

Master's Thesis

Guidelines for Creating Effective e-Learning Content to Introduce a New Teaching Style in  
High Schools in Malaysia

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## 要 旨

本論文は、ブキット・マータジャム高校の大学進学準備課程の高校生に対して行われた e ラーニングシステムについての調査について述べたものである。調査は、公立高校における学生の自習に対して e ラーニングの有用性を示し、教師が効果的なオンライン教材制作のためのガイドラインの使用を好意的に選択することを論拠付けるために行われた。調査は、学生用の e ラーニングコースと教師用の e ラーニングコースにわけて行われ、19 人の学生と 1 名の教師がこの調査に参加した。大学進学準備課程のコンピュータ関連科目である「データベースシステムの計画と設計」に関する教材を開発し、指導教材および調査手段として用いた。

初期評価はひとりの学生を通じて行われ、また科目の専門家が教材の質向上のためにシステムを評価した。調査は、学生用および教師用の 2 種類の質問票からなり、それぞれ 5 つおよび 6 つの主要部で構成されている。

学生の達成度の分析結果から 28% の改善成果が示された。これは、e ラーニングが学生の自習用教材として効果があることを示すものである。つまり、事前テストと事後テストに対する p 値が統計的有意差があることを示したことから、この e ラーニングコンテンツが学生の自習用教材として有効であることが示された。参加者の質問票への回答結果、事前・事後テストの結果から、e ラーニングが公立高校における大学進学準備課程の学生の自習用教材として有用であると考えられる。

## Abstract

This paper attempts to describe a research project related to e-learning system implemented to pre-university students at Bukit Mertajam High School. The study was conducted to determine that e-learning has potential to be implemented in government schools for self-paced study and to obtain teacher's preferences toward the use of Guideline for creating online teaching material. The treatment instruments were the e-Learning Course for students and the e-Learning Course for teachers. About 19 students and a teacher involved in this study. A topic on 'Planning and Design Database System' based on pre-university Computing subject was developed and selected as an instructional material and research instrument.

Early reviews have been conducted through a student and a content expert reviewer reviews the system in order to improve the quality of the instructional material. There are two types of research instruments, one instrument is for students and another one is for teacher in the form of a questionnaire that consisted of five and six main parts.

Results from the students' achievement analysis showed an increase twenty eight percent (28%), this is a proof that the e-learning will be effective as a means of self-paced study. It means this e-learning content was effective for self-paced study because p values for pretest and posttest showed statistical significance. Basing on the participants questionnaire responses and pretest/posttest performance I conclude that e-learning has the potential to be implemented in government schools for self-paced study for pre-university students.

## **CHAPTER 1**

### **Background and Purpose of This Research**

#### **1.1 Introduction**

Beginning in 2004, Ministry of Education (MOE) and Malaysian Administrative Modernization and Management Planning Unit (MAMPU) has conducted collaborative projects pioneering the use of LMS in three schools in Malaysia. Then the project expanded to 50 schools across the country. MOE announced the next project is a mega project starting 25 March 2009 - 24 March 2013. During the implementation period, a number of constraints have been identified and one of them is to provide appropriate teaching materials to promote the use of LMS (Moodle). The current mode of learning in Malaysia is structured on traditional face-to-face methods. Implementing e-learning in secondary school is a new supplementary approach in order to optimize the efficacy of internet based learning and eventually will improve the quality of teaching and learning method.

#### **1.2 Research problem**

Teaching is becoming most challenging profession where knowledge is expanding rapidly because of speedy development in ICT especially the Internet. As new styles of learning have evolved, teachers are expected to facilitate learning and make it meaningful to individual learners rather than just to provide knowledge and skills. Modern developments of innovative technologies have provided new possibilities to teaching professions, but at the same time have placed more demands on teachers to learn how to use these new technologies in their teaching (Robinson & Latchem, 2003). Today, a variety of ICT can facilitate delivery of instruction by combining new technologies with effective pedagogy may be able to provide more flexible ways for learning process. In Malaysia all schools are expected to improve educational practice in the delivery of the courses through the use of the newly adopted Learning Management System (LMS), Moodle. Teachers are encouraged to produce teaching materials according to their subjects. However a few teachers felt that the development of teaching materials for the LMS requires high ICT

skills. This feeling makes them feel tough and not interested in producing their own material. Most teachers do not know how and where to begin developing teaching materials because there are no guidelines and standards to be followed to produce the highest quality learning materials using a variety of formats and adopts appropriate teaching pedagogy. I have been inspired with the mentioned constraints to come with new idea to introduce Guideline to help alleviate the problems faced by teachers. The definition of Guideline in this research is a document that aims to streamline instructional processes according to a teaching routine. Guideline is used in this research to make the development of e-learning content more effective, and presumably of higher quality. The Guideline includes three (3) sections, relating respectively to the Introduction section, the Content section, and the Assessment section. The aim of a Guideline is to introduce a new consistent and effective procedure to alleviate teachers or e-learning content developers designing teaching and learning materials. Guideline is recommendation and advice meant to help teachers create better learning instructions. In regards to the specifics of course design, this study suggests Guideline template which teachers or course designers will be likely to adopt in the e-learning content development process. This Guideline was first adopted by researcher in developing teaching materials to be tested for pre-university students at a secondary school for self-paced study. e-Learning content creation with reference to the Guidelines is expected to have positive impact on learning process and students' achievement. The effectiveness of e-learning content can be recognized only true if the tested student showed increased score after using it. Also, the increase of score reflected indirectly that e-learning can be introduced as a new teaching style in high schools in Malaysia.

### **1.3 Research purpose**

The purpose of this study was to determine that e-learning has potential to be implemented in government schools for self-paced study. A topic on 'Planning and Design Database System' for Computing subject will be developed and has been selected as an instructional material and research instrument for students. This study will utilize a quantitative

experimental design of a group of pre-university students who take Computing as a subject. The expected results should indicate that learning through e-learning by utilizing systematic theory and development design is able to bring positive effects on students. It also expects to obtain positive effect on student's attitude towards self-paced learning. The findings from this study are also expected to show that creating online content based on Guideline will reduce teachers' constraints on using Moodle as a Learning Management System.

#### **1.4 Research Hypothesis**

It is expected the following will be the results of the experiment:

Effective e-Learning content influences students' achievement for self-paced study for pre-university students in government school.

#### **1.5 Research question**

Two research questions were explored:-

- a) Does e-learning offers continual access to self paced learning?
- b) How will e-learning affect the performance of students?
- c) Does e-learning present autonomy?

#### **1.6 Significance of the study**

The e-learning systems help pre-university students to do self-paced learning when studying Computing subject at school or at home. Students can use online course as a supplementary material as an alternative of textbooks or face-to-face class. The e-learning system would develop a more conducive learning environment where students participate actively in the learning process. The student would always be presented with the latest technology. In using the system, it's hoped the students will learn to be more independent in creating their own learning steps. The system will guide them systematically but at the same time give the students freedom to learn at their own pace without having to compete

with other students. This will definitely help the slow learners from being frustrated and the fast learner from getting bored.

A new Guideline was introduced to teachers as tools that could guide them in creating their own online learning material easily. The teachers would have a systematic way of teaching where they can always update and change their teaching material at anytime accordingly. This can be very productive.



## **CHAPTER 2**

### **Literature Review**

The literatures shown show the importance of creating effective e-learning content in the context of new teaching style for educator.

#### **2.1 E-learning**

E-learning is commonly referred to the intentional use of networked information and communications technology in teaching and learning. A number of other terms are also used to describe this mode of teaching and learning. They include online learning, virtual learning, distributed learning, network and web based learning. Self-paced e-learning online refers to situations where an individual learner is accessing learning resources such as a database or course content online via an Intranet or the Internet. A typical example of this is a learner studying alone or conducting some project or assignment on the Internet or a local network.

According to Clark & Mayer (2002), there are three potentially valuable instructional methods unique to e-learning as follows 1) practice with automated tailored feedback, 2) integration of collaboration with self-study, and 3) use of simulation to accelerate expertise. Allen & Seaman (2005) recent survey of higher education in the United States reported that more than 2.35 million students enrolled in online courses in fall 2004. This report also noted that online education is becoming an important long-term strategy for many postsecondary institutions. Jung and I. Rha addressed student achievement and satisfaction as two means to assess the quality of online education. Studies focused on academic achievement have shown mixed reviews, but some researchers point out that online education can be at least as effective as traditional classroom instruction.

EDUCAUSE discussed the SurveyShare that took place from late November 2003 to early January 2004 and Survey results show that pedagogical skill was deemed more important than technological skill for effective online teaching. With regard to the needs for pedagogical competency of online instructors, a majority of the respondents expected that

online instructors would typically have received some sort of training in online teaching either internally or externally by the year 2010.

## **2.2 Learning styles**

Learning styles are generally not related to core intelligence or prior capabilities (Miller, 2000), and while there aren't "good" or "bad" learning styles, there are effective and ineffective matches between the way an individual learns and the way instructional materials are presented or a course is taught (Gagne, Wager, Golas, & Keller, 2005). Online learning is not a fit for all learners but many learners have found huge advantages to an online learning model. If you are a visual learner, you will learn best when information is presented in the form of a graph, chart, picture or text on a page or screen. You need to see the information (Joni Rose, 2006). Some learners prefer to have information presented to them one step at a time in a linear or serial form. Other learners find learning easier when they can see the 'whole picture' to begin with so that they can rearrange the various parts into a pattern which makes sense to them (Duncan, H and Chris, B (1986).

## **2.3 Self-paced Learning**

It is belief that the optimum learning takes place when a student works at his or her own pace, is actively involved in performing specific learning task, and experiences success in learning (Morrison, Ross, & Kemp 2007).

## **2.4 Flexible speaking opportunities over the virtual class**

In order to respond to learners' need for more flexible speaking opportunities for students spread over the virtual class, the e-learning system recently introduced Internet-based, real-time chat room, thus making a groundbreaking move in the online learning and teaching of Computing subject. Some studies suggest that computer chatting improves interactive competence (Chun, 1994). Chat activities promote learner autonomy due mainly to the fact that the teacher role is minimized (Bump, 1990; Chun, 1994; Sullivan &

Pratt, 1996; Warshauer et al, 1996). Chat activities promote active involvement (Bump, 1990; Sullivan & Pratt, 1996; Warshauer, 1996b; Carey, 1999).

## **2.5 Gagne's Nine Events of Instruction**

Instructional design is a means of selecting and arranging instructional material in a way which helps students learn more efficiently and effectively (Merrill & Tennyson, 1981). The purpose of instruction is to help people learn. A study indicated that nine events of Gagne's instructions are actually effective in helping the students to become independent learners if it is followed correctly (Hoskisson & Young, 1989). Gagne's nine instructional events can serve as a learning theory to be applied and improve online teaching and training materials (Peter, 1999). The events of instruction are designed to activate the process of information processing or at least to parallel their occurrence, and support the process (Gagne, Wager, Golas, & Keller, 2005).

Gagne proposes nine instructional events that a single act of learning involves a number of stages of internal processing beginning with (1) Gaining attention, (2) Informing the learner of the objective, (3) Stimulating recall of prerequisite learning, (4) Presenting the stimulus material, (5) Providing learning guidance, (6) Eliciting the performance, (7) Providing feedback about performance correctness, (8) Assessing the performance, and (9) Enhancing retention and transfer (Gagne, Wager, Golas, & Keller, 2005). Gagne & Medsker (1996, chapter 15) provide examples of events for each category of learning outcomes.

### **Event 1: Gaining attention**

In his Conditions of Learning theory, Gagne suggests that gaining the attention of the student is the first step in successful instruction (Gagne & Medsker, 1996). Eysenck (1982) examines and concludes that compensatory system that allows attention to be focused on certain task or environmental stimuli. The way that the learner physically manipulates objects on-screen will affect what they are mentally attending to (Holst). In order for any learning to take place, you must first capture the attention of the student. A even better

way to capture students' attention is to start each lesson with a thought-provoking question or interesting fact. Curiosity motivates students to learn.

#### Event 2: Informing learners of the objectives

In 1965, Gagne published *The Conditions of Learning* which outlined the learner is more likely to understand the objective and establish a realistic expectancy when the nature of the desired performance is made clear. Early in each lesson students should encounter a list of learning objectives. This initiates the internal process of expectancy and helps motivate the learner to complete the lesson.

#### Event 3: Stimulating recall of prior learning

The theory suggests that the prior learning must be retrieved from long-term memory to be accessible in working memory for integration with the new learning (Gagne & Medsker, 1996). A simple way to stimulate recall is to ask questions about previous experiences, an understanding of previous concepts, or a body of content.

#### Event 4: Presenting the content

This is the event of instruction is where the new content is actually presented to the learner. Content should be chunked and organized meaningfully, and typically is explained and then demonstrated. To appeal to different learning modalities, a variety of media should be used if possible, including text, graphics, audio narration, and video.

#### Event 5: Providing learning guidance

To help learners encode information for long-term storage, additional guidance should be provided along with the presentation of new content. Guidance strategies include the use of examples, non-examples, case studies, graphical representations, mnemonics, and analogies. The essence of learning is to provide support for learners in making connections between what they know and what is being learned (Gagne, Wager, Golas & Keller 2002).

#### Event 6: Eliciting performance

In this event of instruction, the learner is required to practice the new skill or behavior. Eliciting performance provides an opportunity for learners to confirm their correct understanding, and the repetition further increases the likelihood of retention. Eliciting performance serves at least two functions. First, it causes the learner to recall from long-term memory what has been learned in short-term memory in order to perform the task. Second, it provides the opportunity for feedback (Gagne, Wager, Golas & Keller 2002)

#### Event 7: Providing feedback

As learners practice new behavior it is important to provide specific and immediate feedback of their performance. Unlike questions in a post-test, exercises within tutorials should be used for comprehension and encoding purposes, not for formal scoring. Additional guidance and answers provided at this stage are called formative feedback (Gagne, Wager, Golas & Keller 2002)

#### Event 8: Assessing performance

Upon completing instructional modules, students should be given the opportunity to take (or be required to take) a post-test or final assessment. This assessment should be completed without the ability to receive additional coaching, feedback, or hints. Tell the learner if mastery is achieved and what to do next if it is not ((Gagne, Wager, Golas & Keller 2002). A commonly accepted level of mastery is 80% to 90% correct.

#### Event 9: Enhancing retention and transfer

Enhancing retention is very important to prevent forgetting. Retention is the ability to reproduce learned behavior after a period of time has elapsed since the last performance (Gagne & Medsker, 1996). The strategy of repeated practice appears to apply to the remembering of verbal information, intellectual skills, and motor skills. Today's learner is called upon to solve novel problems and not just only gaining knowledge.

## **2.6 Instructional System Design**

Instructional Systems is an arrangement of resources and procedures used to facilitate learning (Gagne, Wager, Golar & Keller, 2005). Why did I choose the ADDIE model for this research study? Although there are many different types of instructional design models, one model that has been widely adopted is the instructional systems development model. ADDIE is a long-time, battle-tested, approach to instructional design that can help guide you to the most effective delivery approach (Gagne, Wager, Golas, & Keller, 2005). The ISD process is one in which teachers and trainers can use to design and develop the most appropriate learning environment for their students (Heinich, Molenda, Russell, & Smaldino, 2001). Reigeluth C.M (1999, p.473) says "In general, feedback is more effective in promoting learning when it transmits more complete information. In addition, Perkins in Smart Schools in Reigeluth C.M (1999, p.6) indicates that an instruction should contain in part thoughtful practice, informative feedback and strong intrinsic or extrinsic motivation if it is to foster cognitive learning.

## **CHAPTER 3**

### **Research Methods**

#### **3.1 Population and sampling**

Nineteen pre-university students and a teacher from a secondary school in Bukit Mertajam High School, Penang participated in this study.

#### **3.2 Research Design**

The research procedures were divided into five stages:

Stage 1: The researcher analyzed problems in the current situation in schools

Stage 2: The researcher designed an e-learning system as a new teaching style to introduce in a high school.

Stage 3: The e-learning system and learning materials have been developed by the researcher, and then were evaluated by subject matter expert.

Stage 4: At this stage, the number of the student samples was given the pre-test which is to determine their level of knowledge before being treated with the learning process suggested. Then the entire sample group had to undergo the web based learning process for three weeks.

Stage 5: The post-test was given at this stage. The scores of this post-test will be compared against the pre-test scores to see the effects of an e-learning system.

#### **3.3 Research Procedures**

To overcome the problems mentioned in Chapter 2, e-learning systems was developed and Gagne's Nine Events of information is used as a framework for designing Guideline. These nine events include: gaining attention of the learner, set the objectives of the study, review previous lesson before teaching, presentation, providing guidance to the learner, asking for the response from the learner, providing feedback for the learner, assessment and evaluation and finally enhancing learner's retention. The combination of ADDIE and Gagne's Nine Events model were applied in this research study for quality assurance,

systematic approach is adhered to, and the online course are planned, designed and implemented according to sound instructional theory and pedagogical principle.

### 3.4 Research Methodology

Online educational technology in secondary education is relatively new; research is needed to find the right methods and introducing a mixture of effective instructional design theory. My study is based on the idea of Gagne's Nine Events as discussed in Literature Review in Chapter 2. In this study, I would like to highlight the theory “Gagne's Nine Events” which was introduced to the teachers or the content developers who were involved in the process of creating e-learning material. The renewal presented in this research is Guidelines which is important, simple and easy to be used by anyone as a guide to developing online material.

#### 3.4.1 Guidelines Template

Figure 1 show new features presented in my Guidelines in which the Gagne’s Nine Events were grouped into three sections which are Introduction, Content and Assessment. These Guidelines provide the streamlines of the process for developing e-learning contents.

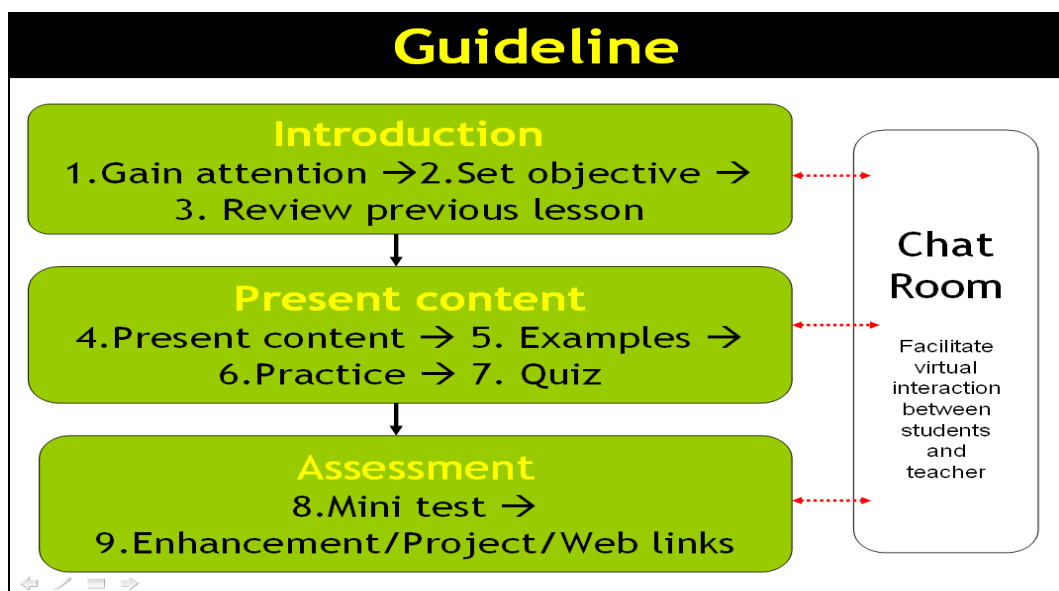


Figure 1: Guideline template shows the streamlines for the process of developing e-learning contents.



### 3.4.2 Guidelines Form

In Figure 2, Guidelines Form shows the step-by-step process of developing e-learning contents. The guidelines were introduced to aid teachers in designing online material. These guidelines are provided to ensure materials posted on Learning Management Systems were pedagogically sound. The guidelines will also give a new consistent and effective procedure to develop e-learning content.

Guidelines			
Topic	Information System		1. Write the name of the topic
Lesson Title	Normalization process		1. Write a descriptive title of the lesson that identifies the content for the reader.
Time allotted	80 minutes		1. Write the time planned for the lesson
Section	Events	Example of teaching activities	
Introduction	1. Gain Attention (Example → <a href="http://mo.iel.d.kumamoto-u.ac.jp/lis09/25/mod/resource/view.php?id=254">http://mo.iel.d.kumamoto-u.ac.jp/lis09/25/mod/resource/view.php?id=254</a> )  <i>Note: copy the link and paste it at internet browser</i>		1. Use a verbal or nonverbal prompt to gain attention. For example, "Look here", "Listen", "Let's begin", or flashing lights 2. Provide interest fact/motivation or curiosity 3. Giving background information creates validity 4. Use sentences such as talking to learners 5. Do not use academic terms which students not familiar with.
	2. Learning Goals (Example → <a href="http://mo.iel.d.kumamoto-u.ac.jp/lis09/25/mod/resource/view.php?id=255">http://mo.iel.d.kumamoto-u.ac.jp/lis09/25/mod/resource/view.php?id=255</a> )  <i>Note: copy the link and paste it at internet browser</i>		1. Write the instructional objectives for the lesson 2. Tell students to what is expected of them 3. Objectives usually focus on knowledge gained, skills, abilities, or attitudes changed 4. To keep on track, start the objective by writing: <i>As a result of this lesson, the student will be able to...</i>
	3. Review (Example → <a href="http://mo.iel">http://mo.iel</a>		1. Stimulating recall of prior learning or 2. Guiding the students in correcting homework or other independent work

	<a href="http://mo.iel.d.kumamoto-u.ac.jp/lis09/25/mod/quiz/view.php?id=267">d.kumamoto-u.ac.jp/lis09/25/mod/quiz/view.php?id=267</a> )  <i>Note: copy the link and paste it at internet browser</i>		or 3. Accessing prior knowledge to enhance meaningful learning
Learning Content	4. Content (Example → <a href="http://mo.iel.d.kumamoto-u.ac.jp/lis09/25/mod/resource/view.php?id=260">http://mo.iel.d.kumamoto-u.ac.jp/lis09/25/mod/resource/view.php?id=260</a> )  <i>Note: copy the link and paste it at internet browser</i>		1. Provide/present the new material 2. The goal is information acquisition 3. Use a variety of media if possible, including text, graphics, audio narration, and video. 4. Content should be chunked and organized meaningfully
	5. Example (Example → <a href="http://mo.iel.d.kumamoto-u.ac.jp/lis09/25/mod/resource/view.php?id=292">http://mo.iel.d.kumamoto-u.ac.jp/lis09/25/mod/resource/view.php?id=292</a> )  <i>Note: copy the link and paste it at internet browser</i>		1. Demonstrations, action, examples, reflective questioning 2. Facilitates the learning process by giving hints and cues when needed using chat room or messages box. 3. To help learners encode information for long-term storage, additional guidance should be provide
	6. Practice (Example → <a href="http://mo.iel.d.kumamoto-u.ac.jp/lis09/25/mod/resource/view.php?id=266">http://mo.iel.d.kumamoto-u.ac.jp/lis09/25/mod/resource/view.php?id=266</a> )  <i>Note: copy the link and paste it at internet browser</i>		1. Requiring the learner to produce based on what has been taught enables the learner to confirm their learning 2. Learner should produce some output based on new learning. Example: practice a skill, discussion, group activity, written response, answer a question.
	7. Quiz (Example → <a href="http://mo.iel">http://mo.iel</a>		1. Gives immediate feedback to learners after eliciting responses. 2. Regular feedback enhances learning

	<a href="http://mo.iel.d.kumamoto-u.ac.jp/lis09/25/mod/quiz/view.php?id=264">d.kumamoto-u.ac.jp/lis09/25/mod/quiz/view.php?id=264</a> )  <i>Note: copy the link and paste it at internet browser</i>		3. Teacher has opportunity to reinforce and correct the performances 4. Types of feedback include: confirmatory, corrective, informative or analytical
Assessment	8. Test (Example → <a href="http://mo.iel.d.kumamoto-u.ac.jp/lis09/25/mod/quiz/view.php?id=280">http://mo.iel.d.kumamoto-u.ac.jp/lis09/25/mod/quiz/view.php?id=280</a> )  <i>Note: copy the link and paste it at internet browser</i>		1. Write the assessment methods for the lesson. 2. Make sure that the assessment specifically measures whether the objectives were reached or not 3. Provide independent practice to forces students to use what they learned and apply it 4. Test to see if stated objectives have been met. 5. This assessment should be completed without the ability to receive additional coaching, feedback, or hints. 6. State a commonly accepted level of mastery. (example: 60% and above.)
	9. Mini Project (Example → <a href="http://mo.iel.d.kumamoto-u.ac.jp/lis09/25/mod/assignment/view.php?id=291">http://mo.iel.d.kumamoto-u.ac.jp/lis09/25/mod/assignment/view.php?id=291</a> )  <i>Note: copy the link and paste it at internet browser</i>		1. Write the student artifact that will be an outcome of this lesson 2. You may evaluate how the lesson plan went over or what you would change in the future in this lesson. 3. Applying learning in real-life situation 4. Teacher asks learners to create activities or assignment. 5. Discuss how this new knowledge or skill will be used in the workplace. 6. Teacher uses a chat room to allow students to pose questions, such as "How will skills of normalization database apply to your future job?"

Figure 2: Guideline Form shows the step-by-step process of developing e-learning contents.

### 3.4.3 Sample lesson to illustrate the events of instruction

Designing effective instruction using sound strategies is essential to providing learners with the opportunities to attain knowledge and become powerful governors of their own lives. The discipline of instructional design is “concerned with producing knowledge about optimal blueprints – knowledge about what methods of instruction will optimize different kinds of desired outcomes” (Reigeluth, 1983). These theories offer explicit guidance on

how to better help people learn and develop (Reigeluth, 1999). The Gagne's Nine Events of Instruction is an example of a well documented design theory that is centered on the importance of developing effective learning content.

In this study I adopted pedagogical theory of Gagne's nine events because the instructional is well structured. As an example you have many kinds of learning activities, but where to place the activity in your instruction. So by referring to Gagne's Nine Events you will know how to present learning content in a proper order. Gagne's theoretical framework was based on the cognitive perspective of learning and emphasized largely the effectiveness of the instructional design. According to Gagne, Briggs & Wager (1992) this theory has correlated the nine events as elements of a good lesson to promote effective learning. The development and creation of the computer based learning incorporated with Gagne's nine Events of Instruction to be considered a good lesson design (Ellington and Earl, 1999).

### Event 1: Gain Attention

Learning is a process that requires attention. In order for learning to take place, capturing the attention of the students is therefore critical; Gagne purposed that learning material should provoke learners to be inquisitive and motivated. By referring to Figure 2, to gain student's attention, this e-learning content was presented by viewing an un-normalized table and a question asking students how to remove repeating data. Learner will feel a need to gather information to solve a problem or resolve an open issue.

Data Modeling and Normalization Process

e-Learning System > Database Design > Resources > Introduction to Data Modeling

Jump to... Update this Resource

Introduction

This is unnormalized table

OrderNo	OrderDate	ProductNo	ProductDesc	Qty
N1201	03031999	P002	Instant coffee (20 sachets)	25
		P008	Mineral water (500 ml)	60
N1078	21021999	P010	Orange Juice (1 Litre)	10
		P008	Mineral water (500 ml)	24
		P005	Fresh milk (1 litre)	10
N1312	06081999	P008	Mineral water (500 litre)	36

repeating data

The above table contains repeating information on "Mineral Water" and "P008".  
Repeating data wastes disk space and creates maintenance problems.

How are you going to remove repeating data and normalize this table

?

Figure 3: Event 1-Gain Attention

## Event 2: Inform Learners of the Objectives

Learning outcomes should be specific and well defined to make clear to the students at the start or early of each given lesson. Objectives would initiate a conscious responsibility towards the learning process; this will assist students to complete the learning programme. To keep students on track, the learning objectives were presented in the form of “By the end of this lesson learner should be able to...” as shown in Figure 4.



Figure 4: Event 2-Inform Learners of the Objectives

### Event 3: Stimulate Recall of Prerequisite Learning

Review previously presented relevant rules or concepts and connect them to the material to be addressed in the current lesson. Within this context, prior knowledge and understanding of previously learned concepts are associated to the overall learning experience. The ability to make connections of previous knowledge to newly learned information could facilitate learning development and long-term memory.

The screenshot displays two panels from an e-Learning System. The top panel, titled 'Data Modeling and Normalization Process', shows a 'Review' section with a breadcrumb trail: 'e-Learning System > Database Design > Quizzes > Review'. It includes tabs for 'Info', 'Results', 'Preview', and 'Edit'. A text box explains that 'Review' is an activity for accessing prior knowledge to enhance meaningful learning, consisting of 8 questions. It states the grading method is 'Highest grade' and that the quiz closed on Wednesday, 29 September 2010, at 08:20 AM. A 'Continue' button is at the bottom. The bottom panel, titled 'Preview Review', shows the same breadcrumb trail plus 'Attempt 1'. It has tabs for 'Info', 'Results', 'Preview', and 'Edit'. A 'Start again' button is present. Below this is a page navigation bar: 'Page: (Previous) 1 2 3 4 5 6 7 8 (Next)'. The main content area shows a question '7 4' with 'Marks: --/6'. The question is 'Name the symbol:'. It lists three options: a) a pink rectangle, b) a green diamond, and c) a yellow oval. Below these are three input fields labeled a), b), and c), each with a 'Choose...' dropdown menu. The dropdown for option b) is open, showing a list of database symbols: 'Choose', 'Attribute', 'Entity', and 'Relationship'. A 'Submit' button is at the bottom left of the question area. At the very bottom of the interface are three buttons: 'Save without submitting', 'Submit page', and 'Submit all and finish'.

Figure 5: Event 3-Stimulate Recall of Prerequisite Learning

## Event 4: Presenting the Content

Due to the different learning styles, learners have selective perceptions of content based on each individual needs and cognitive awareness. In order to elicit a response from the learner, stimulus in this aspect refers to the presentation or display of the content. Therefore, clear, simple and direct to the point language was used to explain concepts. Figure 6 show more images used to illustrate ideas, demonstrate, and present content. Also included were navigational tools for the students to explore.

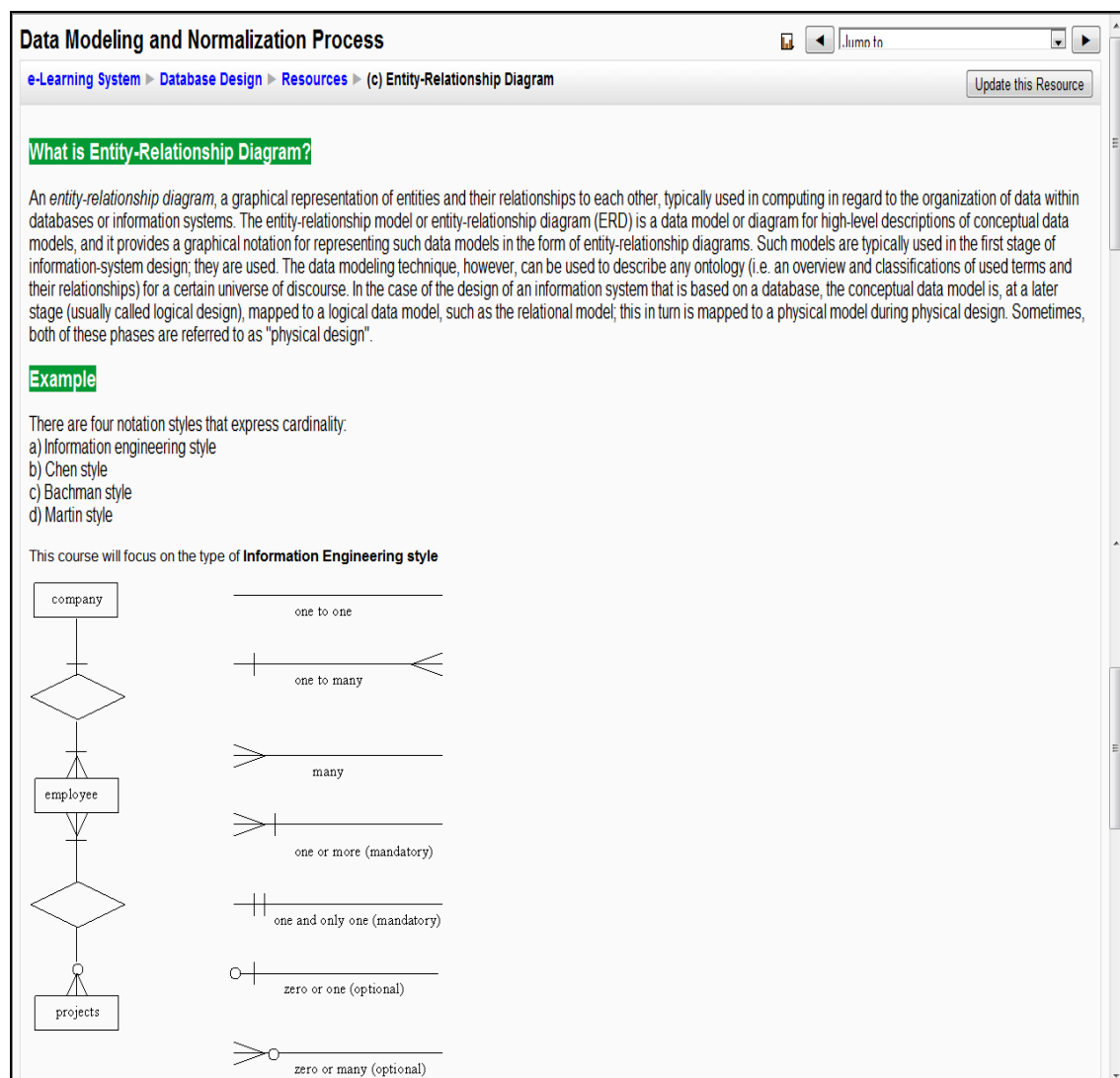


Figure 6: Event 4-Presenting the Content

## Event 5: Providing Learning Guidance

Examples are one of most powerful methods that can be used to build new rich knowledge in long-term memory, and they are popular with learners (Clark & Mayer 2002) Learners were free to study and worked with examples to helps them complete problem assignment. Providing examples, guided instructions, concepts, analogies and graphical representations, in the learning program offers additional guidance to assist learning. In Figure 7, the event shows the example of step-by-step demonstration of how to perform and draw E-R diagram.

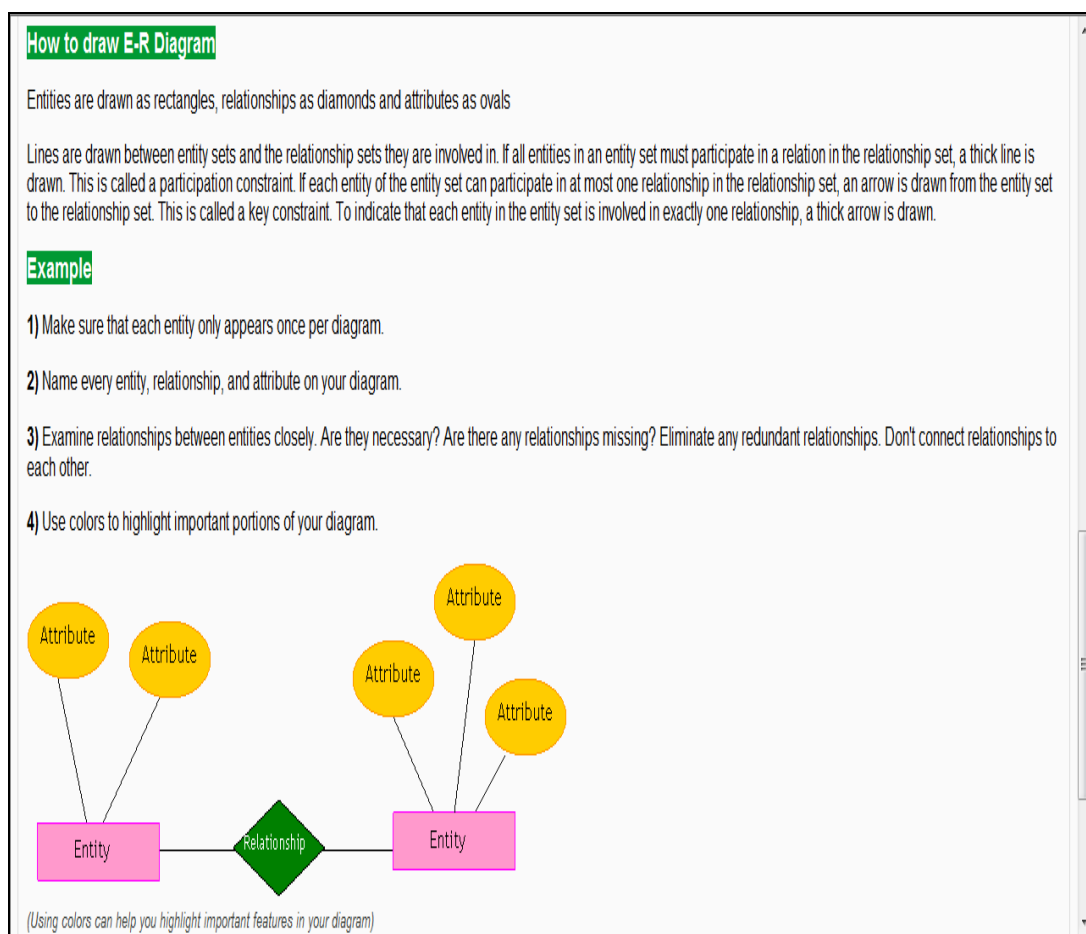


Figure 7: Event 5-Providing Learning Guidance-example



## Event 6: Eliciting the Performance

Researcher believes learners must know how to apply what they learn, to be successful. So, to ensure learning takes place, the application of knowledge is through practicing. Learning activities such as practice is used to enable learners to actively reflect on new information in order to check their knowledge, work problems practice sessions in a coached setting so students can determine/identify gaps in their knowledge. Figure 8 shows teacher asking students to draw a diagram of the ER diagram based on the given scenario. The rationale is students will be able to confirm what they have learned through the work that they have produced based on what has been taught.

The screenshot displays a web-based interface for a practice assignment. At the top, the title 'Data Modeling and Normalization Process' is shown. Below it, a breadcrumb trail reads 'e-Learning System > Database Design > Assignments > Practice (c)'. A 'Jump to...' dropdown menu is located to the right of the breadcrumb. A button labeled 'Update this Assignment' is positioned in the top right corner. A status message states 'No attempts have been made on this assignment'. The main content area contains a 'Question:' section with the text: 'Draw an entity-diagram from the given scenario:-'. Below this, a scenario is described: 'The manager regularly communicates with staff in the sales and marketing and accounts departments by using e-mail. Orders received by sales and marketing are forwarded to the production and accounts departments, for fulfillment and invoicing. The accounts department forward regular written reports to the general manager; they also raise invoices and send these to the customers.' Two instructions are provided: '( i: Students are advise to type the answer using MS Word or Ms Excel, upload the file and submit to the e-learning system. )' and 'ii: Student will get the answer for this practice after submit the file )'. A box at the bottom left specifies the availability and due dates: 'Available from: Tuesday, 14 September 2010, 01:00 PM' and 'Due date: Wednesday, 15 December 2010, 01:00 PM'. At the bottom center, there is a file upload section with the text 'Upload a file (Max size: 1MB)', a 'Browse...' button, and an 'Upload this file' button.

Figure 8: Event 6-Eliciting the Performance-practice


## Event 7: Providing Feedback


Providing informative feedback on learner's performance is an important reinforcement process. The e-learning system gives immediate feedback to learners after eliciting responses. Regular feedback enhances learning process. A quiz with feedback is one of the tools used in this Instruction. Bear in mind that by clicking *submit*, the student can see the answers. Also a student can login, and then ask a friend to help with the answers. Therefore, the quiz score itself should not be used in grading. Figure 9 show the quiz was


designed to give immediate feedback to the student, as a help in learning. In this event, the e-learning systems automatically give information about correct and incorrect responses (Gagne, 1997).


1. Refer to the diagram below and name the correct notation: (12 marks)


a) \_\_\_\_\_

b)  \_\_\_\_\_

c)  \_\_\_\_\_

d)  \_\_\_\_\_

e)  \_\_\_\_\_

f)  \_\_\_\_\_

one to one

zero to one

zero to many

one and only one

one to many

many

2) There are four notation styles that express cardinality. Choose the correct answer from the list. (4 marks)

Choose at least one answer.

☐ a. Information engineering style

☐ b. Chen style

☐ c. Bachman style

☐ d. Martin style

☐ e. Chin style

3) An *entity-relationship diagram*, a \_\_\_\_\_ representation of \_\_\_\_\_ and their \_\_\_\_\_ to each other. (3 marks)

4) A (n) \_\_\_\_\_ database organizes data in rows and columns. (1 mark)

Choose one answer.

☐ a. Relational

☐ b. Hierarchical

☐ c. Object-oriented

☐ d. Network

Figure 9: Event 7-Providing Feedback

### Event 8: Assessing Performance

In order to determine the effectiveness of the learning process, assessment is required to evaluate students' comprehension and knowledge of the learned content. They will also be given a test to see if they understood the content that was presented to them.

1 Update anomalies can be divided into insertion, deletion, and modification anomalies.  
Marks: 2  
Answer: ☐ True ☐ False

2 Most database today use the \_\_\_\_\_ database model.  
Marks: 2  
Answer:

3 A relational database is  
Marks: 2  
Choose one answer.  
☐ a. one that consists of two or more tables  
☐ b. one that consists of two or more tables that are joined in some way  
☐ c. a database that is able to process tables, queries, forms, reports and macros.  
☐ d. the same as a flat file database

4 The power of a relational database comes from connection among tables.  
Marks: 2  
Answer: ☐ True ☐ False

5 The \_\_\_\_\_ key field uniquely identifies a record.  
Marks: 2  
Answer:

Figure 10: Event 8-Assessing Performance (Pretest and Posttest questions)

### Event 9: Enhancing Retention and Transfer

Learning is complete when knowledge can be transferred into a new situation. The need to have varied practice tools and aids can facilitate transfer and enhance retention process. Figure 11 shows the students have to apply what they have learnt in the module in doing a summary and mini project.

Database Design: Assignment: Project e - Windows Internet Explorer  
http://mo.ield.kumamoto-u.ac.jp/is09/25/mod/assignment/view.php?id=291

Database Design: Assignment: Project e

**Data Modeling and Normalization Process**

e-Learning System > Database Design > Assignments > Project e

**1) Project for E-R Diagram (10 marks)**

Scenario:

Dr Rahimi, a lecturer at Science University of Malaysia, has given a list of project title to his students. He has given a deadline for project completion. Each student must join student group. Each group is to develop only one project. The actual date of submission of the project by each group will be recorded. Each project is to be completed with the aid of devices. Each device can be used for many projects.

Indicate the relationships between all the entities and the cardinalities of all the relationships to represent the above scenario using the following information. - A student is uniquely identified by the student number

- A student group is uniquely identified by a group name
- A project is uniquely identified by a project title
- A device is uniquely identified by a device code

(URL for more information: [http://www.umsl.edu/~sauterv/analysis/er/er\\_intro.html](http://www.umsl.edu/~sauterv/analysis/er/er_intro.html))

**Question:**  
Draw an entity-relationship (E-R) diagram. Underline the primary key attribute for each entity. (Students are advise to type the answer using MS Word or Ms Excel.)

Step to follow:

- Define Entities
- Define Relationships (verbs)
- Add attributes to the entities
- Underline the primary key
- Add cardinality to the relation in the E-R Diagram

Figure 11: Event 9-Enhancing Retention and Transfer

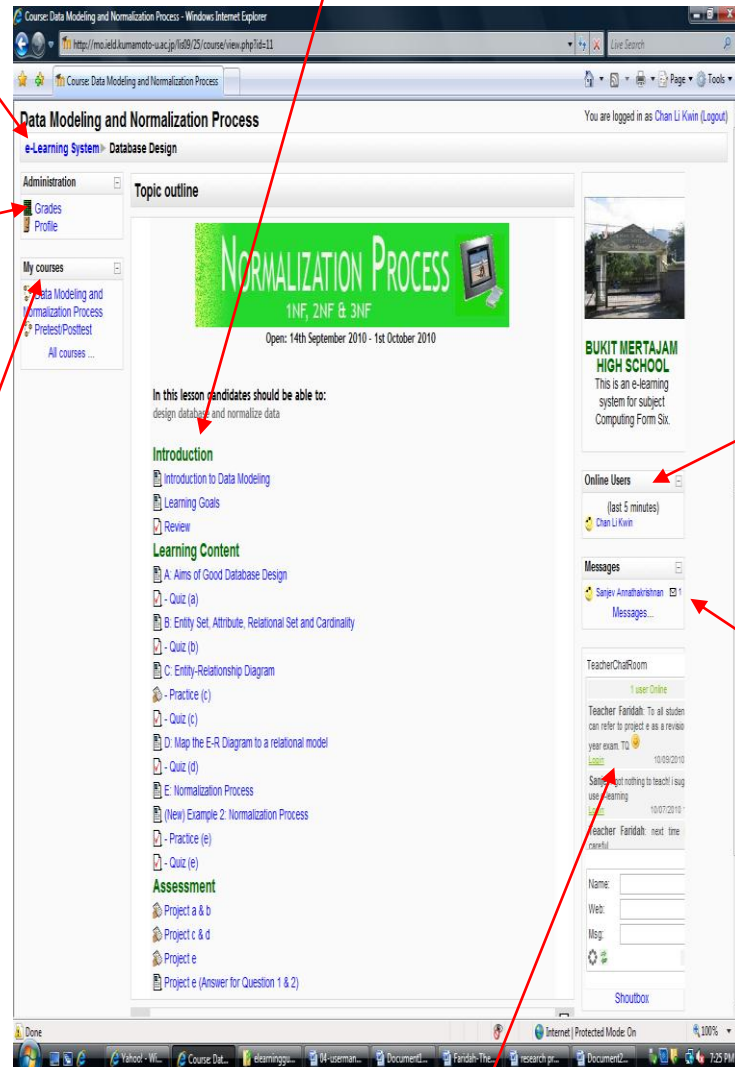
## Sample of Learning Environment Screen

e-Learning Environment: learner should begin with introduction, learning content and assessment.

e-Learning status bar show the learning activity currently learner engaging

Learners can browse their learning achievement and grade

My Courses: Learner can choose other lesson to study from My Courses list



Logout: Learner can click here to logout from learning environment

Online Users: Learner can see the status that who is currently online

Message: Learner can receive and sent message to teacher or other learner

Teacher Chat Room: This teacher chat room is an area for real-time interaction between teacher and students during class session. This chat room is for asking and answering question among class mates. Student also can ask for assistance from teacher or other students.

Figure 12: Learning Environment Screen

e-Learning delivered on the internet or intranets can make use of collaborative facilities such as chat, message boards, online conferencing and e-mails. Theresa (n.d) said if we are to move students toward independence, we must take the position of coach and facilitator, helping students use what they know to learn what they need to know. We must

give them opportunities for meaningful conversations that support their thinking, hold them accountable for their learning, and be thoughtful with our questions. Students in this e-learning environment had access to the teacher in person via message box or chat room on Moodle. Instant teacher chat room feature was added to e-learning system to allow the students asking for help or clarification from teacher or other students. This feature also allows teachers to provide feedback to the students. For this reason the Message, Teacher Chat Room and Online Users features are embarked in this e-learning system. Students have choice to use either message or teacher chat room to communicate with teacher or to others. Chat room and message function is included in the e-learning system to provide for learner-to-learner interaction as compared to CDR-CBT where interaction has been learner to content. This function is hoped to motivated learners where a teacher can give immediate feedback in real time. By using chat room, teacher's role changes from teaching in class to facilitator monitoring student's activities on study. Moule (2002) explained e-learning is better than CD-ROM. Student can use their web connection to e-mail other students, post comments on message board or use chat rooms and videoconference links to communicate live. This type of interaction is helpful, and improvement over CD-ROM learning.

Quek (2007) said the perceived differences in terms of what the teachers used and what they learnt in the online learning environment is attributed mainly to the presence of collaborative peer-to-peer learning besides the instructor support and the online resources. It also shows that the online environment is a powerful learning space for learners to adapt, interact and foster interdependence and pro-social behavior among themselves. Indeed, online learning is a viable platform for developing teachers' good practices on online facilitation in teacher education and this mode of teaching and learning should be extended to the in-service programme with the aim to empower the teachers in becoming effective online educators. Goldman (2009) said that the events were not originally designed with e-learning in mind so some liberal interpretations must be made. Typically the following feedback levels (Event 5 – Event 7) can be incorporated into the “present the content” event.

### **3.5 Scope and limitations**

#### **3.5.1 Scope**

The scope of the study will gain an insight on the impact of the implementation of the e-learning system for the respective government schools.

The study focuses on the following targeted groups and areas:-

a) Students

Motivation, ability to learn and level of creativity through the self-paced, self-accessed and self directed learning strategies

b) Teachers

- Utilization of instructional theory-based teaching methods
- Time saving allow more time for teaching preparation
- Use Guidelines as a framework for creating lesson plan

#### **3.5.2 Limitations**

a) The findings of this study are limited to the target group studies. All generalizations are made based on the findings of this study is limited to pre-university student for the Computing class in the Bukit Mertajam High School session 2010/2011.

b) This study focuses on the self-paced study and collected data from pre-university respondents in urban area using a questionnaire.

c) The study only covered to all 19 pre-university students who study Computing subject in High School Bukit Mertajam.

d) The researcher used learning management system or Moodle to develop an online learning system.

e) The Guidelines were used only by one teacher in High School Bukit Mertajam. Since only one teacher involved in this research, then comments and ideas available are limited. This situation gives little effect to improve the quality of Guideline to be modified for future use.

## **CHAPTER 4**

### **Data and Analyses**

#### **4.1 Introduction**

This chapter presents the data collected in this study and details the findings resulting from an analysis of the data. The data was gathered through questionnaires, interviews and observations of the selected group of participants. The findings of the study are presented to answer the research questions.

#### **4.2 Subject Matter Expert reviews**

There was an expert review the instructional material, a teacher teaching the Computing in High School Bukit Mertajam. The following was her report on the instructional material:

- 1) The processes of 1NF, 2NF and 3NF should be combined
- 2) Add some important topics that should be acquired by students before they can perform the process of normalization. The reason is the limitation of time to teach the topics due to overlap with her schedule and the duration of implementation for e-learning program to be conducted in September. The topics are:
  - a) Aim of database design
  - b) Entity set, attribute, relational set and cardinality
  - c) Use entity-relationship (E-R) diagrams to model data
  - d) Map the E-R diagram to relational model
- 3) Suggested to add more quiz questions for student further understanding the learning content.

#### **4.3 One-to-one evaluation**

There was also a student reviews the e-learning material. His responds was positive towards e-learning content. He was thrilled to be involved with the content even though there are some errors in spelling. He did not have big problem to navigate within e-learning environment. The problem only diagrams in quizzes didn't appear.

#### 4.4 Small group evaluation

##### 4.4.1 Pretest and posttest result

Pretest-posttest was designed for small group evaluation in this research. Pretest-posttest designs are widely used in behavioral research, primarily for the purpose of comparing groups and/or measuring change resulting from experimental treatments. In this research, the pretest and posttest was used because the researcher wants to monitor the effectiveness of a new teaching style for self-paced study upon group of pre-university students. The research was carried out using the experimental methodology in which 19 students were treated as an experimental group. This group had studied the course of Planning and Design Database System using the MOODLE platform Learning Management System. I have used a pretest and posttest experimental design. All students were experienced with the testing format of new e-learning content based on Guideline. Test questions on pre- and post-test were identical. The test questions were derived randomly from a question bank designed by the researcher. After completing the course, the data was collected and analyzed. The following Table 1 showing the students' gain in achievement after studying the normalization process course using the e-learning approach.

Table 1: Pretest-posttest data for the comparison of students' achievement

	<b>Name</b>	<b>Pretest</b>	<b>Posttest</b>	<b>Gain</b>
1	Student 1	20	42	22
2	Student 2	32	56	24
3	Student 3	12	40	28
4	Student 4	36	64	28
5	Student 5	28	76	48
6	Student 6	34	62	28
7	Student 7	24	54	30
8	Student 8	44	72	28
9	Student 9	20	40	20
10	Student 10	40	66	26
11	Student 11	20	52	32
12	Student 12	28	38	10
13	Student 13	32	70	38
14	Student 14	42	58	16
15	Student 15	38	80	42
16	Student 16	24	50	26
17	Student 17	20	58	38
18	Student 18	22	54	32



19	Student 19	34	50	16
		28.947368	56.94737	28

The following graph in Figure 13 shows the students' achievement after studying the normalization process course using the e-learning approach.

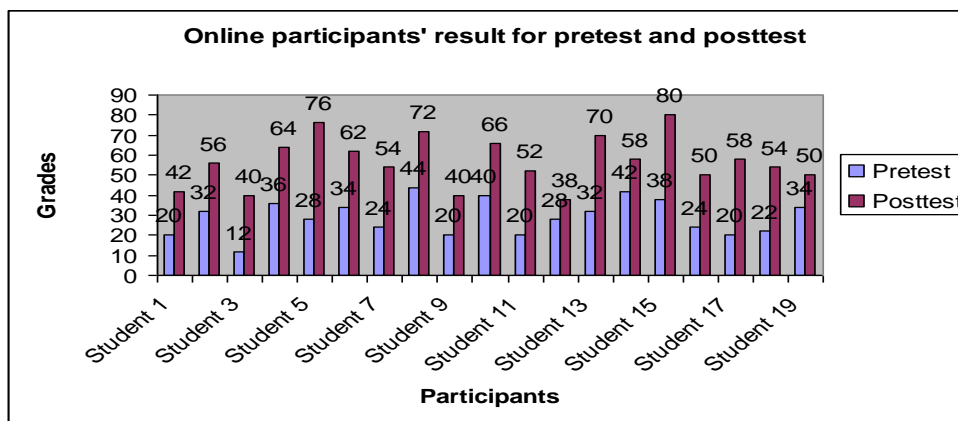


Figure 13: Graph shows results for online pretest and posttest.

#### T-Test reviews

The t-test statistical method was used in this data analysis in comparing participants with pretest and posttest data. Generally speaking, the power of the test represents the probability of detecting differences between the pretest and posttest being compared when such differences exist. A graph in figure 13 shows results for online pretest and posttest. To check the validity of the research hypothesis, the paired samples (dependent) t-test was run on the GraphPad program to determine any significant differences between posttest and pretest scores. The results are shown in table 2, the computed t-value equals (8.0149) at degree of freedom equals (36) with statistical significance less than (0.001). This is less than the claimed level of significance  $\alpha$  (0.05). As seen in the Table 2, the standard deviation in the posttest (12.35) is increased compared to the standard deviation in the pretest (8.90), which means more data variations and pointed out that the student's scores are around the mean (56.96). A common way to measure the effectiveness of instruction is to measure learner achievement. The goal of any learning activity is for learning to take place. The result of t-test shown the effective e-learning content has extremely significant to increase the student achievement. It is clear that the use of

Guideline for creating the e-learning content can even make teaching instruction effective too enhance students' achievement toward this new teaching style for self-paced learning.

Table 2: Shows participants' average result for t-test score

Achievement	N	Mean	S.D.	S.E.M.	t-value	d.f.	p-value
Pretest	19	28.95	8.90	2.04	8.0149	36	0.0001
Posttest	19	56.95	12.35	2.83			

**Confidence interval:**

The mean of Group One minus Group Two equals -28.00

95% confidence interval of this difference: From -35.09 to -20.91

Standard error of difference = 3.493

#### 4.4.2 Online participants' questionnaires results

Based on Figure 14, there are five sections in the questionnaire. The target respondents for Part A (teaching method, strategies and practices), Part B (Involvement/Engagement), Part C (Evaluation of course materials (resources, assignments, assessments)), Part D (Students attitude towards self-paced learning through e-learning), and Part E (General summative) are for nineteen pre-university students from High School Bukit Mertajam.

Section	Instrument Content
Part A	Teaching method, strategies and practices
Part B	Involvement/Engagement
Part C	Evaluation of course materials (resources, assignments, assessments
Part D	Students attitude towards self-paced learning through e-learning
Part E	General summative

Figure 14: Instrument questionnaire for students

This questionnaire requires the respondents indicating their respective perceptions of the five-level Likert scale as follows:

1. Strongly Disagree
2. Disagree
3. Neutral
4. Agree
5. Strongly Agree

All questions contained in the questionnaire need only respondents indicating (/) in the appropriate column.

### **Part A: teaching method, strategies and practices**

This section aims to obtain data on teaching method, strategies and practices. All five questions contained in this section require only respondents indicating (/) in the appropriate column.

Table 3: Shows respondents' result for Part A teaching method, strategies and practices

A	Teaching methods/strategies /practices	1 Strongly Disagree	2 Disagree	3 Neutral	4 Agree	5 Strongly Agree	Mean
1	The e-learning course expresses clear expectations for learning and performance.	1	2	3	10	3	3.63
2	The e-learning course clearly explains concepts.	1	2	2	13	1	3.57
3	The e-learning course uses effective teaching methods that enhance my learning.	2	2	1	11	3	3.57
4	The e-learning course is well organized and prepared.	2	4	2	7	4	3.36
5	Is the pedagogy consistent with current instructional theory?	3	3	1	8	4	3.36

*Item 1: The e-learning course expresses clear expectations for learning and performance.*

3 (16%) strongly agree, 10 (53%) agree, 3 (16%) neutral, 2 (11%) disagree and 1(5%) strongly disagree that the e-learning course expresses clear expectations for learning and performance. Total 32% of students marked negative (neutral and not agree) responses in Item 1 mean the instruction does not clearly explain the learning performance. In this case, there were weaknesses of meaningful dialogue make students not understand well to

proceed to each section. This e-learning program is completely online, meaning I need to provide a set of expectations upfront in each section to support my learners to perform self-paced study. If expectations are clear, the learners will be able to understand well to perform learning. Figure 15 below shows a graph of the field experiment participants' responses about teaching method, strategies and practices for item 1.

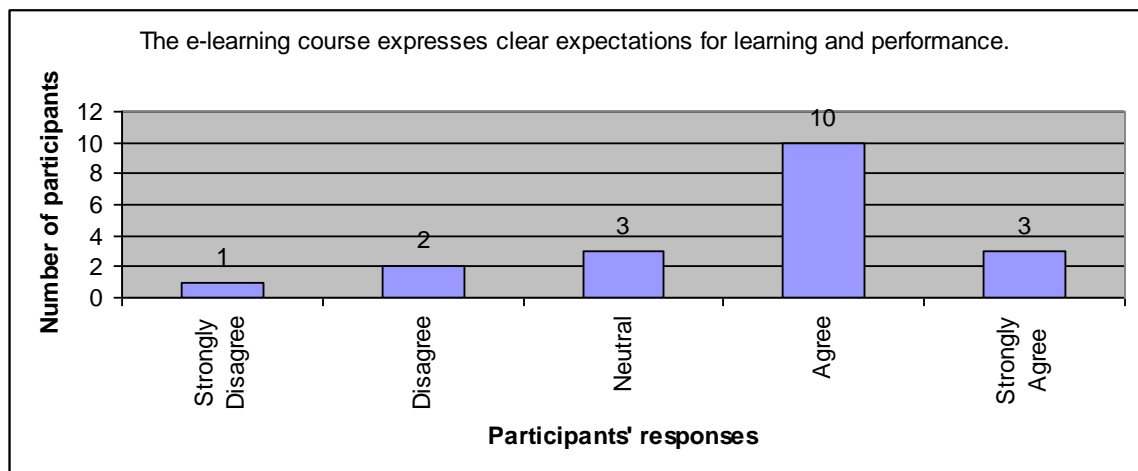


Figure 15: Participants' responses on course expectations for learning performance

*Item 2: The e-learning course clearly explains concepts.*

1 (5%) strongly agree, 13 (68%) agree, 2 (11%) neutral, 2 (11%) disagree and 1 (5%) strongly disagree that the e-learning course clearly explains concepts. Total 26% of students marked negative (neutral and not agree) responses in the e-learning course clearly explains concepts. The weakness is the description of concept was very vague for student to understand the required content. The learning contents should be improved for students to get knowledge. Figure 16 below shows a summary of the field experiment participants' responses on teaching method, strategies and practices for item 2.

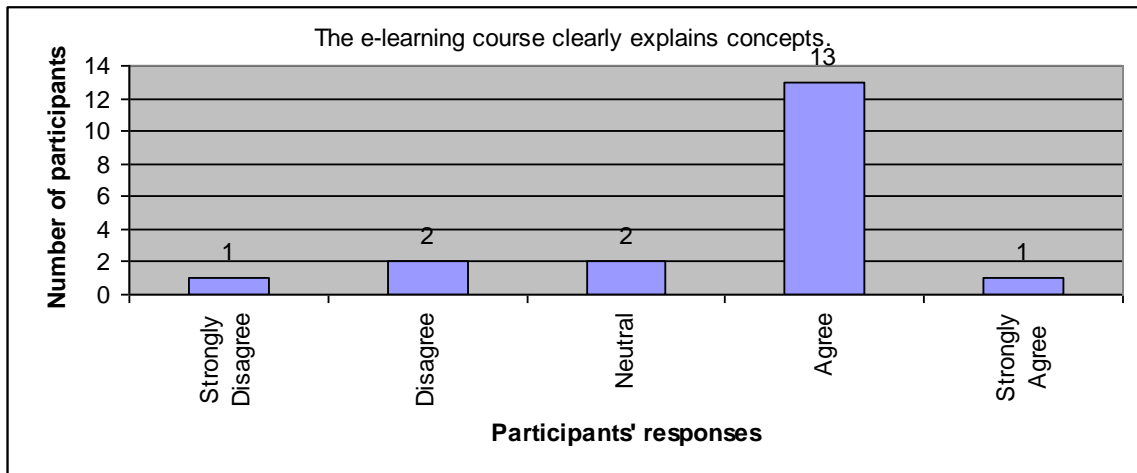


Figure 16: participants' responses on course clearly explains concepts

*Item 3: The e-learning course uses effective teaching methods that enhance my learning.*

3 (16%) strongly agree, 11 (58%) agree, 1 (5%) neutral, 2 (11%) disagree and 2 (11%) strongly disagree that the e-learning course uses effective teaching methods that enhance learning. Total 26% of students marked negative (neutral and not agree) responses in the e-learning course uses effective teaching methods that enhance my learning. The weakness is student not familiar with online method means more time must be given for them to master this new teaching method. Figure 17 below shows a summary of the field experiment participants' responses on teaching method, strategies and practices for item 3.

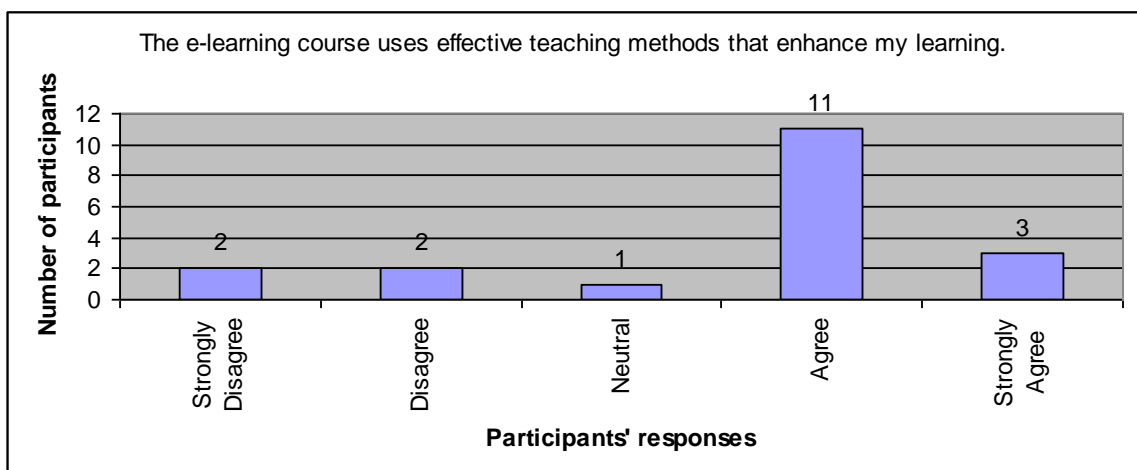


Figure 17: participants' responses on uses effective teaching methods that enhance learning

*Item 4: The e-learning course is well organized and prepared.*

4 (21%) strongly agree, 7 (37%) agree, 2 (11%) neutral, 4(21%) disagree and 2 (11%) strongly disagree that the e-learning course is well organized and prepared. Total 43% of students marked negative (neutral and not agree) responses in the e-learning course is well organized and prepared. I have to improve the organization of the content for example from known to unknown or from simple to complex. Figure 18 below shows a summary of the field experiment participants' responses on teaching method, strategies and practices for item 4.

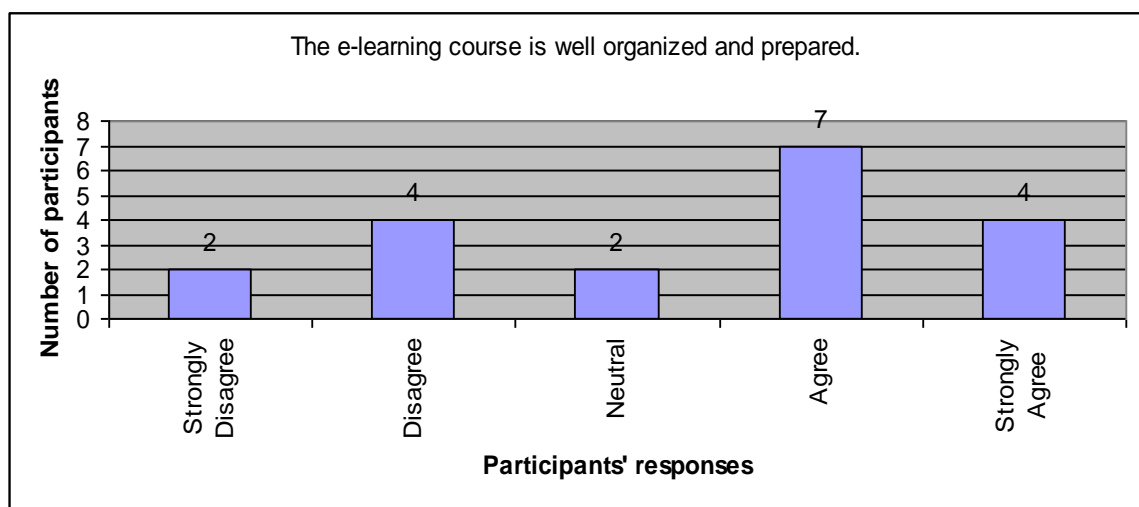


Figure 18: participants' responses on the e-learning course is well organized and prepared

*Item 5: Is the pedagogy consistent with current instructional theory?*

4 (21%) strongly agree, 8 (42%) agree, 1 (5%) neutral, 3 (16%) disagree and 3(16%) strongly disagree that the pedagogy consistent with current instructional theory. Total 37% of students marked negative (neutral and not agree) responses in Item 5. I need to improve methods of presenting learning to be more consistent. Example of a consistent window appears on the computer screen and displays the learning content. Figure 19 below shows a summary of the field experiment participants' responses on teaching method, strategies and practices for item 5

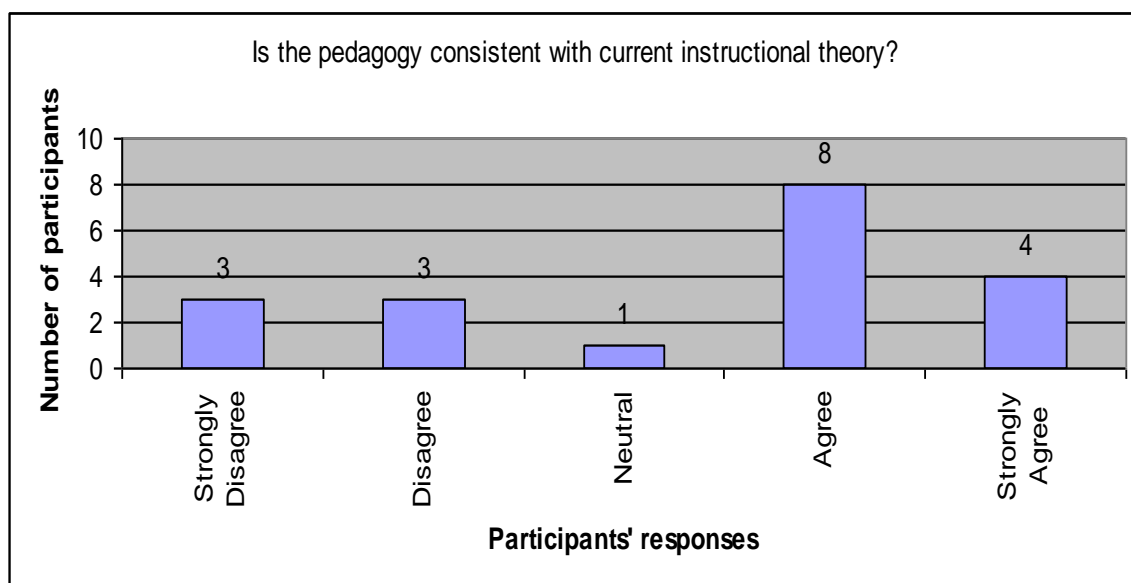


Figure 19: participants' responses on the pedagogy consistent with current instructional theory

## Part B: Student Involvement/engagement

Table 4: Shows respondents' result for Part B student involvement/engagement

B	Involvement/Engagement	1 Strongly Disagree	2 Disagree	3 Neutral	4 Agree	5 Strongly Agree	Mean
6	This is my first experience for self-paced study through e-learning system	0	0	0	15	4	4.21
7	I found the e-learning course is available on an individual basis outside of class when I request it.	0	0	2	10	7	4.26
8	I have put a great deal of effort into advancing my learning in this course.	0	0	2	12	5	4.16
9	In this course, I have been challenged to learn more than I expected.	0	0	0	14	5	4.26
10	I have made my best effort to participate in this course.	0	0	0	13	6	4.32
11	The instructor shows respect and concern for students through Teacher Chat Room.	0	0	0	12	7	4.37
12	The instructor shows respect and concern for students through message box	0	0	1	10	8	4.37
13	Would you like this e-learning material?	0	0	2	12	5	4.16
14	Would you rate this material	0	0	0	15	4	4.21

	as interactive enough for self-paced learning?						
15	On average, I have spent _____ hours per week doing work for this course at home.	0-1 hour	2-4 hours	5-6 hours	7-8 hours	9+ hours	
		3	16	0	0	0	

*Item 6: This is my first experience for self-paced study through e-learning system*

4 (21%) strongly agree, 15 (79%) agree that this is first experience for self-paced study through e-learning system and none for neutral, disagree and strongly disagree. Figure 20 below shows a summary of the field experiment participants' responses on student involvement/engagement for item 6.

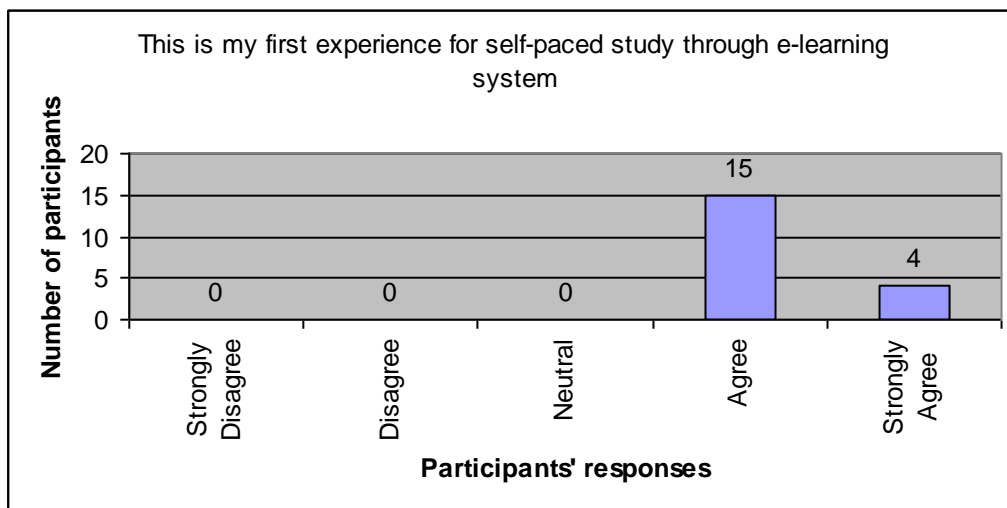


Figure 20: participants' responses on first experience for self-paced study through e-learning system

*Item 7: I found the e-learning course is available on an individual basis outside of class when I request it.*

7 (37%) strongly agree, 10 (53%) agree, 2 (11%) neutral, none for disagree and strongly disagree that the e-learning course is available on an individual basis outside of class. Figure 21 below shows a summary of the field experiment participants' responses on student involvement/engagement for item 7.



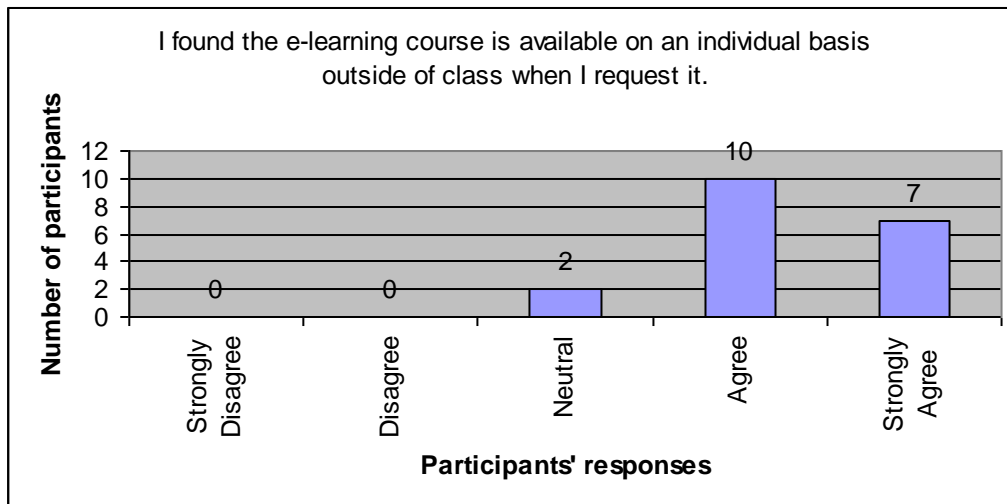


Figure 21: participants' responses on the e-learning course is available on an individual basis outside of class

*Item 8: I have put a great deal of effort into advancing my learning in this course.*

5 (26%) strongly agree, 12 (63%) agree, 2 (11%) neutral, none for disagree and strongly disagree to put a great deal of effort into advancing of learning in this course. Figure 22 below shows a summary of the field experiment participants' responses on student involvement/engagement for item 8.

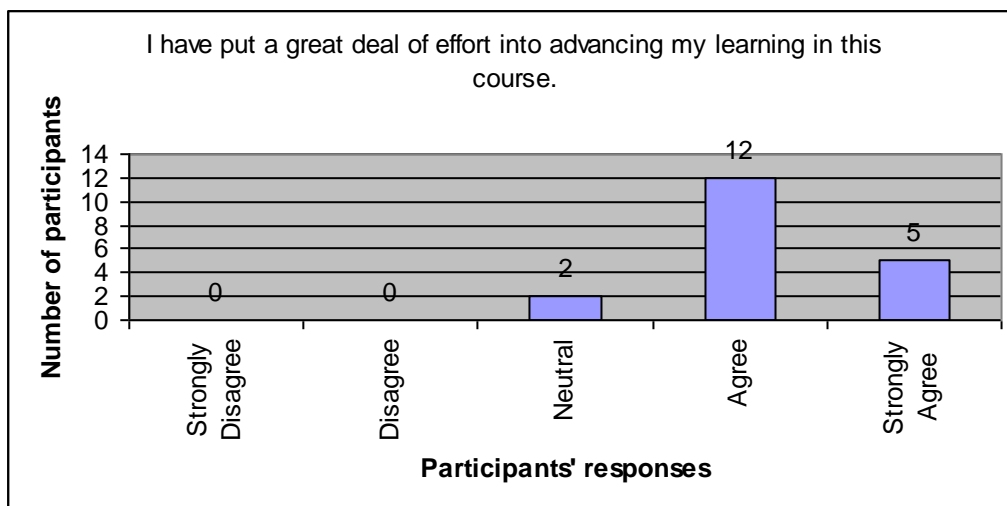


Figure 22: participants' responses on put a great deal of effort into advancing of learning

*Item 9: In this course, I have been challenged to learn more than I expected.*

5 (26%) strongly agree, 14 (74%) agree, none for neutral, disagree and strongly disagree that the course has been challenged them to learn more than they expected. Figure 23 below shows a summary of the field experiment participants' responses on student involvement/engagement for item 9.

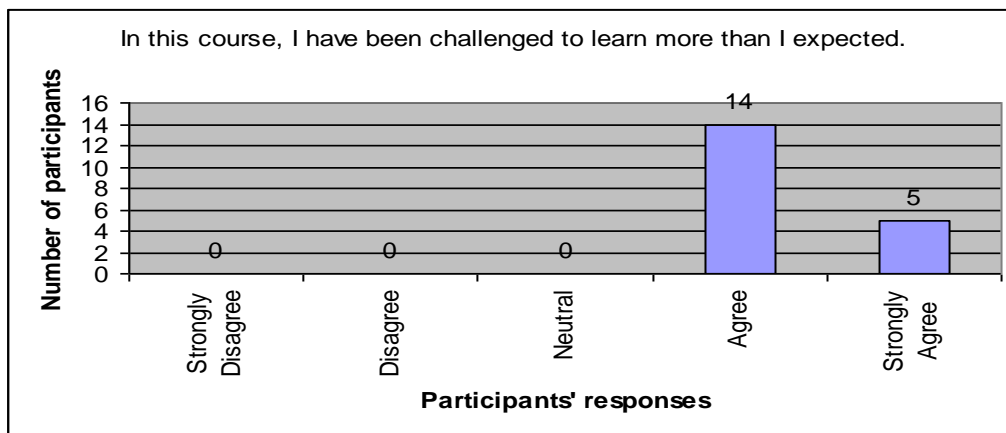


Figure 23: participants' responses on the course have been challenged them to learn more than they expected

*Item 10: I have made my best effort to participate in this course.*

6 (32%) strongly agree, 13 (68%) agree, none for neutral, disagree and strongly disagree that they made the best effort to participate in this course. Figure 24 below shows a summary of the field experiment participants' responses on student involvement/engagement for item 10.

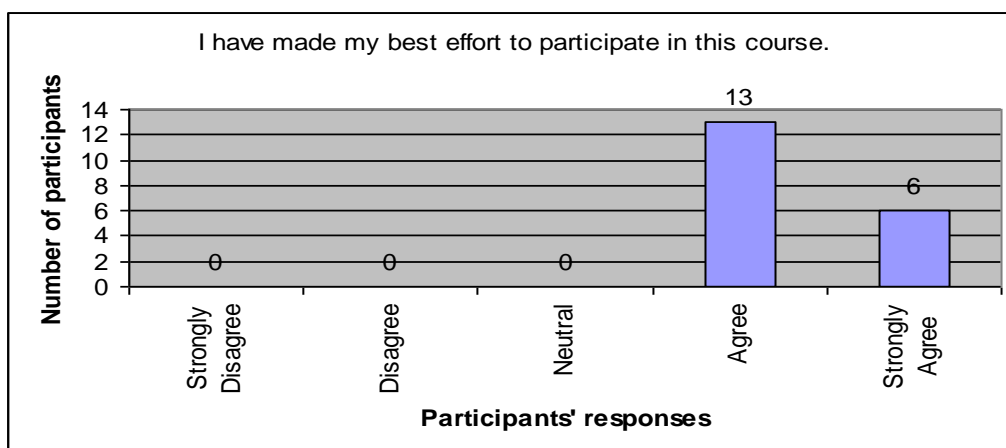


Figure 24: participants' responses on that they made the best effort to participate in this course

*Item 11: The instructor shows respect and concern for students through Teacher Chat Room*

7 (37%) strongly agree, 12(63%) agree, none for neutral, disagree and strongly disagree that the instructor shows respect and concern for students through Teacher Chat Room. Figure 25 below shows a summary of the field experiment participants' responses on student involvement/engagement for item 11.

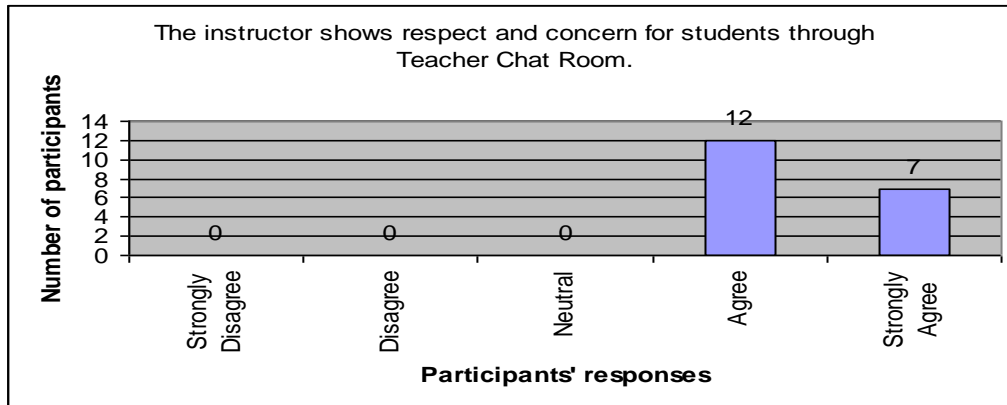


Figure 25: participants' responses on the instructor shows respect and concern for students through Teacher Chat Room

*Item 12: The instructor shows respect and concern for students through message box*

The instructor shows respect and concern for students through message box 8 (42%) strongly agree, 10 (53%) agree, 1 (5%) neutral, (%) disagree and (%) strongly disagree that the instructor shows respect and concern for students through message box. Figure 26 below shows a summary of the field experiment participants' responses on student involvement/engagement for item 12.

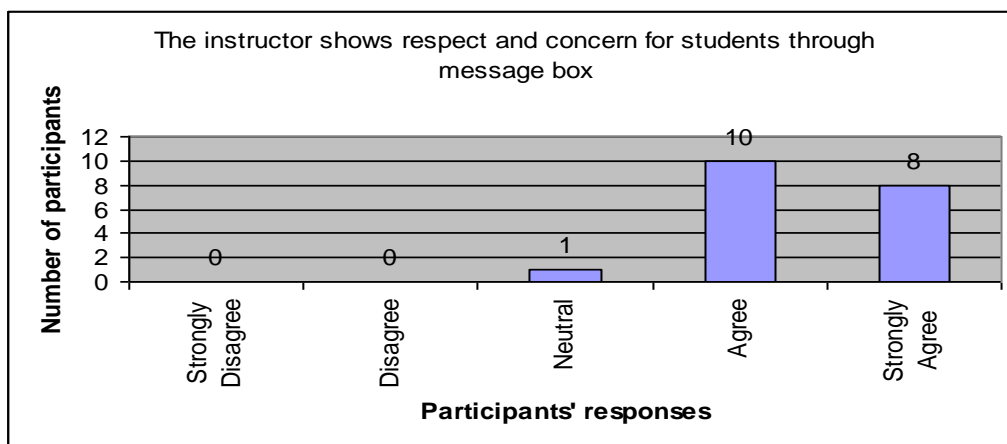


Figure 26: participants' responses on the instructor shows respect and concern for students through message box

*Item 13: Would you like this e-learning material?*

5 (%) strongly agree, 12 (%) agree, 2 (%) neutral, (%) disagree and (%) strongly disagree that they like the e-learning material. Figure 27 below shows a summary of the field experiment participants' responses on student involvement/engagement for item 13.

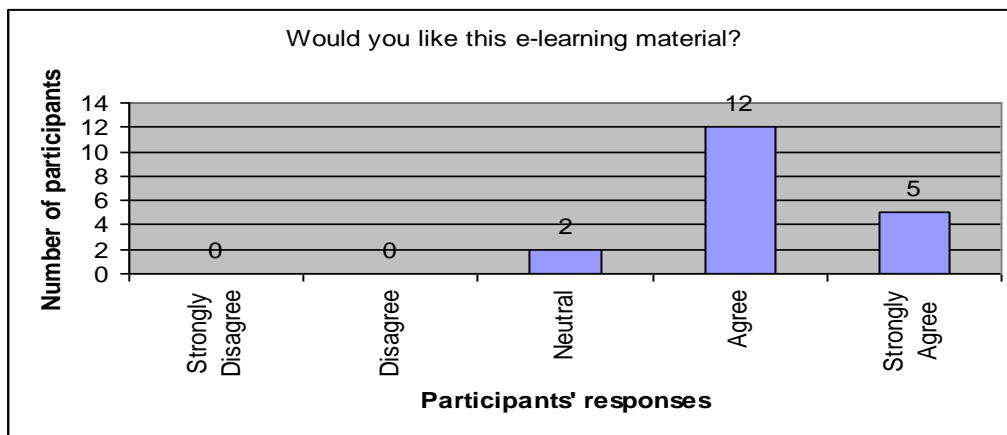


Figure 27: participants' responses on that they like the e-learning material

*Item 14: Would you rate this material as interactive enough for self-paced learning?*

4 (21%) strongly agree, 15 (79%) agree, none for neutral, disagree and strongly disagree that this material as interactive enough for self-paced learning. Figure 28 below shows a summary of the field experiment participants' responses on student involvement/engagement for item 14.

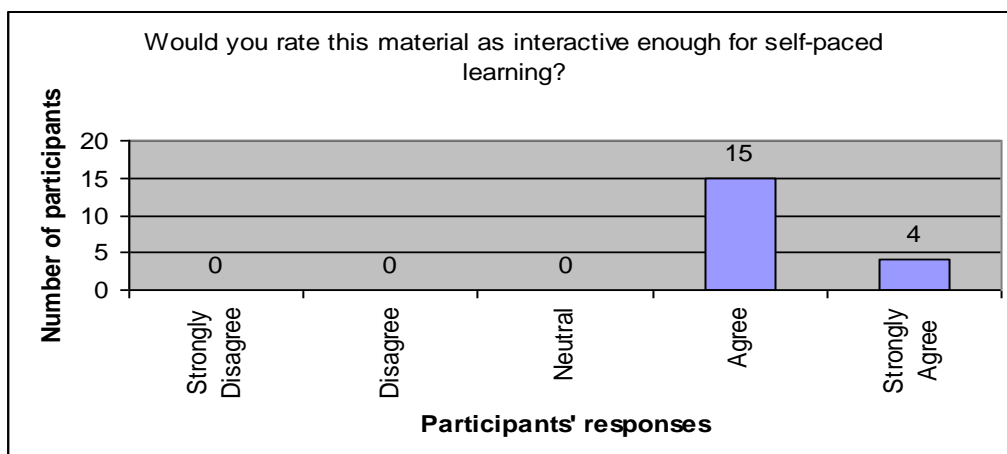


Figure 28: participants' responses on this material as interactive enough for self-paced learning

Item 15: On average, I have spent \_\_\_\_\_ hours per week doing work for this course at home.

On average, there are 3 (16%) 0-1 hours and 16 (84%) 2-4 hours spending time per week doing work at home for this course. Other hours were no responses. Figure 29 below shows a summary of the field experiment participants' responses on student involvement/engagement for item 15.

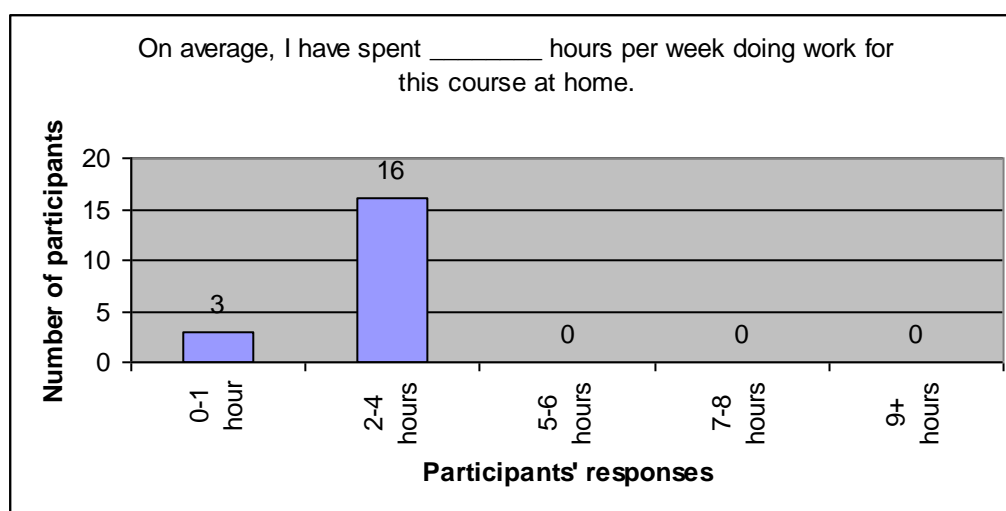


Figure 29: participants' responses on hours per week doing work at home for this course

## PART C: EVALUATION OF COURSE MATERIALS

Table 5: Shows respondents' result for Part C evaluation of course materials

C	Evaluation of course materials (resources, assignments, assessments)	1 Strongly Disagree	2 Disagree	3 Neutral	4 Agree	5 Strongly Agree	Mean
16	The flow of online instruction (introduction, content and assessment) provided me with a quality learning experience	0	0	0	14	5	4.26
17	The quiz with feedback is returned quickly enough to benefit my learning.	1	2	0	12	4	3.84
18	The test accurately assesses what I have learned in this course.	1	1	0	13	4	3.95
19	The test results are returned quickly enough to motivate me	0	0	0	10	9	4.47

20	The projects given in this course have enhanced my learning.	0	0	0	8	11	4.58
21	Teacher is very concerned about students' problems and quickly facilitates me in online class.	1	1	1	15	1	3.73
22	The e-learning course provides clear evaluation criteria.	0	1	1	11	6	4.16
23	The e-learning system grades consistently with the evaluation criteria.	0	1	0	16	2	4.00

*Item 16: The flow of online instruction (introduction, content and assessment) provided me with a quality learning experience.*

5 (26%) strongly agree, 14 (74%) agree, none for neutral, disagree and strongly disagree that the flow of online instruction (introduction, content and assessment) provided a quality learning experience. Figure 30 below shows a summary of the field experiment participants' responses on student involvement/engagement for item 16.

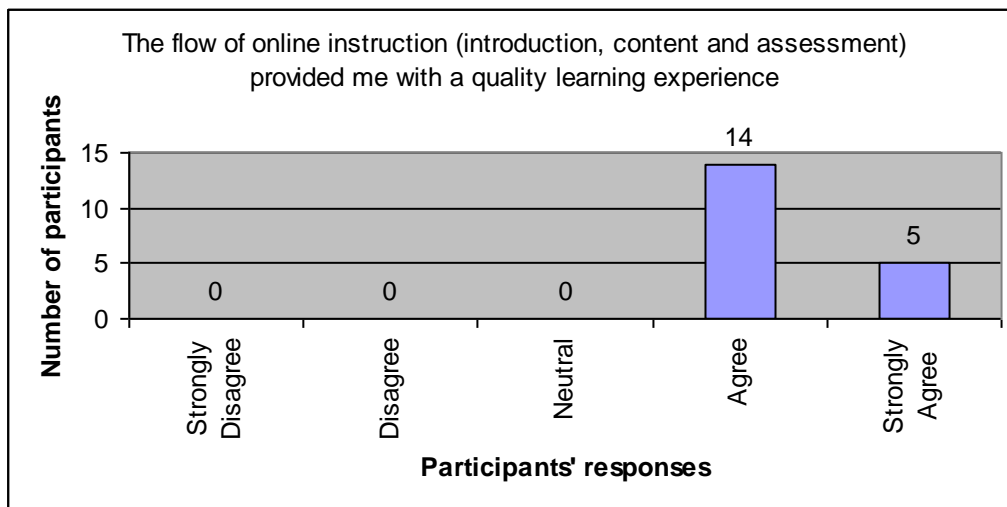


Figure 30: participants' responses on the flow of online instruction (introduction, content and assessment) provided a quality learning experience

*Item 17: The quiz with feedback is returned quickly enough to benefit my learning*

4 (21%) strongly agree, 12 (63%) agree, none (%) neutral, 2 (11%) disagree and 1 (5%) strongly disagree that the quiz with feedback is returned quickly enough to benefit the learning. Figure 31 below shows a summary of the field experiment participants' responses on student involvement/engagement for item 17.

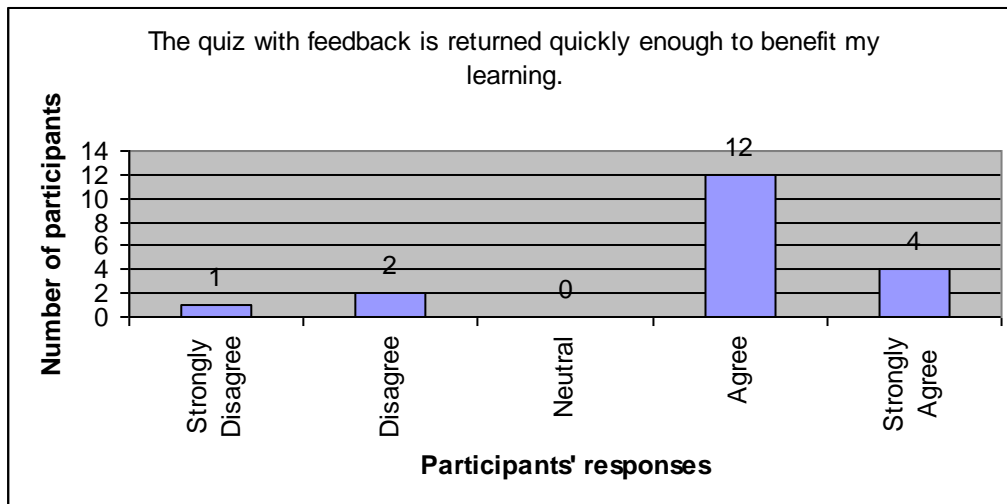


Figure 31: participants' responses on the quiz with feedback is returned quickly enough to benefit the learning

*Item 18: The test accurately assesses what I have learned in this course*

4 (%) strongly agree, 13 (%) agree, (%) neutral, 1 (%) disagree and 1 (%) strongly disagree that the test accurately assesses what they have learned in this course. Figure 32 below shows a summary of the field experiment participants' responses on student involvement/engagement for item 18.

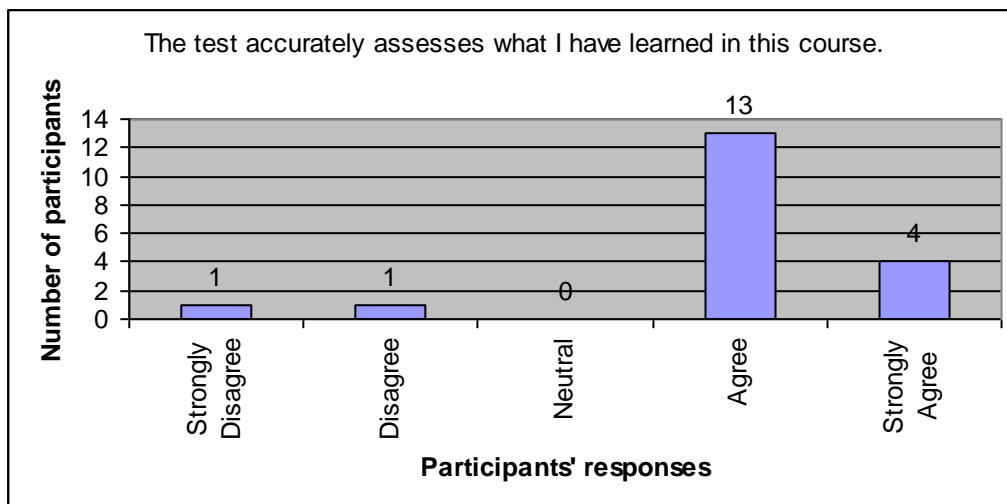


Figure 32: participants' responses on the test accurately assesses what they have learned in this course

*Item 19: The test results are returned quickly enough to motivate me*

9 (%) strongly agree, 10(%) agree, none for neutral, disagree and strongly disagree that the test results are returned quickly enough to motivate them. Figure 33 below shows a summary of the field experiment participants' responses on student involvement/engagement for item 19.

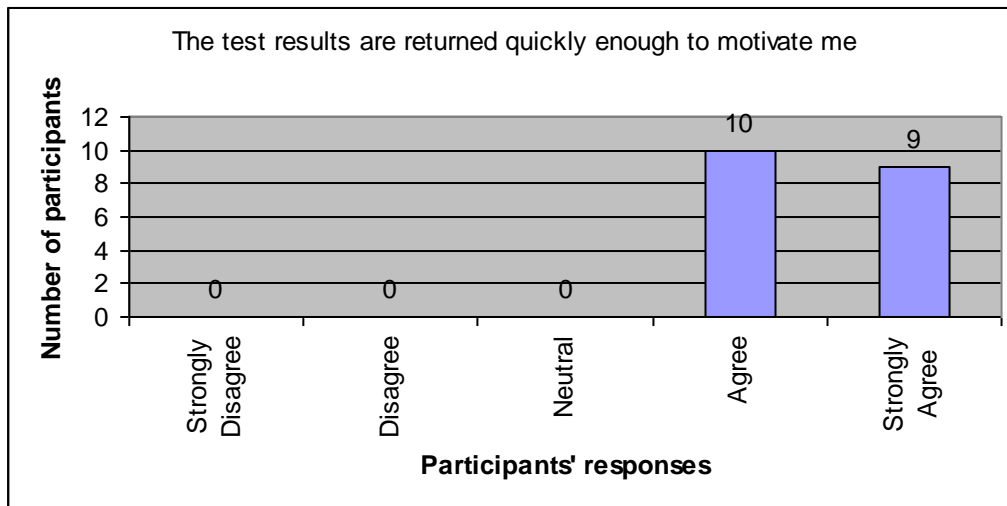


Figure 33: participants' responses on the test results are returned quickly enough to motivate them

*Item 20: The projects given in this course have enhanced my learning*

11 (58%) strongly agree, 8 (42%) agree, none for neutral disagree and strongly disagree that the projects given in this course have enhanced learning. Figure 34 below shows a summary of the field experiment participants' responses on student involvement/engagement for item 20.



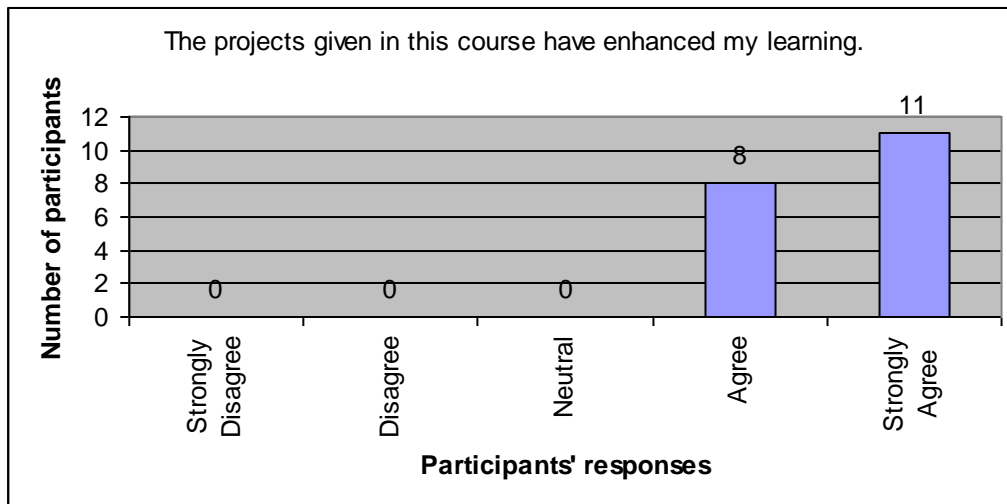


Figure 34: participants' responses on the projects given in this course have enhanced learning

*Item 21: Teacher is very concerned about students' problems and quickly facilitates me in online class*

1 (5%) strongly agree, 15 (79%) agree, 1 (5%) neutral, 1 (5%) disagree and 1 (5%) strongly disagree that teacher is very concerned about students' problems and quickly facilitates in online class. Figure 35 below shows a summary of the field experiment participants' responses on student involvement/engagement for item 21.

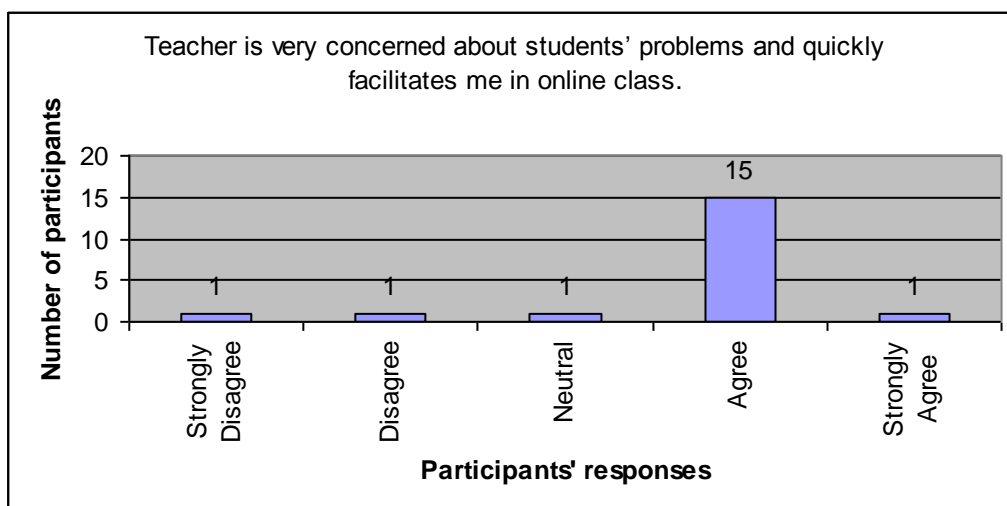


Figure 35: participants' responses on that teacher are very concerned about students' problems and quickly facilitates in online class

*Item 22: The e-learning course provides clear evaluation criteria*

6 (32%) strongly agree, 11 (58%) agree, 1 (5%) neutral, 1 (5%) disagree and none for strongly disagree that the e-learning course provides clear evaluation criteria. Figure 36 below shows a summary of the field experiment participants' responses on student involvement/engagement for item 22.

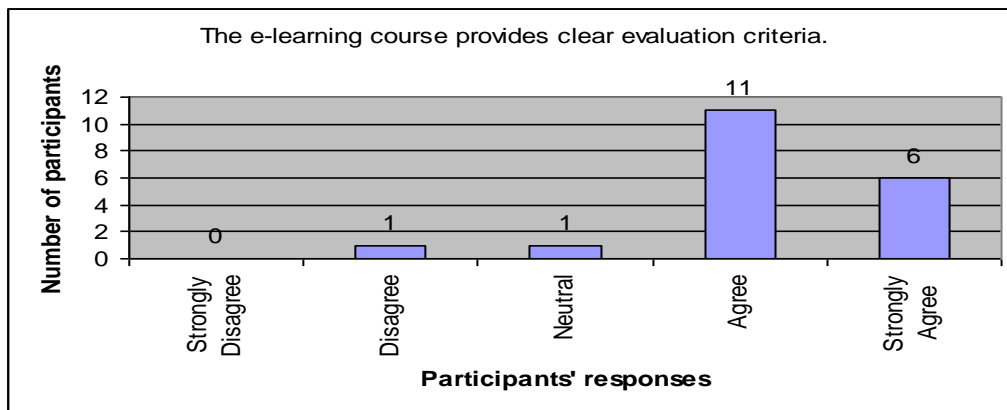


Figure 36: participants' responses on the e-learning course provides clear evaluation criteria

*Item 23: The e-learning system grades consistently with the evaluation criteria*

2 (11%) strongly agree, 16 (84%) agree, none for neutral, 1 (5%) disagree and none for strongly disagree that the e-learning system grades consistently with the evaluation criteria. Figure 37 below shows a summary of the field experiment participants' responses on student involvement/engagement for item 23.

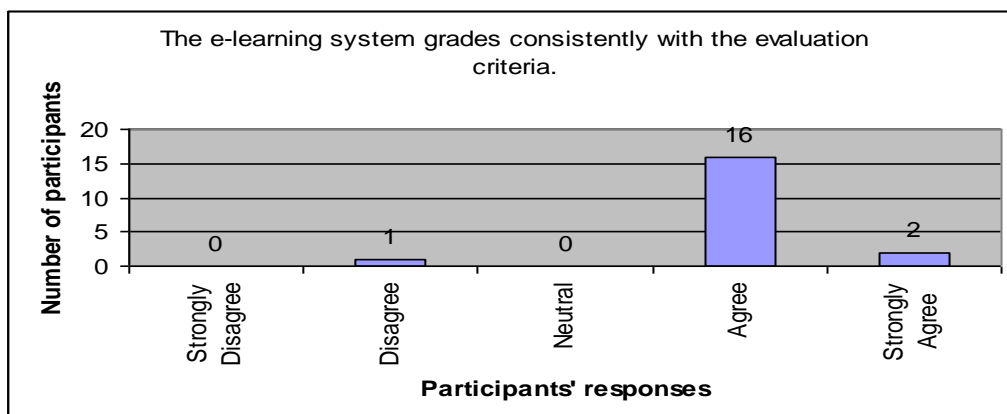


Figure 37: participants' responses on the e-learning system grades consistently with the evaluation criteria

## PART D: STUDENTS ATTITUDE TOWARDS SELF-PACED LEARNING THROUGH E-LEARNING

Table 6: Shows respondents' result for Part D students attitude towards self-paced learning through e-learning

D	Students Attitude towards self-paced learning through e-learning	1 Strongly Disagree	2 Disagree	3 Neutral	4 Agree	5 Strongly Agree	Mean
24	I will put all my effort to study this course through online?	0	0	0	12	7	4.37
25	I found e-learning system suitable for pre-university (form six) students	0	2	0	4	13	4.47
26	I prefer to study through online even it is new for me	0	0	2	9	8	4.32
27	I have ICT skill to use computer and internet to study through online	0	0	0	7	12	4.63
28	I found chat room is useful to facilitate students in online class	0	1	0	9	9	4.37
29	I found the message box is useful to communicate with instructor/students	0	1	0	7	11	4.47
30	I found study through self-paced is easily to absorb learning contents	0	0	0	18	1	4.05
31	I found e-learning course can be used independently by students outside the classroom	0	0	0	0	19	5.00
32	I should promote to other students online study have many benefits	0	0	0	15	4	4.21

*Item 24: I will put all my effort to study this course through online*

7 (37%) strongly agree, 12 (63%) agree, none for neutral, disagree and strongly disagree that respondents will put their effort to study this course through online. Figure 38 below shows a summary of the field experiment participants' responses on student involvement/engagement for item 24.

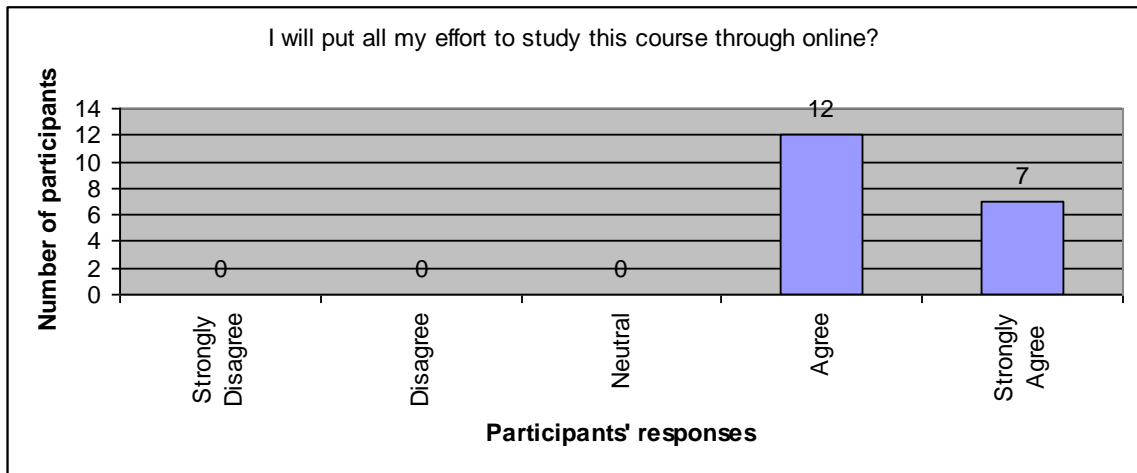


Figure 38: participants' responses on their effort to study this course through online

*Item 25: I found e-learning system suitable for pre-university (form six) students*

13 (%) strongly agree, 4 (%) agree, none for neutral, 2 (%) disagree and none for strongly disagree that an e-learning system suitable for pre-university (form six) students. Figure 39 below shows a summary of the field experiment participants' responses on student involvement/engagement for item 25.

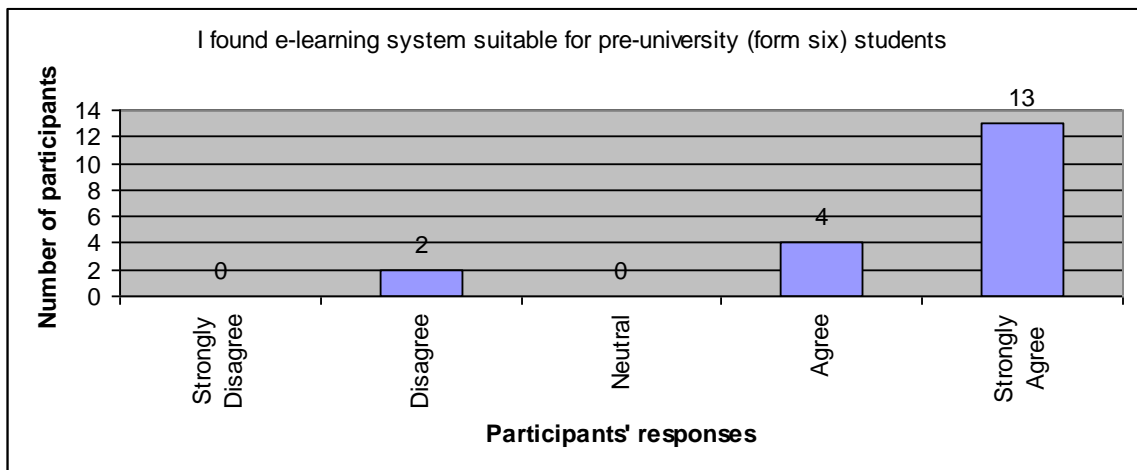


Figure 39: participants' responses on an e-learning system suitable for pre-university (form six) students

*Item 26: I prefer to study through online even it is new for me*

8 (42%) strongly agree, 9 (47%) agree, 2 (11%) neutral, none for disagree and strongly disagree that they prefer to study through online even it is new. Figure 40 below shows a

summary of the field experiment participants' responses on student involvement/engagement for item 26.

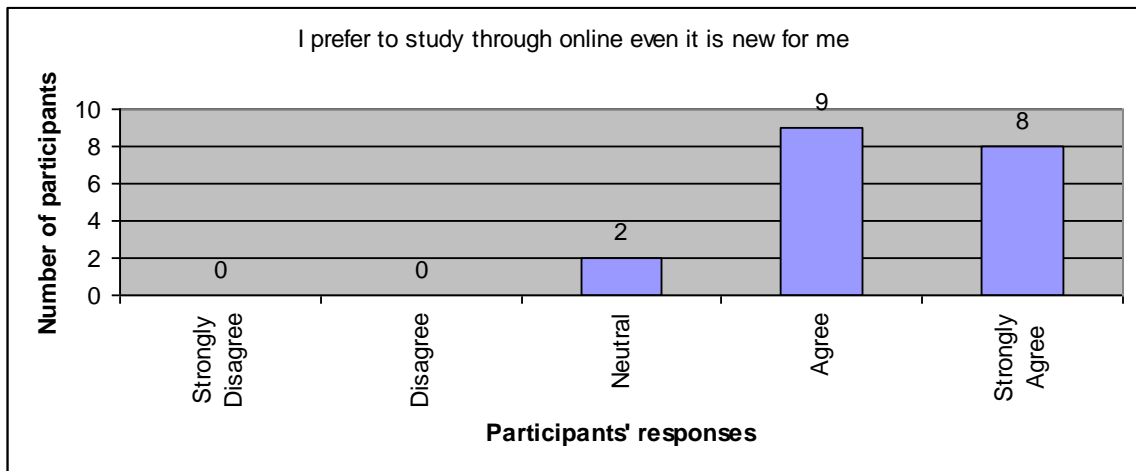


Figure 40: participants' responses on study through online even it is new

*Item 27: I have ICT skill to use computer and internet to study through online*

12 (63%) strongly agree, 7(37%) agree, none for neutral, disagree and strongly disagree that they have ICT skill to use computer and internet to study through online. Figure 41 below shows a summary of the field experiment participants' responses on student involvement/engagement for item 27.

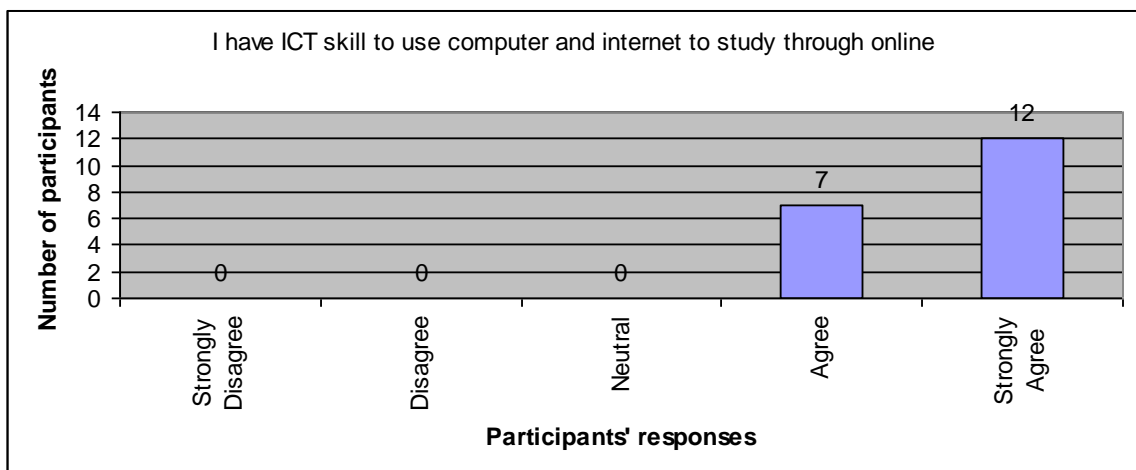


Figure 41: participants' responses on that they have ICT skill to use computer and internet to study through online

*Item 28: I found chat room is useful to facilitate students in online class*

9 (47%) strongly agree, 9 (47%) agree, none for neutral, 1 (5%) disagree and none for strongly disagree that chat room is useful to facilitate students in online class. Figure 42 below shows a summary of the field experiment participants' responses on student involvement/engagement for item 28.

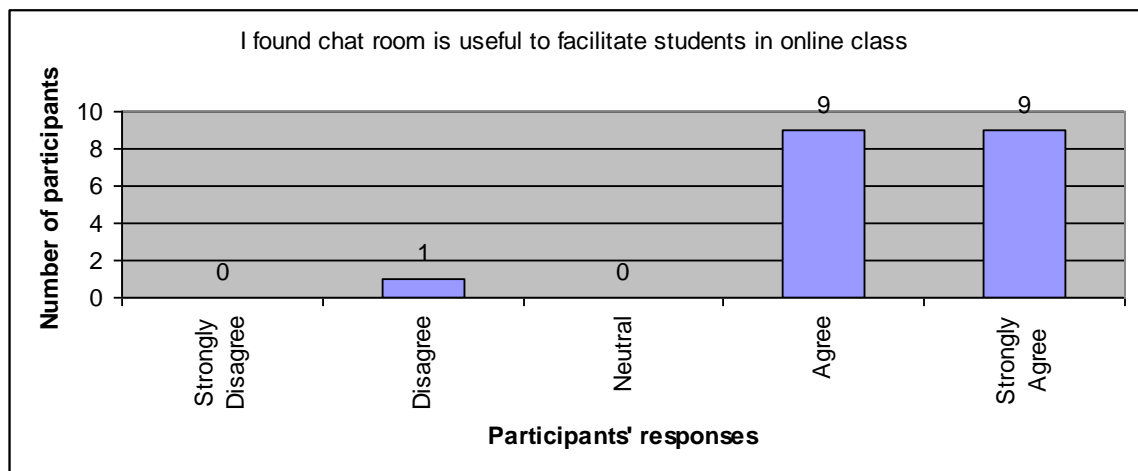


Figure 42: Participants' responses on chat room is useful to facilitate students in online class

*Item 29: I found the message box is useful to communicate with instructor/students*

11 (58%) strongly agree, 7 (37%) agree, (%) neutral, 1 (5%) disagree and (%) strongly disagree that the message box is useful to communicate with instructor/students. Figure 43 below shows a summary of the field experiment participants' responses on student involvement/engagement for item 29.

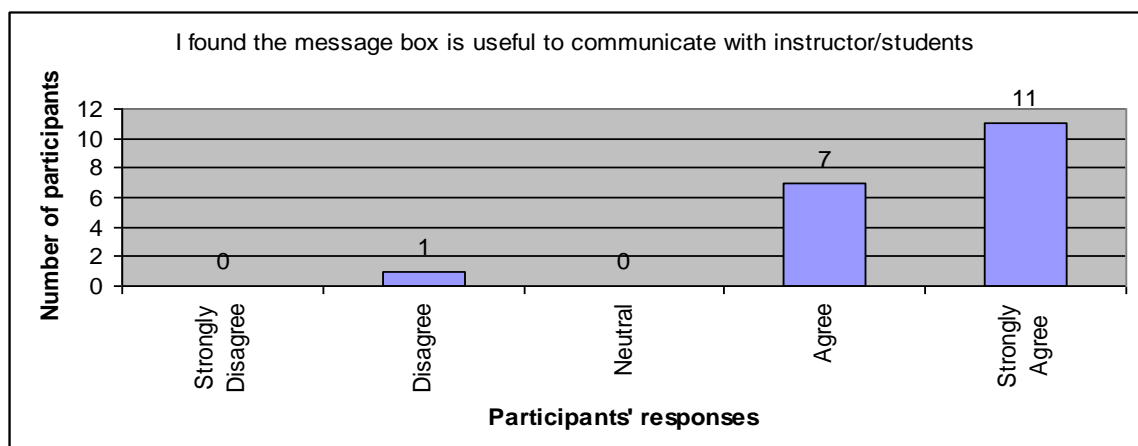


Figure 43: participants' responses on the message box is useful to communicate with instructor/students

*Item 30: I found study through self-paced is easily to absorb learning contents*

1 (5%) strongly agree, 18 (95%) agree, none for neutral, disagree and strongly disagree that study through self-paced is easily to absorb learning contents. Figure 44 below shows a summary of the field experiment participants' responses on student involvement/engagement for item 30.

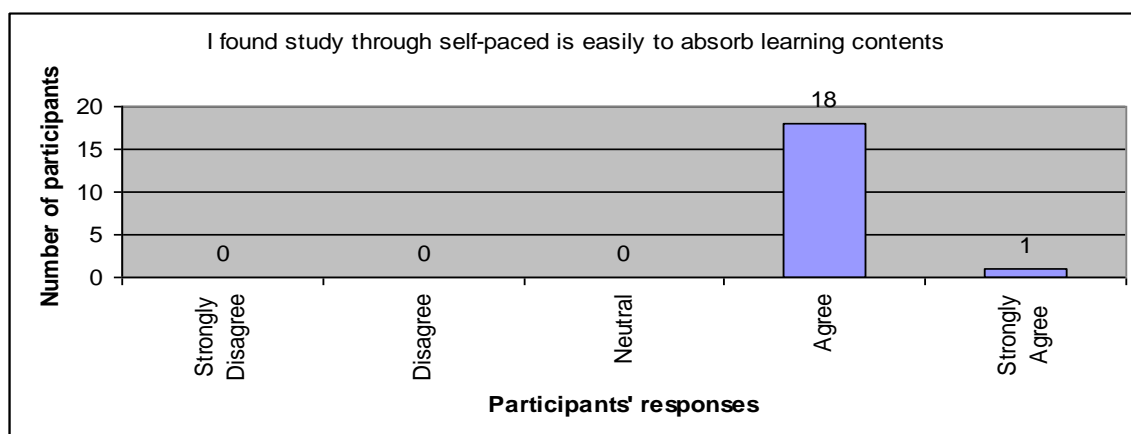


Figure 44: participants' responses on study through self-paced is easily to absorb learning contents

*Item 31: I found e-learning course can be used independently by students outside the classroom*

19 (100%) strongly agree, none for agree, neutral, disagree and strongly disagree that e-learning course can be used independently by students outside the classroom. Figure 45 below shows a summary of the field experiment participants' responses on student involvement/engagement for item 31.

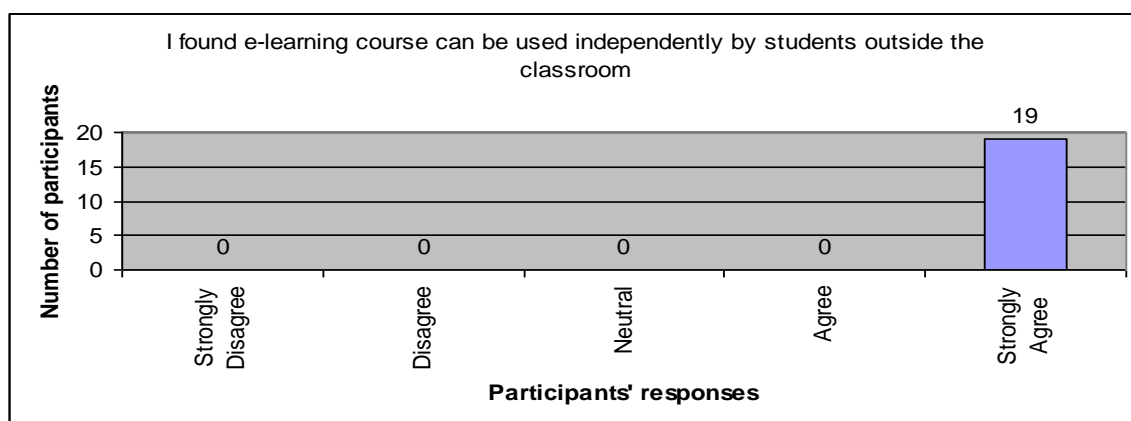


Figure45: participants' responses on an e-learning course can be used independently by students outside the classroom.

Item 32: I should promote to other students online study have many benefits

4 (21%) strongly agree, 15 (79%) agree, none for neutral, disagree and strongly disagree that they should promote to other students online study have many benefits. Figure 46 below shows a summary of the field experiment participants' responses on student involvement/engagement for item 32.

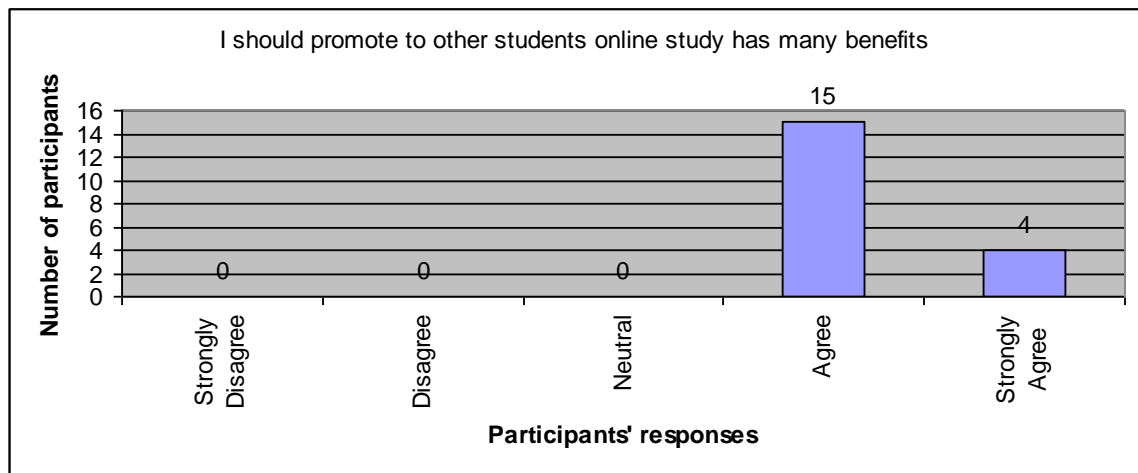


Figure 46: participants' responses on that they should promote to other students online study have many benefits

## PART E: GENERAL SUMMATIVE

Table 5: Shows respondents' result for Part E evaluation of course materials

E	General summative:	1 Strongly Disagree	2 Disagree	3 Neutral	4 Agree	5 Strongly Agree	Mean
33	Overall, the e-learning system has been user friendly to navigate the flow of learning process.	0	0	0	17	2	4.11
34	Overall, this course has been effective in advancing learning through self-paced learning.	0	1	0	4	14	4.63
35	Overall, online learning is very convenient for pre-university student to study at any time after school	0	1	0	8	10	4.42



*Item 33: Overall, the e-learning system has been user friendly to navigate the flow of learning process.*

2 (11%) strongly agree, 17 (89%) agree, none for neutral, disagree and strongly disagree that the e-learning system has been user friendly to navigate the flow of learning process. Figure 47 below shows a summary of the field experiment participants' responses on student involvement/engagement for item 33.

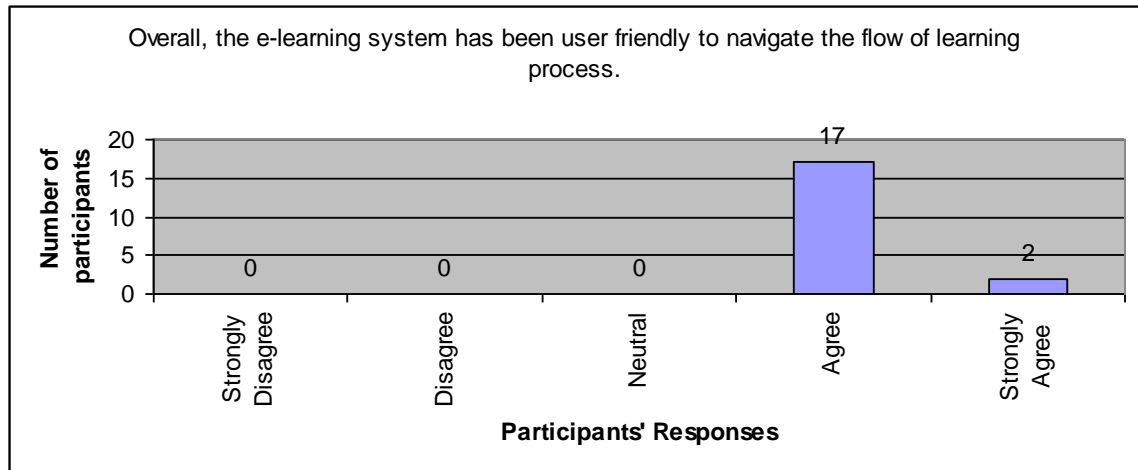


Figure 47: Participants' responses on an e-learning system have been user friendly to navigate the flow of learning process.

*Item 34: Overall, this course has been effective in advancing learning through self-paced learning.*

14 (74%) strongly agree, 4 (21%) agree, none for neutral, 1 (5%) disagree and none strongly disagree that the course has been effective in advancing learning through self-paced learning. Figure 48 below shows a summary of the field experiment participants' responses on student involvement/engagement for item 34.

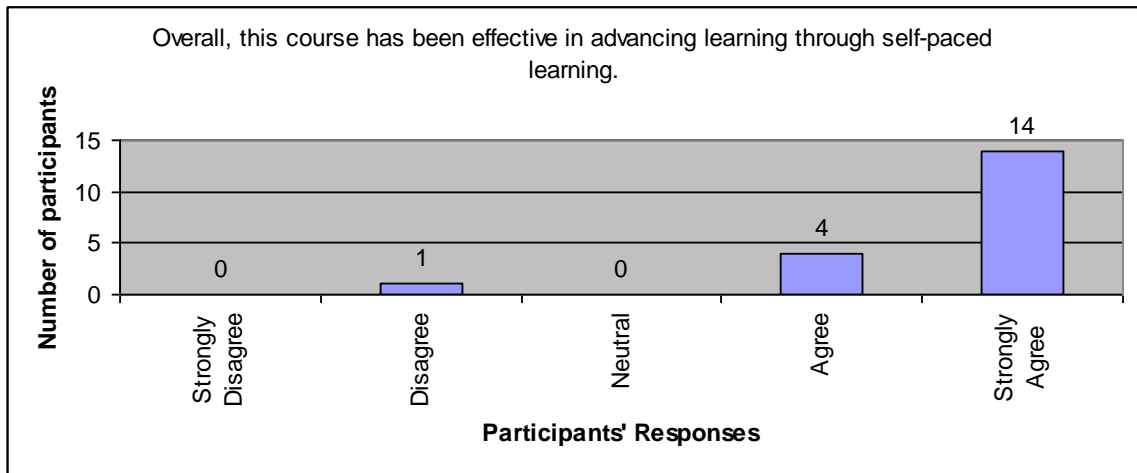


Figure 48: participants' responses on course have been effective in advancing learning through self-paced learning.

*Item 35: Overall, online learning is very convenient for pre-university student to study at any time after school*

10 (53%) strongly agree, 8 (42%) agree, (%) neutral, 1 (5%) disagree and (%) strongly disagree that online learning is very convenient for pre-university student to study at any time after school. Figure 49 below shows a summary of the field experiment participants' responses on student involvement/engagement for item 35.

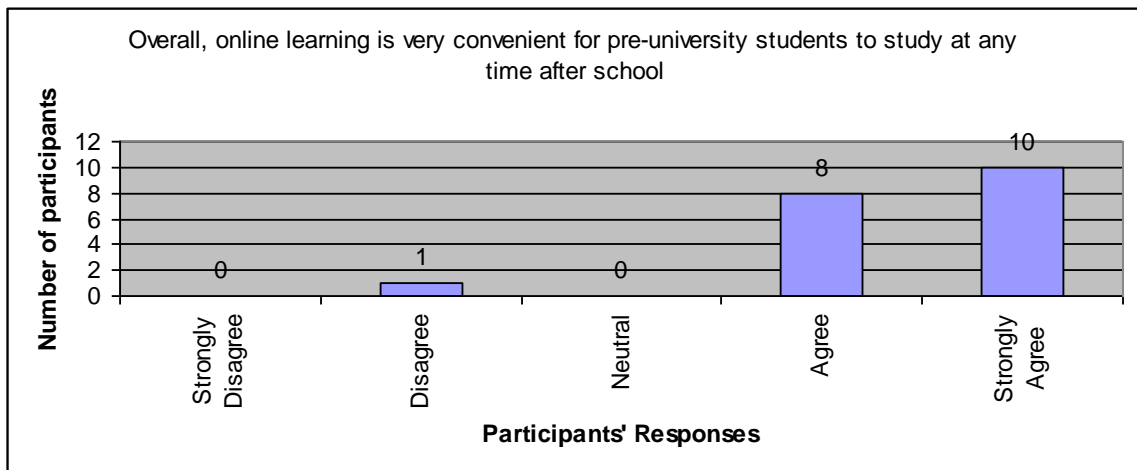


Figure 49: participants' responses on online learning is very convenient for pre-university student to study at any time after school

*Item 35: Do you have any comments about self-paced study through online*

The following statements are student's impressions about studying through online:

Student 1

I feel as I proceed the course, that I'm becoming more and more understand the course content

Student 2

I feel some difficulties to use the e-learning system for the first time. Until I log in several time then I feel familiar with the e-learning environment.

Student 3

I doubt that student need more time to familiar with an e-learning environment and understand the content.

Student 4

Message box makes easier to communicate. For example, teacher doesn't keeps the same hours as students do and so message box helps me ask question when it occurs to me. I though it can lead to me being very help.

Student 5

The e-Learning system allows my study to be neat and organized which generally results in a better grade.

Student 6

Quizzes and Exams should be More Challenging.

Student 7

I was amazed to get the immediate feedback from quizzes.

Student 8

I don't have web site navigation difficulties.

Student 9

I'm really busy with other school activities. So the biggest problem is the time management. After school I'm getting tired.

Student 10

I am becoming confident in using the e-learning system for self-paced study.

Student 11

Students need more examples in understanding the process of normalization.

Student 12

I will continue study when I have mood to do so.

Student 13

This kind of e-learning best suits me. It's silent class, no body make noise.

Student 14

Some students lack of maturity and need teacher to teach them.

Student 15

I wanted to learn the contents right away and couldn't wait until a class might start.

Student 16

I think we can have instance sharing, discussing and interacting about the lessons.

Student 17

I think I have deserved to set my own learning pace through e-learning

Student 18

The e-learning system has helps me to communicate live to my friends in cyber class.

Student 19

More advanced activities on this topic should be offered.

## **CHAPTER 5**

### **Conclusion**

#### **5.1 Discussion of result**

The research finding show that few participants indicated that my teaching methods, strategies and practices are weak in area of instructional method which means the course need to clearly explain the concepts and express clearly expectation for learning and performance. All participants gave positive response that e-learning was user friendly to navigate, effective in advancing learning through self-paced study, and very convenient for them to study at any time after school.

#### **5.2 Data interpretation**

In this study, the effective e-learning content showed that the students' achievement was increased in the pretest and posttest score.

#### **5.3 Implications**

By implication, the research confirms that online material would motivate students to do self-paced learning and motivate them to engage with study at their own time.

#### **5.4 Future plans for e-learning in secondary school**

Online learning is transforming new styles of education delivery for lifelong learning. There has been an accelerating trend in the development of online courses and hybrid learning environments. This rapid evolution has outpaced the capacity of the educational research community to evaluate the consequences of this phenomenon. To improve the quality of instructional online materials, future research is encouraged to explore: (1) How previous experience with technology and online learning affects students' attitudes and success with e-learning in rural area; and (2) How effective Learning Management System can provide a database for teacher reference to track the activities of individual student. This additional research can provide greater insight into which factors promote teacher's role as facilitator in e-learning to succeed.

## 5.5 Conclusion

Basing on the participants questionnaire responses and pretest/posttest performance I conclude that e-learning has the potential to be implemented in government schools for self-paced study for pre-university students

e-Learning system offers continual access to self-paced learning. This factor is very attractive to learners that prefer a non-structured approach to learning. Not only is there 24 hour access to the curriculum, the curriculum can be completed in short bursts of time when schedules allow. In concept, e-learning program is a way of effective learning and very easy to use by all school students and contains essential features such as accessible via the intranet provided by the Malaysian Ministry of Education for all school computer lab of School Net. If this e-learning system available for all subjects meaning that it is also offering online teachers for cyber students to receive comments and tips from teachers or other students through online message box, chat room, email or other social networks. Moreover parents can monitor the performance of the education of their children at all times without impediment anywhere in the world. In this way they can identify the weaknesses of the children since the early days and helped them since the early stages.

Self-paced learning through e-learning system works. To make the e-learning instructional more successful and high quality resources, it requires expert educators to redesign course contents, a multidiscipline of skills and expertise to develop interesting activities and a different teaching approach, but by improving efficiency of online teaching and offering differentiation in learning, it reduces the effects of diversity at curriculum level and improves individuals' chances to fulfill their potentials. Also, e-learning system or online teaching sometimes worries the educators that they may find themselves out of a job, but human interaction plays central role in e-learning or online classroom. Besides development of online material creates new job opportunities for expert educators. This is worth to remember that this generation is digital than the last; therefore there is no age limit on entry to the digital age. Technology is continually simplified. Primary school children can learn with adolescents and adults, at their own rate and on different projects. Digital education does not discriminate, but schools cannot create a digital habit if teachers

do not manage to incorporate information technology and communications into their daily lives.

Having arrived at this point for conclusion, I can say that the digital era does not await us in some distant future but that we are already living it. This e-learning technology already exists in more advanced countries. Why not Malaysia Government grabs it fast? Why do we need to wait, we have to run speedy to catch up with the digital world. A better-educated world will be fairer and more caring world.

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**Appendix A:**  
Pictures of research activity

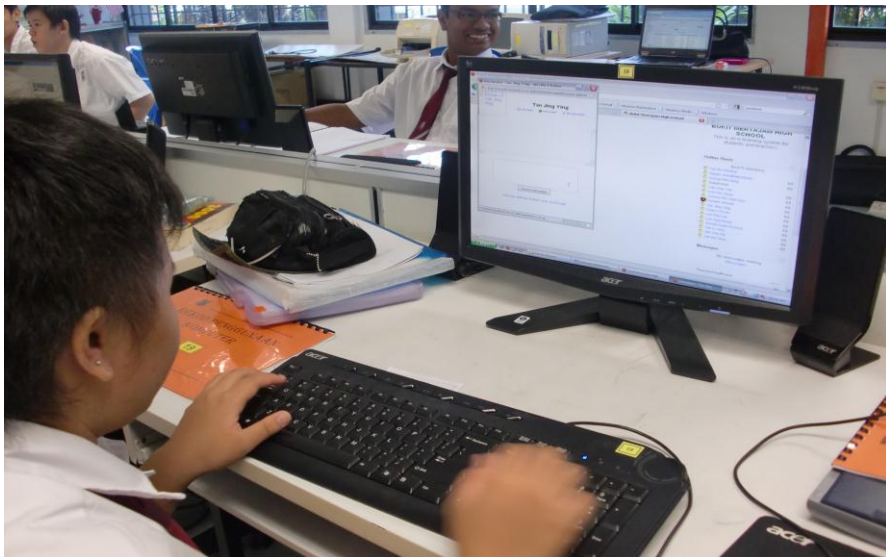
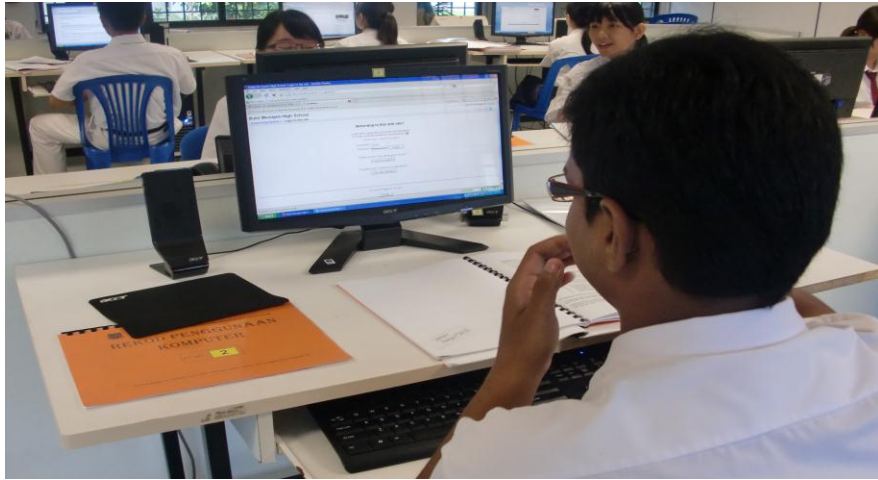
**Subject Matter Expert reviews the e-learning content**



**One-to-one evaluation with student**



## Students login to the e-learning system for the first time








**Students study the e-learning content**



## Appendix B

### Guideline for creating e-learning material

Guidelines			
Topic	Information System		1. Write the name of the topic
Lesson Title	Normalization process		1. Write a descriptive title of the lesson that identifies the content for the reader.
Time allotted	80 minutes		1. Write the time planned for the lesson
Section	Events	Example of teaching activities	
Introduction	1. Gain Attention (Example → <a href="http://mo.ield.kumamoto-u.ac.jp/lis09/25/mod/resource/view.php?id=254">http://mo.ield.kumamoto-u.ac.jp/lis09/25/mod/resource/view.php?id=254</a> )  <i>Note: copy the link and paste it at internet browser</i>	Introduce students to the title. Asking questions in the beginning creates an interactive atmosphere and to grabs the audience's attention.	1. Use a verbal or nonverbal prompt to gain attention. For example, "Look here", "Listen", "Let's begin", or flashing lights 2. Provide interest fact/motivation or curiosity 3. Giving background information creates validity 4. Use sentences such as talking to learners 5. Do not use academic terms which students not familiar with.
	2. Learning Goals (Example → <a href="http://mo.ield.kumamoto-u.ac.jp/lis09/25/mod/resource/view.php?id=255">http://mo.ield.kumamoto-u.ac.jp/lis09/25/mod/resource/view.php?id=255</a> )  <i>Note: copy the link and paste it at internet browser</i>	Tell students the objectives:- By the end of this lesson, learner should be able to: 1. explain the aims of good database design 2. Identify entity, attributes, relational and cardinality 3. Use entity-relationship (E-R) diagram to model data 4. Map the E-R diagram to relational model 5. Normalize data to 1NF, 2NF and 3NF and explain the concepts of full functional dependency, partial functional dependency, and transitive functional dependency	1. Write the instructional objectives for the lesson 2. Tell students to what is expected of them 3. Objectives usually focus on knowledge gained, skills, abilities, or attitudes changed 4. To keep on track, start the objective by writing: As a result of this lesson, the student will be able to...
	3. Review (Example → <a href="http://mo.ield.kumamoto-u.ac.jp/lis09/25/mod/quiz/view.php?id=267">http://mo.ield.kumamoto-u.ac.jp/lis09/25/mod/quiz/view.php?id=267</a> )  <i>Note: copy the link and paste it at internet</i>	For this particular group of learners, they have learned previously about Database concepts. Teacher associates this knowledge with questions.	1. Stimulating recall of prior learning or 2. Guiding the students in correcting homework or other independent work or 3. Accessing prior knowledge to enhance meaningful learning

	browser	<p>5 4 Name the symbol</p> <p>Marks: -6</p> <p>a) </p> <p>b) </p> <p>c) </p> <p>b) <input type="text"/></p> <p>c) <input type="text"/></p> <p>a) <input type="text"/></p> <p><input type="button" value="Submit"/></p>	
Learning Content	<p>4. Content (Example → <a href="http://mo.ield.kumamoto-u.ac.jp/lis09/25/mod/resource/view.php?id=260">http://mo.ield.kumamoto-u.ac.jp/lis09/25/mod/resource/view.php?id=260</a> )</p> <p><i>Note: copy the link and paste it at internet browser</i></p>	To direct students' attention to the topic and to describe the normalization process. Inform the students of the aims of good database design, describe entity set, attribute, relational set and cardinality, E-R diagram and normal form.	<ol style="list-style-type: none"> <li>1. Provide/present the new material</li> <li>2. The goal is information acquisition</li> <li>3. Use a variety of media if possible, including text, graphics, audio narration, and video.</li> <li>4. Content should be chunked and organized meaningfully</li> </ol>
	<p>5. Example (Example → <a href="http://mo.ield.kumamoto-u.ac.jp/lis09/25/mod/resource/view.php?id=292">http://mo.ield.kumamoto-u.ac.jp/lis09/25/mod/resource/view.php?id=292</a> )</p> <p><i>Note: copy the link and paste it at internet browser</i></p>	Explain to the students the process of normalization and show examples.	<ol style="list-style-type: none"> <li>1. Demonstrations, action, examples, reflective questioning</li> <li>2. Facilitates the learning process by giving hints and cues when needed using chat room or messages box.</li> <li>3. To help learners encode information for long-term storage, additional guidance should be provide</li> </ol>
	<p>6. Practice (Example → <a href="http://mo.ield.kumamoto-u.ac.jp/lis09/25/mod/resource/view.php?id=266">http://mo.ield.kumamoto-u.ac.jp/lis09/25/mod/resource/view.php?id=266</a> )</p> <p><i>Note: copy the link and paste it at internet browser</i></p>	Provide activity for students to practice their knowledge. Activities such as match the correct answer, identify the cardinality, normalized the data to 1NF, 2NF and 3NF, identify the redundant data and etc.	<ol style="list-style-type: none"> <li>1. Requiring the learner to produce based on what has been taught enables the learner to confirm their learning</li> <li>2. Learner should produce some output based on new learning. Example: practice a skill, discussion, group activity, written response, answer a question.</li> </ol>
	<p>7. Quiz (Example → <a href="http://mo.ield.kumamoto-u.ac.jp/lis09/25/mod/quiz/view.php?id=264">http://mo.ield.kumamoto-u.ac.jp/lis09/25/mod/quiz/view.php?id=264</a> )</p> <p><i>Note: copy the link and paste it</i></p>	To test students' understanding on normalization process. Ask students to answer quiz. Random questions are given. A feedback appears to indicate a correct or incorrect answer. Students discuss answer with friends through TeacherChatRoom or	<ol style="list-style-type: none"> <li>1. Gives immediate feedback to learners after eliciting responses.</li> <li>2. Regular feedback enhances learning</li> <li>3. Teacher has opportunity to reinforce and correct the performances</li> <li>4. Types of feedback include: confirmatory, corrective, informative or analytical</li> </ol>

	at internet browser	Message Box.	
Assessment	<p>8. Test (Example → <a href="http://mo.ield.kumamoto-u.ac.jp/lis09/25/mod/quiz/view.php?id=280">http://mo.ield.kumamoto-u.ac.jp/lis09/25/mod/quiz/view.php?id=280</a> )</p> <p><i>Note: copy the link and paste it at internet browser</i></p>	<p>To evaluate students' understanding of the content. Ask students to answer question given test. The e-learning system provides feedback right after the test is completed.</p>	<ol style="list-style-type: none"> <li>1. Write the assessment methods for the lesson.</li> <li>2. Make sure that the assessment specifically measures whether the objectives were reached or not</li> <li>3. Provide independent practice to forces students to use what they learned and apply it</li> <li>4. Test to see if stated objectives have been met.</li> <li>5. This assessment should be completed without the ability to receive additional coaching, feedback, or hints.</li> <li>6. State a commonly accepted level of mastery. (example: 60% and above.)</li> </ol>
	<p>9. Mini Project (Example → <a href="http://mo.ield.kumamoto-u.ac.jp/lis09/25/mod/assignment/view.php?id=291">http://mo.ield.kumamoto-u.ac.jp/lis09/25/mod/assignment/view.php?id=291</a> )</p> <p><i>Note: copy the link and paste it at internet browser</i></p>	<p>Inform the students of an example online database <a href="http://www.umsl.edu/~sauterv/analysis/er/er_intro.html">http://www.umsl.edu/~sauterv/analysis/er/er_intro.html</a> Encourage students to collect more information on similar web-based application. Encourage students to answer scenario question to complete the projects.</p>	<ol style="list-style-type: none"> <li>1. Write the student artifact that will be an outcome of this lesson</li> <li>2. You may evaluate how the lesson plan went over or what you would change in the future in this lesson.</li> <li>3. Applying learning in real-life situation</li> <li>4. Teacher asks learners to create activities or assignment.</li> <li>5. Discuss how this new knowledge or skill will be used in the workplace.</li> <li>6. Teacher uses a chat room to allow students to pose questions, such as "<i>How will skills of normalization database apply to your future job?</i>"</li> </ol>

## Appendix C

Lesson Plan created by teacher/user of Guideline

October 15, 2010  
Norhayati Binti Ujar  
Bukit Mertajam High School

### GUIDELINE FOR CREATING LESSON PLAN (Guideline Form for teacher to fill in)

			Guidelines
Topic	<b>Communist Threat : Emergency of Malaya 1948</b>		1. Write the name of the topic
Lesson Title	<b>The Emergency Measures.</b>		1. Write a descriptive title of the lesson that identifies the content for the reader.
Time allotted	<b>40 minutes</b>		1. Write the time planned for the lesson
Section	Events	Example of teaching activities	
Introduction	1. Gain Attention (Example → <a href="http://mo.andioield.kumamoto-u.ac.jp/lis09/25/mod/resource/view.php?id=254">http://mo.andioield.kumamoto-u.ac.jp/lis09/25/mod/resource/view.php?id=254</a> )  <i>Note: copy the link and paste it at internet browser</i>	Teacher displays pictures related with Communist Party of Malaya and asks students to mention the situation during the emergency.	1. Use a verbal or nonverbal prompt to gain attention. For example, "Look here", "Listen", "Let's begin", or flashing lights 2. Provide interest fact/motivation or curiosity 3. Giving background information creates validity 4. Use sentences such as talking to learners 5. Do not use academic terms which students not familiar with.
	2. Learning Goals (Example → <a href="http://mo.iield.kumamoto-u.ac.jp/lis09/25/mod/resource/view.php?id=255">http://mo.iield.kumamoto-u.ac.jp/lis09/25/mod/resource/view.php?id=255</a> )  <i>Note: copy the link and paste it at internet browser</i>	At the end of this lesson, students are expected to : 1. Identify the Communist Terrorist Threat and the proclamation of emergency 1948. 2. Describing the emergency measures.	1. Write the instructional objectives for the lesson 2. Tell students to what is expected of them 3. Objectives usually focus on knowledge gained, skills, abilities, or attitudes changed 4. To keep on track, start the objective by writing: <i>As a result of this lesson, the student will be able to...</i>
	3. Review (Example → <a href="http://mo.iield.ku">http://mo.iield.ku</a>	Teacher displays a picture and asks students to explain	1. Stimulating recall of prior learning or 2. Guiding the students in



	<a href="http://mamoto-u.ac.jp/lis09/25/mod/quiz/view.php?id=267">mamoto-u.ac.jp/lis09/25/mod/quiz/view.php?id=267</a> )  <i>Note: copy the link and paste it at internet browser</i>	the cause of emergency.	correcting homework or other independent work or 3. Accessing prior knowledge to enhance meaningful learning
Learning Content	4. Content (Example → <a href="http://mo.ield.ku/mamoto-u.ac.jp/lis09/25/mod/resource/view.php?id=260">http://mo.ield.ku/mamoto-u.ac.jp/lis09/25/mod/resource/view.php?id=260</a> )  <i>Note: copy the link and paste it at internet browser</i>	Teacher provides video, text and pictures using PowerPoint.	1. Provide/present the new material 2. The goal is information acquisition 3. Use a variety of media if possible, including text, graphics, audio narration, and video. 4. Content should be chunked and organized meaningfully
	5. Example (Example → <a href="http://mo.ield.ku/mamoto-u.ac.jp/lis09/25/mod/resource/view.php?id=292">http://mo.ield.ku/mamoto-u.ac.jp/lis09/25/mod/resource/view.php?id=292</a> )  <i>Note: copy the link and paste it at internet browser</i>	Teacher explain to the students the emergency measures.	1. Demonstrations, action, examples, reflective questioning 2. Facilitates the learning process by giving hints and cues when needed using chat room or messages box. 3. To help learners encode information for long-term storage, additional guidance should be provide
	6. Practice (Example → <a href="http://mo.ield.ku/mamoto-u.ac.jp/lis09/25/mod/resource/view.php?id=266">http://mo.ield.ku/mamoto-u.ac.jp/lis09/25/mod/resource/view.php?id=266</a> )  <i>Note: copy the link and paste it at internet browser</i>	Teacher provides activity for students to practice the knowledge.	1. Requiring the learner to produce based on what has been taught enables the learner to confirm their learning 2. Learner should produce some output based on new learning. Example: practice a skill, discussion, group activity, written response, answer a question.
	7. Quiz (Example → <a href="http://mo.ield.ku/mamoto-u.ac.jp/lis09/25/mod/quiz/view.php?id=264">http://mo.ield.ku/mamoto-u.ac.jp/lis09/25/mod/quiz/view.php?id=264</a> )  <i>Note: copy the link and paste it at internet browser</i>	Teacher ask students to answer quiz	1. Gives immediate feedback to learners after eliciting responses. 2. Regular feedback enhances learning 3. Teacher has opportunity to reinforce and correct the performances 4. Types of feedback include: confirmatory, corrective, informative or analytical

Assessment	<p>8. Test (Example → <a href="http://mo.ield.ku.mamoto-u.ac.jp/lis09/25/mod/quiz/view.php?id=280">http://mo.ield.ku.mamoto-u.ac.jp/lis09/25/mod/quiz/view.php?id=280</a> )</p> <p><i>Note: copy the link and paste it at internet browser</i></p>	<p>To evaluate students' understanding of the content. Ask students to answer the test.</p>	<ol style="list-style-type: none"> <li>1. Write the assessment methods for the lesson.</li> <li>2. Make sure that the assessment specifically measures whether the objectives were reached or not</li> <li>3. Provide independent practice to forces students to use what they learned and apply it</li> <li>4. Test to see if stated objectives have been met.</li> <li>5. This assessment should be completed without the ability to receive additional coaching, feedback, or hints.</li> <li>6. State a commonly accepted level of mastery. (example: 60% and above.)</li> </ol>
	<p>9. Mini Project (Example → <a href="http://mo.ield.ku.mamoto-u.ac.jp/lis09/25/mod/assignment/view.php?id=291">http://mo.ield.ku.mamoto-u.ac.jp/lis09/25/mod/assignment/view.php?id=291</a> )</p> <p><i>Note: copy the link and paste it at internet browser</i></p>	<p>Inform the students of an example online database : <a href="http://en.wikipedia.org/wiki/Circumstances_prior_to_the_Malayan_Emergency">http://en.wikipedia.org/wiki/Circumstances_prior_to_the_Malayan_Emergency</a>.          courage students to collect more information on similar web-based application.          Encourage students to answer scenario question to complete the projects.</p> <ol style="list-style-type: none"> <li>1. Discuss the emergency implication in term of political, social and economic development</li> </ol>	<ol style="list-style-type: none"> <li>1. Write the student artifact that will be an outcome of this lesson</li> <li>2. You may evaluate how the lesson plan went over or what you would change in the future in this lesson.</li> <li>3. Applying learning in real-life situation</li> <li>4. Teacher asks learners to create activities or assignment.</li> <li>5. Discuss how this new knowledge or skill will be used in the workplace.</li> <li>6. Teacher uses a chat room to allow students to pose questions, such as "<i>How will skills of normalization database apply to your future job?</i>"</li> </ol>

## Appendix D:

### The e-Learning System developed by teacher/user of Guideline

The screenshot shows a Windows Internet Explorer browser window with the address bar displaying <http://mo.ied.kumamoto-u.ac.jp/lis09/25/course/view.php?id=24>. The browser's menu bar includes File, Edit, View, Favorites, Tools, and Help. The toolbar contains various icons for search, share, check, translate, and autofill. The address bar also includes a search box and a sign-in button.

The main content area displays the e-Learning System interface for 'History Form 6'. The interface includes a sidebar with navigation links for Administration (Turn editing on, Settings, Assign roles, Grades, Groups, Backup, Restore, Import, Reset, Reports, Questions, Files, Profile) and Course categories (Teacher Course: e-Learning Guideline, Student Course: History Form 6, Student Course: 958 Computing, All courses...). The main content area features a 'Topic outline' section with a large graphic that reads 'History Form 6' and a small image of a historical scene. Below the graphic, the topic 'THE COMMUNIST THREAT : THE MALAYA EMERGENCY 1948' is listed. The content area also includes a 'The Fact' section with a paragraph of text about the Communist Party of Malaysia (CPM) and the Malayan Emergency. The bottom of the page shows the status bar with 'Internet | Protected Mode: Off' and a zoom level of 75%.