements and to succeed at their studies (Abas, 2009).

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On another note, online learning technologies are also continuing to develop, including the development of interactive content management systems, which are able to; for example, select the most appropriate representation of the content for individual learners depending on their demonstrated learning style (Manochehri, 2011). While significant studies exploring the design of instructional environments that can accommodate a learner's individual differences have emerged, there appears to be a growing void between the focus on the utilisation of online technology for delivering instruction and the vast body of content knowledge relating to instructional design, theories and models such as those developed by Gagne (2006). With the proliferation of online learning environments, it would seem that developers of web-based learning might well have largely ignored the employment of instructional design practices (Snyder, 2010).

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The way in which students read from *Hypertext Markup Language* (HTML) page on a computer screen is different from the way they read from a printed page. The ever-growing availability of information on the Internet has encouraged students to skim-read over Web pages and avoid large continuous blocks of text. Generally, students become disappointed when they access large amounts of online text that must be read (as is the case when working on assignments), particularly when it is poorly designed due to one use of dense text with inappropriate font styles clashing with background colours and patterns (Clark, 2010). The structure and organisation of the Web pages within the Web site and how students are expected to interact with the online materials are also important considerations for the design of effective online educational materials. After all, decisions made at the instructional design phase of course development can influence and encourage different learning strategies that can be used by students (Altaboli, 2014).

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As online learning technologies continue to develop, the use is “both a medium and a message of educational innovation” which conveys a message as a perception of competitive advantage (Kidd, 2010). While the process of creating Web pages is relatively simple, creating educationally effective and useful Web sites is still an arduous task (Chou, 2011). In this regard, Makkonen (2007) suggests “... using hypertext to organise and retrieve information since they resemble the workings of human memory and cognition far more closely than does the organisational structure of linear text” (p. 5).

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For Beuschel (2011), learning on the Internet places greater demands on the learner than the traditional face-to-face learning where design elements keep the learner on track through interface interactions. The Web removes linear text structures found in textbooks and replaces them with "building blocks" of shorter text from various online sources. In concurrence Foureman (2010), argues that "... generally, instructional designers either do not always appear to take advantage of the hypermedia technology, or do so without pedagogical foundation" (p. 12).

For the researcher, this view seems to consolidate further the benefits of online learning technologies.

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1.2 Background of the study

The current scenario on the use of existing web-based learning system seems to suggest that the system is effective. However, it requires much amendment to suit the local context (Embi, 2011). This would include in relation to the governance of e-Learning are the lack of a clear e-Learning policy, absence of a clear governance structure, and the lack of clear line of responsibility on the task of planning and implementing e-Learning and lastly absence of a deicated e-Learning centre/unit as one of the main challenges. This augers well with the suggested recommendations for sound governance structure with clearly defined roles and responsibilities with appropriate governance hierarchy by establishing an e-Learning governance structure in respective institutions. These institutions must not only have a comprehensive e-Learning policy, which includes not only the establishment of a dedicated e-Learning

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centre/unit, but also meeting the needs of an e-Learning infrastructure and human resources. With this, there is a need of larger annual budget to be pumped into e-Learning practicing institutions to enable them to compete in the global virtual education arena. Against this backdrop, a research was carried out seeking some much needed ideas and practices in the web-based learning environment.

The Internet provides significantly different and interesting possibilities for computer-meditated communication and learning from other forms of educational technologies. In addition, it also offers more opportunities to the distance learner to search for additional resources. In concurrence, Chang & Smith (2008) emphasise the need for instructors to abandon the teacher-centered approach in favour of the student-centered approach with a view to creating a more conducive online learning environment.

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As a communication medium, the Internet has gained wide social acceptance which cannot be ignored (Bernal, 2010). Online learning environments have appeared in a variety of forms and applications in higher education. In some cases, entire courses are delivered exclusively online to students in remote locations. Supplementary materials such as introductory notes including excess information to the class Web site are also mailed to students in remote areas.

Sometimes the entire class Web site is duplicated onto a CD-ROM for these students with slow and unreliable Internet access. In other cases, the lecturers use a class Web site as a supplement to their face-to-face delivered classes. In such cases, the lecturer utilises the online communication facilities as well as place additional

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information not provided in class on the class Web site for students to access. Some lecturers utilise the class Web site for the teaching of specific skills and knowledge through automated pre-programmed online activities. These automated systems can provide specific feedback to students' answers and can automatically adjust their assessment depending on how many attempts are made at particular questions.

Thus, it can be seen that there are numerous ways in which online learning environments may be utilised based on the students' and instructor's instructional and pedagogical needs. In many cases, however, the development of instructional materials to be delivered online is left in the hands of lecturers without instructional design experience (Denis, 2010). While some lecturers have created excellent online learning environments, others use their class Web sites for posting content information in the shortest time possible. This may include lecture notes for students to access and print out, without any consideration towards how students will interact and interpret the materials in a particular environment.

Some lecturers, with worthy intentions, are just coming to grips with online learning and are making fundamental mistakes due to lack of appropriate instructional design experience (Saeed & Sinnappan, 2011). In fact, studies have reported that the design and development of online learning environments in ITEs is largely of an ad-hoc and uncoordinated nature producing greatly varying levels of success (Artino, 2009). The development of class Web sites is often carried out without consideration of the instructional and pedagogical needs of the students. Kartal & Uzun (2012) in highlighting this, states “an online learning design model is constructed through the integration of pedagogical models, instructional strategies, and learning

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technologies". Sheridan (2006), points out that several administrators have adopted online learning as a cheap method of distributing courses to masses of students, thereby, increasing the educator-to-student ratio. This inappropriate use of the Internet for learning is reminiscent of previous inappropriate uses of media technologies for learning, as observed by (Martineau, 2009):

> Since we have learnt that merely broadcasting lectures over the airwaves is not a meaningful educational experience, it is somewhat surprising to see many people making the same mistake with the Web... so online educators need to find ways of using the new medium effectively. It is a two-way medium and this is what makes it ideal for use as an educational technology. This also means that you cannot just put up course notes and disappear for a semester…many e-learning courses and programs fail because they fail to address the issue of learner satisfaction. (p. 16)

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Varying attitudes towards the use of one Internet for learning currently exist and some are still arguing whether it is an acceptable medium for use in ITEs (Embi, 2011). Some lecturers' approach online learning with scepticism, believing they have heard previous claims of the benefits of educational technology for example CD-ROM, only to be disappointed (Pan & Lau, 2010). This may be because of the many inadequate limitations of the CD-ROM, such as the elaboration of the content. Indeed, some educators have questioned the suitability of online learning for higher education and whether higher education is being devalued through efforts towards accommodating flexibility. A question remains, therefore, as to whether online learning potentially contributes towards devaluing ITEs. Arguments centred on

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whether online learning is suitable for ITEs may sometimes appear to be clouded with misinformation.

Simonsen & Myers (2011), argue that learning is the driving force for technological interventions, not forcing learning to fit within technological interventions. Any investigation into how online learning may add value needs to include how online technologies may be used to effectively address educational problems and needs. Educational needs may include the development of a constructivist learning environment allowing learners to engage in knowledge construction (Jonassen, 2006), which online learning can accommodate through, for example, collaborative learning, not only among all students, but also between students and the instructor (Chao & Saj, 2010).

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Several studies have attempted to determine whether online learning is more or less beneficial than traditional face-to-face learning. Some researchers point out that online education can be at least as effective as traditional classroom instruction (Angiello, 2010). While learners studying in distance mode may have different learning needs from those attending face-to-face classes, we are actually seeing online learning utilised in all of these modes of delivery. The use of the Internet for learning is being used for varying groups of students from first year undergraduate students through to aged postgraduate students. In each of these cases, the lecturers utilise online learning in specific ways to accommodate their students' learning needs. Further investigation is needed to determine whether materials for online learning are appropriately designed for students entering ITEs with varying learning needs and studying in various modes of delivery.

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