

จุฬาลงกรณ์มหาวิทยาลัย

ทุนวิจัย

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การพัฒนาโปรแกรมอีเลิร์นนิ่งโดยใช้เกมเป็นสื่อเพื่อประกอบการสอน

ภาษาอังกฤษสำหรับสัตวแพทย์ 1

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ABSTRACT

In the era of globalization, gam-based learning is one of the options that teachers implement with the students both inside and outside the classroom. This study focuses on the role of edutainment at the tertiary level. The context is the teaching and learning of English for Veterinary Profession I (Eng Vet Prof I) for 2nd year students at Chulalongkorn University Language Institute (CULI) in Bangkok, Thailand. This course focuses on improving the students' listening and speaking skills in the Veterinary field. In order to make the materials relevant and attractive to Net Gen learners, a game-based supplementary e-learning program, so-called CULI ZOO, being now considered as an alternative pedagogy, adaptable for Net Gen, has been developed. Game based learning has been shown to increase students' learning ability, promote learner autonomy, motivate the students to learn, and engage students in a meaningful, interactive environment of learning. The purposes of the study presentation are to develop an effective game-based supplementary e-learning program for students in English for Veterinary Profession I and to evaluate the effectiveness of the program. As for the sample group of the study, the second year Veterinary Science students who enrolled in the English for Veterinary Profession I course in 2014 and 2015 served as the control group and the experimental group, respectively. Both groups did the same pretest at the beginning of the course. The results from the t-test confirmed that both groups were comparable. Only the 2015 students were exposed to CULI ZOO. The scores from the midterm and final examinations were counted as posttest scores. After the experimental group students finished playing CULI ZOO, they had a chance to complete a set of the questionnaires eliciting their attitude toward CULI ZOO. Also, sixteen students were randomly selected for the interviews. As for the findings, the results, obtained from the t-test, showed a statistically significant difference in the posttest scores between both groups at a significance level of 0.05. Likewise, there is a significant difference between the pretest and posttest scores of the students' in the experimental group. As for the students' attitude, the data from the questionnaires and interviews explicated that the students in the experimental group had positive toward CULI ZOO. Last but not least, in the experimental group, the students' total scores from CULI ZOO correlated to their scores from the posttest.

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CHAPTER ONE

INTRODUCTION

In teaching languages, including English as a foreign language, (or other subjects), teachers have struggled to catch the attention of their audience of learners. As Gilmore (2003: 2) notes, “A bored student is really no student at all”. Boredom is a major problem for the teaching of English as a foreign language (EFL) in Thailand, at all levels: primary, secondary, and even into tertiary education. The major paradigm for teaching in Thai EFL classrooms is the traditional so-called “chalk-and-board” and lecture formats. In general, students find this methodology less than inspiring and as a result, their learning suffers. In response to this struggle to motivate and stimulate students to learn English, the Chulalongkorn University Language Institute (CULI) in Bangkok, Thailand initiated the Experiential English (Exp Eng) programs for Chulalongkorn University (CU) freshmen (excluding the students in the Faculty of Arts). Moreover, EAP programs have been provided to the students in each faculty in order to enhance their English for specific purposes. These programs emphasize learning by doing. Furthermore, a key tenet of teaching is to take into account affect, and attempt to boost autonomy and motivation, and reduce anxiety. However, these goals are difficult to achieve fully in the three hours per week allotted to the program. As a consequence, it was deemed necessary to create some form of supplementary materials for students to accomplish the set program objectives. In general, the existing supplements available are paper-based, which teachers distributed during their classes and at their discretion. These supplements are used according to the particular teacher (e.g. as homework, as classwork, etc.), and may not have motivated the students to learn and may not have raised their autonomy. The students may have been bored by the non-interactive, uninteresting tasks.

One approach that attempts to alleviate all of the above obstacles to learning is “edutainment”. It is the merging of entertainment and education, and is defined by Buckingham and Scanlon as “a hybrid genre that relies heavily on visual material, on narrative or game-like formats, computer games-education-implications for game developers, and on more informal, less didactic styles of address” (2000, as cited in Rapeepisarn, Wong, Fung & Depickere, 2006). As the major goal of edutainment is to enhance learning, and as this goal is parallel with the objectives of the English for Veterinary Profession I program (Eng Vet Prof I), focusing on improving students’

listening and speaking skills in veterinary science context and situations, edutainment is seen as a good fit for the program.

Furthermore, the role of technology and its importance in modern teaching cannot be denied. The current generation of students, having been born in a technology-rich milieu, not only desires, but also requires multimedia in their learning (Oblinger & Oblinger, 2005) Bringing computers, online games, and the Internet into the classroom is theorized to have a profound effect on students' perception of education – they are likely to see the experience as more fun and entertaining, rather than dull and monotonous (Okan, 2003). Bearing this in mind, the decision has been made to develop an e-learning program rather than a more traditional program that must be taught face-to-face. There are a number of advantages to such a program. The key advantage of an e-learning program is the ability to bring together various types of media, convenience and timeliness of access, and the inherent facility of technology to cater to a wide range of learning styles and preferences. In the construction of any computer-assisted language learning materials, eight conditions are deemed necessary for optimal learning (Egbert et al., 1999). Presented are their eight conditions:

1. Learners have opportunities to interact and negotiate meaning.
2. Learners interact in the target language with an authentic audience.
3. Learners are involved in authentic tasks.
4. Learners are exposed to and encouraged to produce varied and creative language.
5. Learners have enough time and feedback.
6. Learners are guided to attend mindfully to the learning process.
7. Learners work in an atmosphere with an ideal stress/anxiety level.
8. Learner autonomy is supported.

These ideas may have remained merely untested theories, except for the happy coincidence of the Chulalongkorn University Academic Affairs Department announcing a policy wherein the department encouraged all faculties in the university to produce e-learning courses/programs, to fulfill the following goals: enhance learner autonomy, supplement existing programs, and provide students an instructional alternative. Therefore, the researcher has been inspired to create the supplementary e-learning program for the English for Veterinary Profession I as a pioneering e-learning program that integrates concepts from edutainment and CALL to help foster an optimal

language learning environment, promote learner autonomy and motivation, while decreasing anxiety, and ultimately, enhance the learning experience.

This study will present a literature review regarding related concepts: edutainment, game-based learning, and the learner factors of learner autonomy, motivation, and anxiety. This will be followed by a detailed explanation of the development and applications of this e-learning program as well as the students' attitudes toward the program.

Research questions

This research aims to answer the following questions:

- 1 What are the main components of an effective game-based supplementary e-learning (GBSe) program for English for Veterinary Profession I?
- 2 To what extent can the GBSe program enhance students' listening skills?
- 3 What are the students' attitudes toward the GBSe program for English for Veterinary Profession I?
- 4 Is there a correlation between the students' listening ability from the midterm and final examinations and that from the GBSe program?

Research objectives

The research aims

- 1 to develop an effective game-based supplementary e-learning (GBSe) program for English for Veterinary Profession I,
- 2 to investigate the effectiveness of the GBSe program,
- 3 to explore the students' attitudes toward the GBSe program for English for Veterinary Profession I, and
- 4 to find out the correlation between the students' listening ability from the midterm and final examinations and that from the GBSe program.

Statement of hypotheses

From the literature, the hypotheses of the study have been set up as follows:

1. The posttest mean score of the students, who are exposed to the GBSe program, is significantly higher than that of the students who are not exposed to the GBSe program.

2 The posttest mean score of the students, who are exposed to the GBSe program, is significantly higher than their pretest mean score.

3 Students, who are exposed to the GBSe program, are likely to have positive attitude toward the program.

4 The students' scores from the GBSe program correlate to those from the posttest (the midterm and final examinations).

Definition of terms

Supplementary materials refer to paper-based handouts, which teachers distribute to the students during their classes and at their discretion to supplement the book *English for Veterinary Profession I*. These supplements can be used according to the particular teacher (e.g. as homework, as classwork, etc.).

Edutainment is derived from two words: "education" and "entertainment" which is the act of learning heavily through any of various media such as movies, songs, games.

Game-based Learning refers to teaching-learning actions carried out in formal and/or informal educational settings by adopting games. It encompasses the use of both games designed expressly for fulfilling learning objectives (educational games) and "mainstream games" -- i.e. those games that are developed for fun when used to pursue learning objectives (Kirriemuir & McFarlane, 2004: 19).

The supplementary e-learning program refers to the e-learning program that is used for supplementing a subject in the classroom instruction.

English for Veterinary Profession I (Eng Vet Prof I) is a compulsory ESP/EAP program offered by the Chulalongkorn University Language Institute (CULI) to the sophomores of the Faculty of Veterinary Science in the first semester. The main content of the Eng Vet Prof I program is focused on improving the students' listening and speaking skills.

The students here refer to the CU sophomores in the Faculty of Veterinary Science who enrolled the English for Veterinary Profession I in semester one of academic year 2014 and 2015.

Significance and Usefulness of Research

The study can reveal both pedagogical and research implications. For pedagogical implication, a model of developing a game-based supplementary e-learning program can be demonstrated. It can shed light on designing game-based supplementary e-learning programs for ESP/EAP (or other subjects) that are both educational and entertaining and that motivate the students to learn effectively as well as autonomously.

As for research implication, a framework of developing an effective game-based e-learning program can be initiated. Moreover, the results of the study can reveal the students' attitudes toward the effectiveness of the game-based supplementary e-learning program as an alternative for instruction.

CHAPTER TWO

LITERATURE REVIEW

This chapter consists of literature review covering four main areas: edutainment, computer-assisted language learning, materials design, and the learner factors of learner autonomy, motivation, and anxiety.

Edutainment

Edutainment is derived from two words: “education” and “entertainment” (Singhal & Rogers, 1999). As defined by Rapeepisarn, Wong, Fung & Depickere (2006: 29), “edutainment is the act of learning heavily through any of various media such as television programs, video games, films, music, multimedia, websites and computer software”.

Edutainment can be classified in many ways, depending on the criteria chosen. They can be classified by location, purpose and content, target group, and type of media (White, 2003, as cited in Rapeepisarn *et al.*, 2006). The purpose of edutainment is to design and implement a media message that is meant to simultaneously entertain and educate so as to foster its target audience’s knowledge about an educational issue, enhance positive attitudes, and lead to discernible behavioral changes (Singhal & Rogers, 1999). If done correctly, the benefits are manifold and will affect numerous stakeholders, such as governments, broadcasting networks, educators, commercial sponsors, and audiences (Brown, 1991, as cited in Singhal & Rogers, 1999). In education especially, edutainment can lead to many benefits.

Research has shown that implementing edutainment results in a number of positive outcomes. One of the most successful examples of an edutainment program is the US children’s television program, created in 1969, known as *Sesame Street*. Statistics show the program is watch by 12 million Americans weekly. Its target audience is preschoolers, and its main objective is to prepare these watchers for school by teaching them letters, numbers, shapes, and social values such as kindness and cooperation. It achieves its goals through the use of songs, animations, live-action films, special effects, and celebrity visits. Findings indicate that viewers of *Sesame Street* consistently score higher than non-viewers on tests in all curriculum areas. According to Morrisett (1974, as cited in Lesser, 1974), “*Sesame Street*’s success comes from combining the technology of television with the art of entertainment and specific educational aims” (p. 20). Beyond that, Pierfy (1977) reported that twenty-two

simulation and gaming studies came to the same conclusion that the use of these edutainment alternatives could lead to greater retention of knowledge when compared to conventional classroom instruction. Furthermore, students expressed greater interest when simulation and games were introduced, than when classes were conducted without these added edutainment options. Similarly, Phanarangsarn (2000), in a qualitative study to investigate the effects of English grammar teaching songs, discovered that participants had an easier time remembering grammar rules precisely when compared to simply reading the information. The participants viewed the use of songs as innovative, authentic, and unique, and deemed the technique new and interesting. More recently, Resnick (2004) found that the creativity of Singaporean students increased after they were exposed to edutainment in the form of an activity wherein they utilized their strong math and science skills to create a model robot. The results of the research showed that these students found greater enjoyment in their learning and realized more readily the beneficial applications of their academic knowledge.

Computer-assisted language learning

The use of computers in language teaching and learning, or computer-assisted language learning (CALL), has occurred since the 1960s (Lee, 2000). Though initially they were seen as merely technological tools, more recently, educators have come to realize that to maximize the benefits of CALL, computers must also be seen as stimulators of learning (Hawkrigde, 1990, as cited in McLoughlin & Oliver, 1998). CALL's strengths are its affordance of experiential learning, motivation, enhanced student achievement, authentic materials for study, greater interaction, individualization, independence from a single source of information, and global understanding (Lee, 2000). Furthermore, computers are able to provide individualized instruction in a manner that would be unfeasible in conventional classrooms (Säljö, 1994, as cited in McLoughlin & Oliver, 1998).

In the construction of any computer-assisted language learning materials, eight conditions are deemed necessary for optimal learning (Egbert, Chao, & Hanson-Smith, 1999). Presented are their eight conditions:

Table 2.1: Conditions for optimal language learning environments

1. Learners have opportunities to interact and negotiate meaning.
2. Learners interact in the target language with an authentic audience.
3. Learners are involved in authentic tasks.
4. Learners are exposed to and encouraged to produce varied and creative language.
5. Learners have enough time and feedback.
6. Learners are guided to attend mindfully to the learning process.
7. Learners work in an atmosphere with an ideal stress/anxiety level.
8. Learner autonomy is supported.

Most importantly, it must be understood that the modern generation of learners is fundamentally different from any prior; having grown up in a technology-rich environment, they act and think in thoroughly distinct ways (Thorne & Payne, 2005). These digital-age foreign language learners need to be taught using a method that addresses these differences. As they are highly familiar and comfortable with computers—evidenced, for instance, by the Mahidol University’s National Institute for Child and Family Development finding that the majority of Thai internet users are under the age of twenty (Wongruang, 2009)—it seems apt to utilize CALL.

Materials design

Prabhu (1987) mentioned that ‘loosely structured’ teaching materials can be easily adapted to a particular classroom and the teacher should determine how to simplify, add to or adjust them to make them useful to their students. Materials as learning resources can vary from one learner to another within the same class (Prabhu, 1987). Robinson (1991) emphasized the importance of authentic materials in ESP. She mentioned that the material can be anything that is available to the language teacher, but it must not be the one produced for language-teaching purposes. Therefore, it is the responsibility of the teacher to select or develop materials of their own. Jolly and Bolitho (1998) outlined a framework for materials writing that starts from identification of a need to fulfill or a problem to solve by the creation of materials. The next step is exploration of language in terms of meaning, function, and skills. The third step is contextual realization of the proposed new materials by finding suitable ideas, contexts with which to work. The fourth step is pedagogical realization of materials by finding

appropriate exercises and activities and writing appropriate instructions for use. The fifth step is physical production of materials, involving consideration of layout, type size, visuals, reproduction, tape length, and so on. The sixth step is usage of the materials in class, and finally evaluation of materials against agreed objectives.

They concluded that materials' writing is most effective when it matches the learners' needs. The teacher understands the learners best so all teachers need grounding in materials writing to create the most appropriate materials for the students. Also, trialing and evaluation are vital to the success of any materials.

Learner factors: autonomy, motivation, anxiety

There is an abundance of literature on the importance of learner factors in language learning. Three of the key factors noted by researchers, which edutainment and CALL are proposed to have a positive effect on are learner autonomy, motivation, and anxiety.

Learner autonomy

Lee (1998) notes that there are several essential factors for fostering learning autonomy, including voluntariness, learner choice, and flexibility.

Voluntariness: It has been noted that autonomy is an ability born of conscious choice (Little & Dam, 1998). An autonomous learner "is not one to whom things merely happen; [he/she] is the one who, by [his/her] own volition, causes things to happen" (Thanasoulas, 2000). Training a learner to *be* autonomous is an illusory goal; learners do not have autonomy imposed on them (Little, 1991, as cited in Thanasoulas, 2000). A learner must intend, of his or her own accord, to engage in independent learning (Little & Dam, 1998). Research has found that requiring learners to take part in a self-directed learning program does not have the same positive effects as allowing learners to satisfy their own educational aspirations (Lee & Ng, 1994, as cited in Lee, 1998; Thanasoulas, 2000).

Learner choice: In promoting autonomy, it appears that the learner has an integral role to play in the choice of content and sequence of his/her own educational experience (Thanasoulas, 2000). All learners are unique, with differing requisite knowledge and needs, so only the individual is able to evaluate and reflect on how to best maximize his/her learning experience; as a result, whenever possible, learners must make choices as individuals, not as a group (Fenner, 2000). Learner choice means

giving learners the freedom to select his/her own learning path and it is posited to be key to the development of autonomy (Holec, 1983, as cited in Fenner, 2000). Though this is not always fully feasible in reality, allowing learners some semblance of choice is believed to result in greater autonomy.

Flexibility: In order to promote autonomy in language learning, learners must be provided with numerous opportunities to utilize the target language in ways that do not lead to fixed, predictable outcomes (Fenner, 2000; Little, 1990). They must also be allowed to select tasks that suit their particular interests and needs (Lee, 1998).

Motivation

Motivation is a complex, multi-faceted variable. For a student to be motivated, four elements must be present – a goal, a desire to achieve the goal, positive attitudes and effort (MacIntyre, 2002).

Gardner has noted that “the source of the motivating impetus is relatively unimportant, provided that motivation is aroused” (Kang, 2000, p. 1). However, it is argued that a course or program that appears to meet a learner’s expressed needs are more motivating than those deemed irrelevant (Crookes & Schmidt, 1991). Lukmani (1972) claims that creating different sets of materials in order to better suit each individual student’s goals will significantly increase motivation. It has also been found that environments that utilize technology, especially computer-based technology, appear to raise learners’ motivation in the classroom (Chang, 2005). According to Warschauer (1996), it is well established that learners are motivated by the use of computers in a learning experience. Among its many motivational aspects, computer-assisted learning is appealing as it offers personalized instructional opportunities, increase of learner control and the novelty of a new medium. Students surveyed by Warschauer (1996) showed differential motivation that paralleled the extent that computer usage was integrated into the overall structure of their courses. Skinner and Austin (1999) found that a group of mixed-nationality, intermediate EFL students responded positively when they were allowed to engage in computer conferencing; their motivation increased, as their confidence rose, they felt more like a member of a community and their writing skills broadened. Although these positive effects were not manifested in the actual classroom, the marked increase in motivation that the computer conferencing induced bodes well for further research and applications. The internet is also another technology that may prove motivational in the classroom. Subjects in Shih

and Gamon's study were highly motivated by the competitiveness and high expectations of a web-based course, and that motivation was the most significant correlate of learner achievement, as measured by course grades (2001).

Student motivation, on the whole, appears to improve with the introduction of technology into the language learning process. Thus, the use of technology in the learning of English may increase learners' motivation. Becker (2000) also noted that computers were motivating only so far as teachers used them in certain ways, such as prioritizing computer usage for information gathering or assigning student presentations.

Anxiety

Another learner factor associated with success and failure in foreign language learning is anxiety, and this is true whether the learning takes place formally, in a classroom, or informally, such as through interacting with native speakers (Oxford, 1999). Anxiety is the subjective feeling, in conjunction with the arousal of the autonomic nervous system, of emotions such as tension, uneasiness or even fear in anticipation of a threatening stimulus (Koba, Ogawa, & Wilkinson, 2000; Horwitz, Horwitz & Cope, 1991).

It would be impossible to include an exhaustive list of all the specific techniques and approaches a teacher could employ to address and combat anxiety in the foreign language classroom. What seems to be the consensus is that relaxation greatly reduces anxiety (MacIntyre, 1999). This can be achieved in various ways, but in an e-learning course, for example, students are allowed to go at their own pace and receive immediate feedback. Further than that, researchers offer a plethora of suggestions for dealing with the anxious learner. Oxford suggests a number a methods to diminish language anxiety, including providing activities that are suitable for a range of learning styles and strategies, giving rewards that support target language use and administering clear, unambiguous tests with familiar test items (1999).

CHAPTER THREE

RESEARCH METHODOLOGY

Research Design

The study is developmental and experimental research. The research will be conducted in two main phases: developing a game-based supplementary e-learning program (CULI ZOO) and evaluating the program developed.

Phase 1: The development of the game-based supplementary e-learning program

There are two sub-phases here: designing the tasks and developing the GBSe program (CULI ZOO).

In sub-phase 1, first of all, the literature regarding serious games and online games will be reviewed. Also, the students' attitudes of online games will be investigated using a set of questionnaires. Then, the game-based supplementary e-learning program was designed based on the findings from the literature and survey (Watanapokakul, 2015) as well as the content in the English for Veterinary I course offered by CULI. The Eng Vet Prof I program is offered every first semester to all veterinary sophomores. The program contents are drawn from the coursebook entitled the *English for Veterinary Profession I* developed by CULI. There are six units in the program, which focus on improving the students' listening and speaking skills. The six units include: pronunciation practice, listening strategies, talking to patients' owners, oral presentation skills, listening to academic talks and lectures and discussing veterinary issues.

The students' achievement is assessed and evaluated in two ways: their academic knowledge and assignments. The former is based on listening tests via the midterm and final examinations. The latter is based on five assignments by the end of units 3-6. To say, by the end of Unit 3, students have a chance to do a role-play in a vet clinic, consisting of a vet, a patient's owner, and a reporter. By the end of Unit 4, a student gives two oral presentations (a pair presentation and a group presentation) in a veterinary-related topic in front of the class. By the end of Unit 5, the students attend a lecture by a professor from the Faculty of Veterinary Science. While listening to the lecture, the students have to complete the outline. After the lecture, they have to form groups of four students and write a short summary of the lecture based on their complete

outlines. By the end of Unit 6, the students are asked to prepare to give a discussion on veterinary-related topic in groups.

In developing the e-learning program, as a supplement of the Eng Vet Prof I course, the content of each of the mentioned six units of the coursebook will be taken as reference points. The tasks are presented in multiple ways; for instance, as songs, as news items, as games, and as video clips. In order to complete the tasks, the user must also employ various response methods, including dragging and dropping, typing in words, and clicking on pictures. Authenticity is a key factor in the design of all the tasks; the tasks and language use real contexts and situations for veterinarians. Students are involved in the tasks by listening, reading, and writing, but speaking is not yet possible on this platform. Since the course is for veterinary science students; thus, the GBSe program was designed by using a zoo as a setting. The GBSe program is so-called CULI ZOO.

The design of a game-based e-learning task must be firmly placed within a pedagogical framework (Egenfeldt-Nielsen, 2005). This means that aspects such as learner objectives, teaching approaches, and learner outcomes need to be accounted for. Based on the review of the current frameworks and a consideration of the grouped game elements and instructional categories (Table 3.1), Van Staalduinen & de Freitas (2011) have combined all that they have reviewed and integrated it into a new game-based learning conceptual framework within a constructivist perspective. This is presented in Figure 3.1.

Table 3.1: The current frameworks

Theories	Scholars	Concepts
Learning Organization Questions	Anderson et al. (2001)	<ul style="list-style-type: none"> - Learning objectives - Instructional design - Assessment - Important alignment aspects
Approaches	Garris et al. (2002); Wilson et al. (2009); Kolb (1984)	<ul style="list-style-type: none"> - Systematic elements - user behaviour - system (game) feedback - debriefing - game elements - learning outcomes

	Jarvis & de Freitas (2009); de Freitas & Jarvis (2008); Van Staalduinen (2010)	<ul style="list-style-type: none"> - Game elements (action-domain link, adaptation, assessment/feedback, challenge, conflict, control, debriefing/evaluation, fantasy, goals/objectives, instructions/help/hints, interaction (equipment), interaction (interpersonal), interaction (social), language/communication, location, mystery, pieces or players, player composition, problem-learner link, progress, representation, rules, safety, sensory stimuli, and theme)
Gameplay & Player Motivation	Csikszentmihalyi (1990)	<ul style="list-style-type: none"> - The Flow Theory <ul style="list-style-type: none"> - clear goals - active player feedback - sense of control
	Moser (2000)	<ul style="list-style-type: none"> - The Engagement Theory <ul style="list-style-type: none"> - incorporate challenge - fantasy - curiosity - control

Figure 3.1: The game-based learning framework

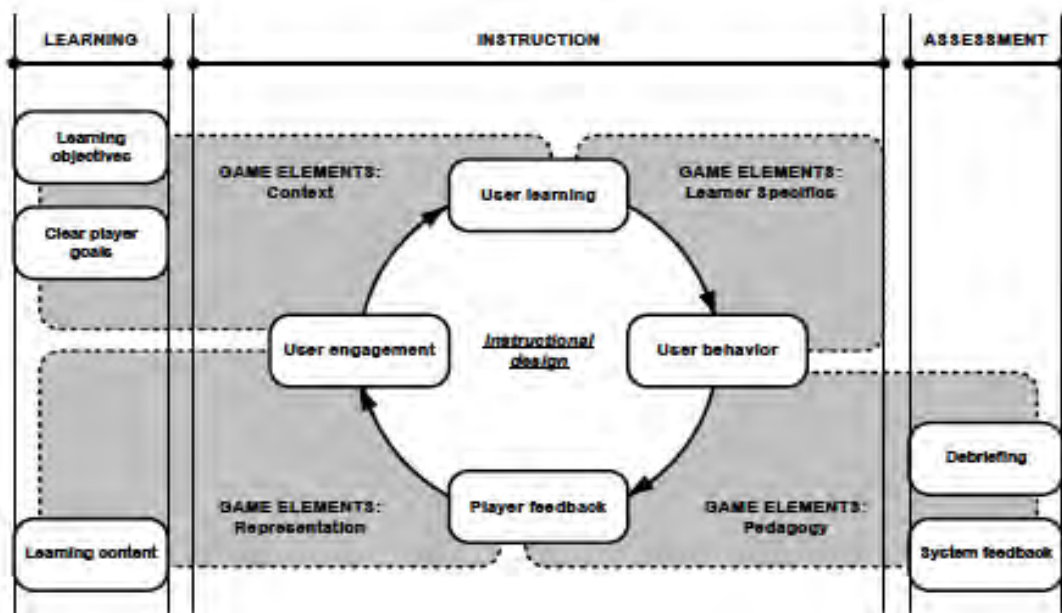


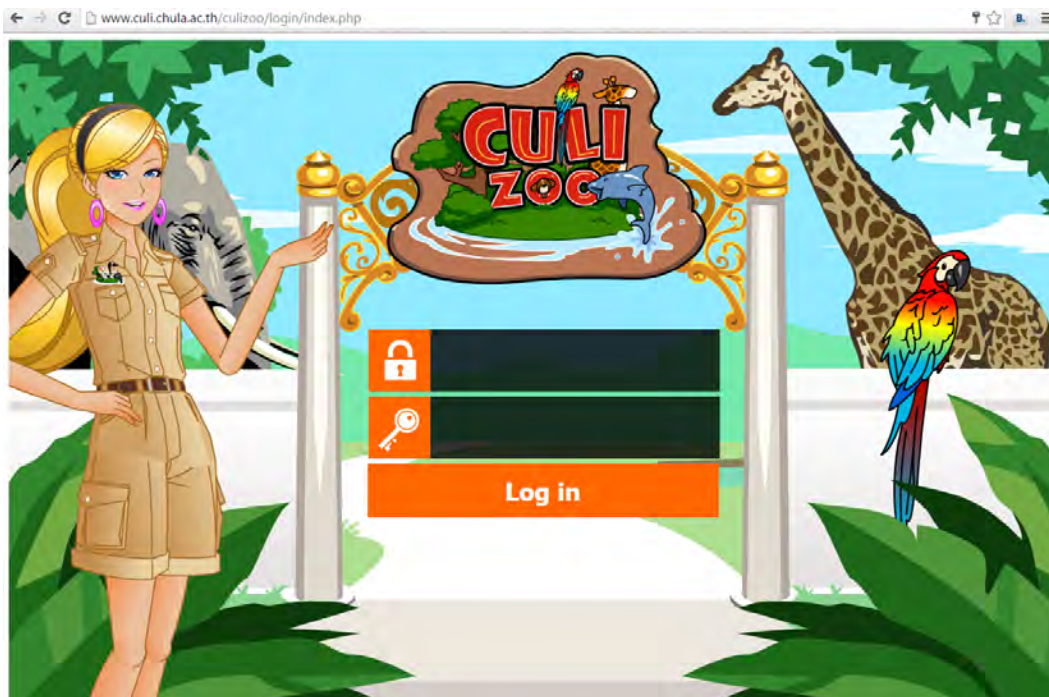
Figure 3.1 presents the framework, developed by Van Staalduinen & de Freitas (2011, p. 49), that combines what they found to be the best aspects of game-based learning. The Learning Column shows a game designer needs to define (1)the learning objectives, (2)clear player goals (goals in the game need not equate to the learning objectives and must be separately mentioned), and (3)the learning content in general (e.g. subjects, etc.). The Instruction Column indicates what aspects of the player's involvement should be considered: (1)user behaviour, (2)user feedback, (3)user engagement, and (4)user learning. It is very important for the instructional design that user actions are given enough feedback to trigger engagement, which leads to learning. In this column, a Four-Dimensional Framework is proposed. The framework consists of game elements (van Staalduinen, 2010) that have been divided into four categories (de Freitas & Oliver, 2006). These are Context (fantasy, goals/objectives, language/communication, mystery, pieces or players, player composition, rules, and theme); Learner Specifics (challenge, conflict, and progress); Pedagogy (adaptation, assessment/feedback, debriefing/evaluation, instructions/help/hints, and safety); and Representation (action-domain link, control, interaction (equipment), interaction (interpersonal), interaction (social), location, problem-learner link, representation, and sensory stimuli). Finally, the Assessment Column provides two aspects: debriefing and system feedback (score). This framework ultimately contributes to learning outcomes from playing the game of a learner.

Also, the four categories of game elements—context, learner specifics, pedagogy, and representation—are relevant to the four instructional design blocks and specific design components in the different columns. For instance, the set of context game elements are relevant to learning objectives and clear player goals in the learning column, and to both the user engagement and user learning components of the instruction column. During design, special attention needs to be paid to the links and relationships between these components; consistency is a must for good learning design. Also, the alignment of the aspects categorized in the three columns—learning, instruction, and assessment—is essential to a good learning experience. A sample of the task/game design is presented in Appendix 1.

After all tasks (games) had been designed, three experts in ELT were asked to validate and edit the tasks. The modification was made based on their comments.

In sub-phrase 2, the GBSe program (CULI ZOO) was designed to simulate being in a zoo, so it has been named CULI ZOO. Once a student logs into CULI ZOO at www.culi.chula.ac.th/culizoo with their student ID number and customized password, he/she is presented with the main page which shows the entrance of a zoo.

Figure 3.2: The entrance of CULI ZOO



After logging into CULI ZOO, the student will see a map of the zoo. The map has six clickable areas representing the six units in the coursebook. Before starting in the first zone, he/she is asked to choose one fish tank. After completing each station, the player can go to *AQUA Shop* to buy fish and accessories for his/her fish tank.

Figure 3.3: The CULI ZOO map



Figure 3.4: AQUA Shop



Scores in the zoo are kept in two ways: *CULI dollars* and *Total Score*. Each correct answer gains one CULI dollar. There are three bonus scores for a difficult question and ten bonus score when the player can correctly answer all questions in a task. However, although students may repeat the tasks innumerable times, only scores from the first attempt are counted and logged into the system. The student's scores from the first attempt of each task are collected as the student's *Total Score*. Upon completion of each task in the six zones, the student can spend CULI dollars buying fish and accessories for his/her fish tank. The student can click on "My Tank" to see his/her tank any time. The student can click on his/her fish tank any time. When there is at least one fish in the tank, the player has to usually visit the tank in order to increase its emotion and health by feeding the fish and buying some more tank accessories. After completing the last task in zone six the student's total score will be presented on a board, and the list of the top five score will be presented as well. Spontaneously, the program exits automatically to the main page

Based on the six units in the coursebook, the e-learning program contains six zones, namely Bird Park, Animal Shows, Vet Clinic, Museum, Aquarium, and Wildlife Park. Each of which represents each unit in the coursebook. The student has to progress from zone 1 (unit 1) to zone 6 (unit 6). Also, the level of difficulty of the games is gradually increased accordingly. In each zone, there are three tasks (games) for the student to carry out. Here is the summary of the tasks in every zone of the game.

Table 3.2: Summary of Zones and Tasks of CULI Zoo

Zone	Task	Type of Game	Setting
1 Bird Park (Pronunciation Practice)	1. Minimal Pairs (15 pairs: 9 easy pairs, 6 difficult pairs)	Clicking on the correct answer	In a macaw cage
	2. Word Stress (12 words: 3 2-syllable words, 3 3-syllable words, 3 4-syllable words, and 3 more-than-4-syllable words)	Clicking on the correct syllable	In a bird show dome
	3. Sentence Stress (8 sentences)	Clicking on the correct answer	In an open bird park
2. Animal Shows (Listening Strategies)	1. Matching: Dogs can speak! (15 items)	Matching	At a dog show
	2. T/F Questions: The secret language of dolphins (6 questions)	Clicking on the correct answer	At a marine mammal show
	3. MC Qs: Interview of the marine mammal trainer (6 questions)	Clicking on the correct answer	On the stage of the marine mammal show
Game #1	Click on the correct stress pattern on the syllable of an animal name	Clicking on the correct syllable	In a game room
3. Vet Clinic (Talking to the Pet's Owner)	1. Filling in the patient form: pet's owner-receptionist	Typing the correct answer	At a reception counter in a vet clinic
	2. Checking the symptom-treatment list: pet's owner-vet (diagnosis)	Typing the correct answer	In a diagnosis room
	3. Directions for medication use, making payment, and making the next appointment: pet's owner-receptionist	Typing the correct answer	At a reception counter in a vet clinic
4. Museum (Presentation Skills)	1. The timeline of CULI Zoo	Dragging-Dropping	In the museum
	2. Locations of the animal cages in the zoo	Dragging-Dropping	In the museum
	3. Information of extinct animals	Typing the correct answer	In the museum

Game #2	Categorizing the animals into birds, aquatic animals, reptiles, amphibians or mammals	Dragging and Dropping	In a game room
5. Aquarium (Listening to a Lecture)	1. Completing the outline: dolphins	Typing the correct answer	At a dolphin tank in the aquarium
	2. Completing the outline: whales	Typing the correct answer	At a whale tank in the aquarium
	3. Completing the summary: similarities and differences between dolphins and whales	Typing the correct answer	In the aquarium
6. Wildlife Park (Discussion)	1. Distinguishing Fact / Opinion	Typing the correct answer	At the open park
	2. Distinguishing For / Against	Typing the correct answer	At the open park
	3. Categorizing for or against arguments of a discussion	Dragging and Dropping	At the open park
Game #3	Animal Trivia (Multiple choice / True-or-False Questions)	Clicking on the correct answer	In a game room

After CULI ZOO had been developed, three experts in ELT were asked to validate the program by using a 6-point Likert Scale questionnaire. The questionnaire was divided into two parts: pedagogical usability and general usability. All experts quite showed positive responses to the program. However, there were some comments on the program, and they gave some suggestions as follows:

- There are some typos and misspellings. (See the script.)
- The program is interesting. I want to see it when the program is completely developed.
- There is a variety of tasks and the levels of difficulty.
- Please add bonus scores if the students can answer all questions correctly.
- Although the scores of the first attempt are recorded, if a student repeatedly plays a game, the score of that round should be presented to the student too.
- The students can practice their listening skills in the vet context.

A revision was later made based on their comments. For example, the teacher can log into the program to see the students' scores of each task as well as their total scores. After that, a group of 30 vet students, who enrolled English for Veterinary Profession I in semester one of the academic year 2014, were asked to join a pilot study of CULI ZOO. A set of questionnaires was then given to the students after playing CULI ZOO to elicit their opinions toward the program. An interview was made with six out of 30 students. The responses from the questionnaires and interview showed positive opinions toward the program. However, there were some suggests and comments from the students as follows:

- It is fun.
- In some tasks, there is no voice of the speaker. (e.g. Tasks 2- 3 in Zone 2)
- The program is beautiful and colorful.
- I cannot buy sharks and sea urchins in AQUA shop.
- In zone 4, the pictures of tasks 1 and 2 do not correlate the script/game.
- In Zone 5, answers can vary. Please add the possible answers.
- Some games are too difficult.

After that, CULI ZOO was revised based on the comments and suggestions.

Phase 2: The evaluation of the game-based supplementary e-learning program

There are two main stages to evaluate the program: validating the program by three experts and a pilot study and implementing the program.

Population and sampling

The population was CU sophomores, who enrolled the English for Veterinary Profession I in semester one of academic years 2014 and 2015. There were 98 students in 2014 and 111 students in 2015. All of them served as the sample group. The students in 2014 were the control group while those in 2015 were the experimental group, exposed to CULI ZOO.

Research Instruments

There were three research instruments in the study to evaluate the effectiveness of CULI ZOO: the pretest and posttest, a set of questionnaire, and semi-structured interviews.

The pretest was constructed based on the content in Units 1-6 as follows:

Parts	Units	Details
Part 1 20 points (10%)	Unit 1: Pronunciation Practice	Contrasting pairs: - Identify the word that you hear in 8 minimal pairs. Stress identification: - Identify the stressed syllable in 8 words. - Identify the meaning of the 4 sentences from the stressed word.
Part 2 10 points (5%)	Unit 2: Listening strategies	Listening comprehension: - Listen to two dialogues relevant to the veterinary field, and answer the questions. (Identifying the main idea & specific details: multiple choice questions & open-ended questions)
Part 3 10 points (5%)	Unit 3: Talking to the patients' owners	Listening to a conversation between a pet owner and a nurse at a clinic: - Complete a form of the patient's information
Part 4 10 points (5%)	Unit 4: Listening comprehension	Listen to two long dialogues relevant to the veterinary field and answer the questions. (Identifying the main idea & specific details: Multiple choice questions & T/F questions).
Part 5 15 points (7.5%)	Unit 5: Listening & Outlining	Listen to a lecture, and complete the missing outline.
Part 6 15 points (7.5%)	Unit 6: Listening & Summarizing	Listen to a discussion, and fill in the blank to complete a summary of the discussion.

The posttest was constructed based on the content in Units 1-6. The same test specification as that of the pretest was employed. However the posttest was divided into two parts: one for the midterm examination, consisting of the content in Units 1-3, and the other for the final examination, consisting of the content in Units 4-6.

A set of questionnaire was designed to collect students' demographic characteristics and their opinions toward CULI ZOO. There were four parts of the questionnaire. The first part asked the students about their demographic information, their grades in Experiential English 1 and 2 and their opinions toward learning English.

The second part asked the students about their opinions toward the overview of CULI ZOO. The third part asked the students about their opinions toward each game/task in CULI ZOO. The last part is an open-ended question asking the students to give suggestions to CULI ZOO.

Semi-structured interviews were performed with sixteen randomly-selected students. The researcher asked the students to obtain the in-depth opinions toward CULI ZOO (e.g. DO you like CULI ZOO? Why / Why not? and What need to be improved?).

All research instruments were validated by three experts in the field of English Language Teaching, and the revisions were made based on their comments. Also, vet students, who enrolled the English for Veterinary Profession I in semester one of the academic year 2014, were asked to join a pilot study of those research instruments. Modification was made according to their comments.

Data collection

The students were randomly divided into four sections. The students in academic year 2014 served as the control group, and the students in academic year 2015 served as the experimental group. In the beginning of the course, all of the students were asked to do the pretest. The pretest scores of both groups were analyzed using *Independent Samples t-test* at a significance level of 0.05 to ensure that both groups are somewhat comparable in their English listening ability, $t(205.14) = -0.477$, $p = 0.634$, $95\%CIs = [-3.789226, 2.312530]$.

Table 3.3: Statistics of the pretest scores of the students in the control group and the experimental group

	N	Min	Max	Mean	S.D.	t	P
Control Group (2014)	98	12.00	69.00	40.35	11.08	-0.477	0.634
Experimental Group (2015)	111	13.50	67.50	41.09	11.34		

The experimental group was asked to play CULI ZOO at www.culi.chula.ac.th/culizoo (zones 1-3 before the midterm examination and zones 4-6 before the final examination) while the control group was not. After the students in the experimental group were exposed to CULI ZOO, their scores were accumulated. Then the students were asked to do the questionnaires, and twenty of them were randomly selected to be interviewed. The interviews were tape-recorded. As for the control group, the paper-based supplementary materials were distributed to the students to do outside the classroom after they studied each unit, and the answer key was given

to the students later. Both groups were exposed to the same coursebook in the classroom and followed the same course syllabus as well as the same assessment criteria. The key difference is that the experimental group was exposed to CULI ZOO—which was able to play anywhere and anytime as long as the students could access the Internet, and they played CULI ZOO after studying each unit of the coursebook--while the control group was exposed to the paper-based supplementary worksheets—given to the students to do by themselves after studying each unit. Both CULI ZOO and paper-based supplementary worksheets contained the same content and exercises. The 2014 students' scores from paper-based supplementary materials and the 2015 students' scores from CULI ZOO accounted for 10% of the total assessment score.

Data analysis

The SPSS Program was employed for data analysis. An *Independent Samples t-test* was employed to quantitatively analyze the students' posttest scores (consisting of the midterm examination and the final examination) between the two groups; moreover, a *Paired Samples t-test* was utilized to quantitatively compare their scores between the pretest and the posttest scores in each group. Also, the students' responses from the questionnaires were analyzed using the SPSS Program to obtain the descriptive statistics, frequency, percentage, mean scores and S.D. Furthermore, the students' responses from the interviews were analyzed using content analysis, frequency and percentage. Last but not least, the *Pearson product-moment correlation coefficient* was used to find out the correlation between the students' scores from the posttest and those from the CULI ZOO.

Summary

This is a developmental and experimental research. The research was conducted in two main phrases: the development of the GBSe program (CULI ZOO) and the evaluation of the effectiveness of the program.

The experiment was based on quasi-experimental research design. The study was conducted with two groups of sophomores who enrolled the English for Veterinary Profession I course in 2014 (98 students) and 2015 (111 students). The students in 2014

were in the control group, who were not exposed to CULI ZOO, while those in 2015 were in the experimental group and exposed to CULI ZOO. Both groups took the same pretest. The students' scores from the midterm and final examinations served as the posttest scores. Also, both groups were exposed to the same cookbook, syllabus, and assessment. After the students in the experimental group finished playing CULI ZOO, they were asked to do the questionnaires and some of them were randomly chosen to be interviewed. The scores from their pretest and posttest as well as the total scores from CULI ZOO were compared. In addition, the responses from the questionnaires and the semi-structured interviews were analyzed using content analysis.

CHAPTER FOUR

RESEARCH FINDINGS

In this chapter, the students' pretest and posttest scores in both groups were quantitatively compared using the SPSS Program. Moreover, the students' responses from the questionnaires and the semi-structured interviews were qualitatively and quantitatively analyzed. The findings are presented based on the research hypotheses.

Hypothesis 1: The posttest mean score of the students, who are exposed to the GBSe program, is significantly higher than that of the students who are not exposed to the GBSe program.

To test the hypothesis, the scores obtained from the posttest scores of the control and experimental groups were compared in terms of descriptive statistics: minimum scores, maximum scores, means scores, and S.D. Also, to analyze the differences between the posttest scores of the students in 2014 and those in 2015, *Independent Samples t-test* was implemented. The findings are presented in the following table.

Table 4.1: Statistics of the posttest scores of the students in the control group and the experimental group

	N	Min	Max	Mean	S.D.	t	P
Control Group (2014)	98	30.00	71.00	49.82	10.38	-1.9899	0.04793
Experimental Group (2015)	111	31.00	74.00	52.71	10.55		

Apparently, on average, the posttest scores of the control and experimental groups are significantly different at the level of 0.05, $t(204.57) = -1.9899$, $p = 0.04793$, 95% CIs = [-5.74505, -0.02650]. This means that the mean score of the experimental group (52.71) is statistically significantly higher than that of the control group (49.82).

In conclusion, research hypothesis 1 has been accepted. This is to say that the mean scores of the students who were exposed to CULI ZOO were significantly higher than those of the students who were not exposed to CULI ZOO.

Hypothesis 2: The posttest mean score of the students, who are exposed to the GBSe program, is significantly higher than their pretest mean score.

To test the hypothesis, the pretest and posttest scores of the students in the experimental group were analyzed to gain the descriptive statistics. Also, *Paired Samples t-test* was used to determine the differences between their pretest and posttest scores. The statistics is presented as follows.

Table 4.2: Statistics of the pretest and posttest scores of the students in the experimental group (2015)

	N	Min	Max	Mean	S.D.	t	P
Pretest	111	13.50	67.50	41.09	11.34	-6.315	0.000
Posttest	111	31.00	74.00	52.71	10.55		

On average, the pretest and posttest scores of the students in the experimental group is significantly different at the level of 0.05, $t(97) = -6.315$, $p = 0.000$, 95% CIs = [-12.29774, -6.41654].

For the control group, the students' pretest scores were also analyzed using descriptive statistics and *Paired Samples t-test*. The findings are shown as follows.

Table 4.3: Statistics of the pretest and posttest scores of the students in the control group (2014)

	N	Min	Max	Mean	S.D.	t	P
Pretest	98	12.00	69.00	40.35	11.08	-14.061	0.000
Posttest	98	30.00	71.00	49.82	10.38		

On average, the pretest and posttest scores of the students in the control group is significantly different at the level of 0.05, $t(97) = -14.061$, $p = 0.000$, 95% CIs = [-10.80889, -8.13499].

In conclusion, research hypothesis 2 has been accepted. This is to say that the mean scores of the posttest (52.71) of the students who were exposed to CULI ZOO were significantly higher than those of their pretest (41.09). Likewise, the mean scores of the posttest (49.82) of the students who were not exposed to CULI ZOO were significantly higher than those of their pretest (40.35). In other words, the posttest mean scores of the students in both groups were statistically significantly higher than their pretest mean scores.

Hypothesis 3: Students, who are exposed to the GBSe program, are likely to have positive attitude toward the program.

This part concerned with the students’ opinions regarding the implementation of CULI ZOO. The data was obtained from two research instruments: questionnaires and semi-structured interviews. The results from the questionnaires were quantitatively analyzed to test the hypothesis. Also, additional data from the interviews was analyzed to triangulate and confirm the hypothesis.

Findings from the questionnaires

One hundred and eleven students were asked to do the questionnaires after playing CULI ZOO. There were four main parts of the questionnaires.

Part one of the questionnaires related to students’ demographic data. The findings from the students’ responses are presented in the following table.

Table 4.4: Students’ demographic data

1. Gender	Male	Female							
	32 (28.8%)	79 (71.2%)							
2. Age	17 Yrs	18 Yrs	19 Yrs	20 Yrs					
	2 (1.8%)	4 (3.6%)	46 (41.1%)	59 (53.2%)					
3. GPAX	3.501-4.00	3.001-3.50	2.501-3.00	2.001-2.50	1.501-2.00	1.001-1.50	Lower than 1.00		
	12 (10.8%)	66 (59.5%)	26 (23.4%)	7 (6.3%)	-	-	-		
4. Grades for the Experiential English I Course	A	B+	B	C+	C	D+	D	F	
	13 (11.7%)	26 (23.4%)	29 (26.1%)	27 (24.3%)	15 (13.5%)	-	1 (0.9%)	-	
5. Grades for the Experiential English II Course	A	B+	B	C+	C	D+	D	F	
	5 (4.5%)	28 (25.2%)	21 (18.9%)	37 (33.3%)	16 (14.4%)	2 (1.8%)	-	-	

6. How can you evaluate your English skills?	Poor	Moderate	Good	Excellent					
6.1 Listening	29	57	23	2					

	(26.1%)	(51.4%)	(20.7%)	(1.8%)					
6.2 Speaking	32 (28.8%)	58 (52.3%)	20 (18.0%)	1 (0.9%)					
6.3 Reading	9 (8.1%)	65 (58.6%)	35 (31.5%)	2 (1.8%)					
6.4 Writing	33 (29.7%)	58 (52.3%)	17 (15.3%)	3 (2.7%)					
7. You think English is (You can choose more than one answers.)	Difficult	Easy	Necessary for my occupation	Unnecessary for my occupation	Should be one of the compulsory courses of the faculty	Should not be one of the compulsory courses of the faculty			
	65 (58.6%)	14 (12.6%)	104 (93.7%)	0 (0%)	34 (30.6%)	10 (9.0%)			
8. You like studying English.	Yes	NO							
	79 (71.2%)	32 (28.8%)							
9. You like studying English because ... (You can choose more than one answers.)	I like my primary-school English teachers.	I like learning grammar	I like my high-school English teachers.	I like learning reading.	I can have good scores in the exam.	I like learning speaking.	I'd like to contact with foreigners.	I like learning listening.	I think English is beneficial when I work.
	20 (18.0%)	10 (9.0%)	22 (19.8%)	22 (19.8%)	22 (19.8%)	37 (33.3%)	51 (45.9%)	42 (37.8%)	72 (64.9%)
	Other reasons (Please specify.) - I am not good at English, but I consider it beneficial and necessary for my everyday life. (2, 1.8%) - I want to improve my English skills. (1 / 0.9%) - English subjects affect my GPAX. (1 / 0.9%) - I want to play games without consulting a dictionary. (1 / 0.9%) - The teacher is kind. (1 / 0.9%)								
10. You don't like studying English because ... (You can choose more than one answers.)	I don't like my primary-school English teachers.	I don't like learning grammar.	I don't like my high-school English teachers.	I don't like learning reading.	I can't have good scores in the exam even though I have well studied for it.	I don't like learning speaking.	I don't like memorizing vocabulary.	I don't like learning listening.	I don't see benefits of learning English.
	1 (0.9%)	10 (9.0%)	0 (0%)	3 (2.7%)	15 (13.5%)	5 (4.5%)	8 (7.2%)	6 (5.4%)	0 (0%)
	Other reasons (Please specify.) - I lack English skills and time to practice. (1 / 0.9%) - Actually I like English, but the results of the tests always disappoint me. (1 / 0.9%) - I don't like the way of assessment and evaluation of the university: focusing on memorizing. (1 / 0.9%) - I want more speaking activities. (1 / 0.9%) - The tests should be used to assess what the students' have learned, and the results should not be counted for students' grades. (1 / 0.9%)								

N = 111

From the table, the sample group consisted of 111 Veterinary Science sophomores: 35 males and 76 females, aged between 19-20, whose English ability in

this class is in the upper-intermediate to advanced level. Most of them considered their four English skills moderate. Although, most of the students considered English difficult (58.6%), they realized that English is important for their career (93.7%) and should be compulsory in their curriculum (30.6%). The findings also showed that most of them (71.2%) liked studying English. The reason “I think English is beneficial when I work.” ranked first (64.9%). This was followed by “I like learning listening.” (37.8%) and “I like learning speaking.” (33.3%). 28.8% claimed that they did not like learning English. “I can’t have good scores in the exam even though I have well studied for it.”(13.5%) was the main reason these students claimed. Second and third were “I don’t like learning grammar.” (9.0%) and “I don’t like memorizing vocabulary.” (7.2%).

Part two of the questionnaires concerned with the students’ opinions toward the overview of CULI ZOO. The findings from the students’ responses are rearranged based on the mean scores and presented in the following table.

Table 4.5: Students’ opinions toward the overview of CULI ZOO

Items	0 None	1 Poor	2 Fair	3 Good	4. Excellent	Mean	S.D.	Comments
Organization & Design								
Theme / Concept	0 (0%)	3 (2.7%)	18 (16.2%)	60 (54.1%)	30 (27.0%)	3.05	0.737	- The program looks like a program for 3-year-old kids. (1 / 0.9%)
Interest	1 (0.9%)	5 (4.5%)	27 (24.3%)	52 (46.8%)	26 (23.4%)	2.87	0.854	-
Overall	1 (0.9%)	2 (1.8%)	30 (27.0%)	57 (51.4%)	21 (18.9%)	2.86	0.773	-
Layout & Design	0 (0%)	2 (1.8%)	35 (31.5%)	54 (48.6%)	20 (18.0%)	2.83	0.737	- beautiful graphic (5 / 4.5%) - colorful (2 / 1.8%)
Navigation	0 (0%)	4 (3.6%)	43 (3.8%)	52 (46.8%)	12 (10.5%)	2.65	0.722	- The program is not stable. Sometimes it automatically logs out. (1 / 0.9%)
TOTAL MEAN SCORE						2.85	0.7646	

Items	0 None	1 Poor	2 Fair	3 Good	4. Excellent	Mean	S.D.	Comments
Game-based Learning								
Objectives of each game	0 (0%)	1 (0.9%)	14 (12.6%)	50 (45.0%)	45 (41.4%)	3.27	0.713	-
Promoting the player’s English listening skills	1 (0.9%)	3 (2.7%)	10 (9.0%)	59 (53.2%)	38 (34.2%)	3.17	0.773	-
Font Type / Size	0 (0%)	4 (3.6%)	20 (18.0%)	46 (41.4%)	41 (36.9%)	3.12	0.828	- By the end of each game, the item “Mission complete!” appears and it overshadows the answers of the game. (1 / 0.9%)

Variety of games	0 (0%)	6 (5.4%)	22 (19.8%)	47 (42.3%)	36 (32.4%)	3.02	0.863	- I prefer more variety of games. (1 / 0.9%)
Instructions / Rules	0 (0%)	1 (0.9%)	23 (20.7%)	61 (55.0%)	26 (23.4%)	3.01	0.694	-
Goal(s) of each game	0 (0%)	5 (4.5%)	21 (18.9%)	54 (48.6%)	31 (27.9%)	3.00	0.809	-
Repeat Play	0 (0%)	4 (3.6%)	27 (24.3%)	50 (45.0%)	30 (27%)	2.95	0.813	- I can play as many times as I want. (2 / 1.8%) - The first attempt of play each game is recorded in the total score, so I can see my real listening ability. (1 / 0.9%)
Interaction with the player	0 (0%)	6 (5.4%)	45 (40.5%)	41 (36.9%)	19 (17.1%)	2.66	0.826	-
Level of Difficulty	0 (0%)	3 (2.7%)	48 (43.2%)	52 (46.8%)	8 (7.2%)	2.59	0.667	- The level of difficulty is suitable. (1 / 0.9%)
Scoring	2 (1.8%)	8 (7.2%)	42 (37.8%)	47 (42.3%)	12 (10.8%)	2.53	0.851	- A misspelled answer should be scored 0.5. (1 / 0.9%) - The scoring system is not stable. (1 / 0.9%) - In fill-in-the blank tasks, some more answers should be applicable. (1 / 0.9%) - The score from CULI ZOO should not be counted as a part of the total score in this subject. It makes the students stressed, and it seems the students play the game for the grade, not for practicing their English skills. (1 / 0.9%)
Sound / Sound effects	3 (2.7%)	16 (14.4%)	43 (38.7%)	37 (33.3%)	12 (10.8%)	2.35	0.950	- Some background sounds or sound effects (e.g. bird sounds in zone 1) are too loud and interrupt listening of the main content. (11 / 9.9%) - Some accents of the speakers are difficult to understand. (1 / 0.9%) - The sound of some parts is not clear enough. (1 / 0.9%) - It will be good if the background sounds can be turned off. (1 / 0.9%)
Giving feedback of the games	7 (6.3%)	22 (19.8%)	41 (36.9%)	28 (28.5%)	13 (11.7%)	2.16	1.075	- The answer key should be showed right away after submitting the answers. (13 / 11.7%) - The answer key should be presented by the end of every task. (2 / 1.8%) - The explanations of the answer key should be provided for the students by the end of each game. (1 / 0.9%)
TOTAL MEAN SCORE						2.82	0.821	
TOTAL GRAND MEAN SCORE						2.835	0.7925	

From the table, there were two main categories of CULI ZOO that students could comment: organization & design and game-based learning. The questionnaires consisted of seventeen 5-point-Likert-scale items. The students' responses were analyzed using frequency, percentage, mean score, and S.D. Moreover, the comments from the students were analyzed using content analysis. Frequency and percentage were also used to analyze the content. To elicit the students' opinions toward CULI ZOO's organization and design, there were five aspects for the students to evaluate and the findings showed that, on average, the theme/concept (3.05) ranked first, followed by interest (2.87), overall (2.86), layout & design (2.83), and navigation (2.65), respectively. The total mean score of its organization & design was 2.85, showing positive responses.

As for game-based learning category, the top-three high mean scores were objectives (3.27), promoting the player's English listening skills (3.17), and font type / size (3.12), respectively. However, scoring (2.53), sound / sound effects (2.35), and giving feedback of the games (2.16) respectively gained the top-three lowest mean scores. The total mean score of its feature of game-based learning was 2.82, showing positive responses.

However, the total grand mean score of students' opinions toward the overview of CULI ZOO was 2.835. This shows that the overview of CULI ZOO is somewhat good.

Part three of the questionnaires concerned with the students' opinions toward each task of CULI ZOO. The findings from the students' responses are presented in the following table.

Table 4.6: Students' opinions toward each task of CULI ZOO

Items	0 Totally Dislike	1 Dislike	2 Somewhat Like	3 Like	4. Totally Like	Mean	S.D.	Comments
Zone 1: Bird Park								
1: Minimal pairs	1 (0.9%)	2 (1.8%)	26 (23.4%)	63 (56.8%)	19 (17.1%)	2.87	0.740	-
2: Word stress	0 (0%)	3 (2.7%)	30 (27%)	56 (50.5%)	22 (19.8%)	2.87	0.752	- The background sound is too loud and interrupts the listening. (2 / 1.8%)
3. Sentence stress	2 (1.8%)	5 (4.5%)	34 (30.6%)	53 (47.7%)	17 (15.3%)	2.7	0.848	- The background sound is too loud and interrupts the listening. (2 / 1.8%)
TOTAL MEAN SCORE						2.81	0.78	

Zone 2: Animal Shows								
1: Dogs can speak!	0 (0%)	5 (4.5%)	32 (28.8%)	58 (52.3%)	16 (14.4%)	2.77	0.750	- There are too many questions. (1 / 0.9%)
2: The secret language of dolphins	0 (0%)	7 (6.3%)	41 (36.9%)	48 (43.2%)	14 (12.6%)	2.63	0.788	-
3: Interview of a marine mammal trainer	0 (0%)	7 (6.3%)	41 (36.9%)	51 (45.9%)	12 (10.8%)	2.61	0.750	-
TOTAL MEAN SCORE						2.67	0.762	

Game Arcade 1								
Guessing the word stress pattern	0 (0%)	3 (2.7%)	15 (13.5%)	27 (24.3%)	21 (18.9%)	3.00	0.859	- I want to see the answer key. (2 / 1.8%) - Most words get the primary stress on the first syllable. (1 / 0.9%)

Zone 3: Vet Clinic								
1: A talk of a pet's owner and a receptionist	0 (0%)	6 (5.4%)	30 (27%)	47 (42.3%)	27 (24.3%)	2.86	0.810	- I want to see the answers of all questions by the end of the game. (3 / 2.7%) - A misspelled answer might be rewarded. (1 / 0.9%)
2: A talk of a pet's owner and a vet	0 (0%)	5 (4.5%)	35 (31.5%)	50 (45%)	21 (18.9%)	2.78	0.802	- It is a bit difficult. (1 / 0.9%)
3: A talk of a pet's owner and a receptionist	0 (0%)	5 (4.5%)	30 (27%)	53 (47.7%)	23 (20.7%)	2.85	0.800	- This game covers all the content of unit 3 in the textbook. (1 / 0.9%)
TOTAL MEAN SCORE						2.83	0.804	

Zone 4: Museum								
1: The timeline of the Zoo	3 (2.7%)	17 (15.3%)	40 (36%)	35 (31.5%)	16 (14.4%)	2.40	1.003	- The choices are showed according to the sequences of the answer key. The choices should be jumbled. (3 / 2.7%) - The font size in this game is a bit too small. (1 / 0.9%)
2: Locations of the animal cages in the zoo	4 (3.6%)	13 (11.7%)	33 (29.7%)	42 (37.8%)	18 (16.2%)	2.52	1.020	- This game is too difficult. (3 / 2.7%) - The player should have a chance to change their answers until pressing the button "Submit". (2 / 1.8%)
3: Information of extinct animals	6 (5.4%)	12 (10.8%)	34 (30.6%)	37 (33.3%)	21 (18.9%)	2.50	1.090	- There are some technical problems in this game. I can't complete some blanks. (2 / 1.8%) - The answer key should be provided. (2 / 1.8%) - This game is difficult. (1 / 0.9%)
TOTAL MEAN SCORE						2.47	1.037	

Game Arcade 2								
Categorizing the animals into birds, aquatic animals, reptiles, amphibians, or mammals	0 (0%)	3 (2.7%)	21 (18.9%)	38 (34.2%)	28 (25.2%)	3.01	0.828	- It is difficult to drag a word and drop it into the blank. (3 / 2.7%) - The words move so fast that I can't drag all into the correct blank. (3 / 2.7%) - I like this game. (1 / 0.9%)

Zone 5: Aquarium								
1: About dolphins	0 (0%)	4 (3.6%)	48 (43.2%)	48 (43.2%)	11 (9.9%)	2.59	0.718	-
2: About whales	0 (0%)	4 (3.6%)	44 (39.6%)	52 (46.8%)	11 (9.9%)	2.63	0.713	- There are too many technical terms. (1 / 0.9%)
3. Similarities and differences between dolphins and whales	0 (0%)	5 (4.5%)	37 (33.3%)	51 (45.9%)	18 (16.2%)	2.74	0.783	-
TOTAL MEAN SCORE						2.65	0.738	

Zone 6: Wildlife Park								
1: Distinguishing Fact/Opinion	1 (0.9%)	2 (1.8%)	30 (27%)	55 (49.5%)	23 (20.7%)	2.87	0.788	- This game is difficult. (1 / 0.9%)
2: Distinguishing For/Against	0 (0%)	3 (2.7%)	26 (23.4%)	59 (53.2%)	23 (20.7%)	2.92	0.740	- It is difficult. (2 / 1.8%)
3. Categorizing pros& cons of discussion	1 (0.9%)	3 (2.7%)	30 (27%)	53 (47.7%)	24 (21.6%)	2.86	0.814	- The headings of the table should be changed from "pros" and "cons" to "for" and "against". (2 / 1.8%) - It is difficult. (1/ 0.9%)
TOTAL MEAN SCORE						2.88	0.780	

Game Arcade 3								
Animal trivia	1 (0.9%)	8 (7.2%)	32 (28.8%)	44 (39.6%)	14 (12.6%)	2.63	0.864	- This game is very difficult. (1 / 0.9%) - I don't have information of many animals. (1 / 0.9%)

Aqua Shop								
Buying marine animals, supplements, accessories, or medicine for a fish tank.	0 (0%)	9 (8.1%)	22 (19.8%)	39 (35.1%)	35 (94.6%)	2.95	0.944	- Sometimes I bought a shark, but later there is no shark in my fish tank. (1 / 0.9%) - I wish I could myself locate the accessories I bought.

TOTAL GRAND MEAN SCORE						2.79	0.8396	
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Among the six zones, the students, on average, liked zone 6 most (2.88). This was followed by zone 3 (2.83), zone 1 (2.81), zone 2 (2.67), zone 5 (2.65), and zone 4 (2.47), respectively. All in all, the students, on average, tended to like all the six zones (2.79).

Part four of the questionnaires is an open-ended question, asking the students to make suggestions to CULI ZOO. There were 39 students (35.1%) made some suggestions in this part of the questionnaire. The findings from the students' responses have been tallied, categorized, and presented in the following table.

Table 4.7: Students' suggestions to CULI ZOO

Comments	Frequency	Percentage
- The background sound of some games (e.g. zone 1) is such a nuisance. It interrupts the listening.	12	10.8%
- The program is unstable, e.g. Sometimes there are some errors. Sometimes it takes a while to download the program.	8	7.2%
- I want the answer key to be presented by the end of each game.	5	4.5%
- I want to see the tape script.	2	1.8%
- When playing each task, I want to listen more than two times.	1	0.9%
- The button "print screen" is unclickable.	1	0.9%
- For answering each question, I prefer having choices to choose.	1	0.9%
- The teacher should assign to do CULI ZOO only a week before the exam.	1	0.9%
- The scores from CULI ZOO (the total score) should not be counted as a part of the total score of the English for Veterinary Profession I course.	1	0.9%

To summarize, from the questionnaires, the students showed their positive attitude toward CULI ZOO. However, there are some flaws of the program, which were considered for improvement.

Findings from the interviews

Four students from each section were randomly selected to be interviewed after they had completed CULI ZOO. Altogether, there were sixteen students (14.4%) interviewed by the researcher, 4 males (25.0%) and 12 females (75.0%). The interviews were tape-recorded. The responses from the students are presented as follows.

Question 1: Do you like CULI ZOO? Why?

Responses: Yes. (16 /100%) Their reasons were

- It can help practice listening. (16 / 100%)
- The tasks are more or less the same as those in the midterm and final examinations, so I can use it to practice for my exams. (10 / 62.5%)

- It is fun (5 / 31.25%)
- I can play CULI ZOO anywhere and anytime I prefer. (2 / 12.5%)
- It is more motivated than paper-based exercises. (2 / 12.5%)
- Most of the tasks contain many questions that can be randomly presented to the player, so it is challenging and not boring. (1 / 6.25%)

Question 2: Do you think that CULI ZOO should be a part of the students' assessment of the course? Why / Why not?

Responses: Yes. (9 / 56.25%) The reasons were

- It can be used to brush up and prepare for the exams. (4 / 25.0%)
- It is fun. (3 / 18.75%)
- The tasks in CULI ZOO are more or less the same as those in the midterm and final exams. (3 / 18.75%)

No. (7 / 43.75%) The reason were

- It makes me stressed since the score from CULI ZOO affect my grade of this course. (7 / 43.75%)
- I am not good at listening. (3 / 18.75%)

Question 3: Is there anything in CULI ZOO that you do not like or need improvement?

Responses:

- I want the program to show the answer key of every task. (10 / 62.5%)
- I want to see the tape script of every task. (6 / 37.5%)
- There are some errors in the fish tank. For example, when I buy one item, the item does not appear in my fish tank, or sometimes I get other items instead. (3 / 18.75%)
- The teacher should allow the students to play CULI ZOO along the semester, not only a week before the examination. (3 / 18.75%)
- I want to locate the item I buy from the Aqua shop by myself. It will be more fun (1 / 6.25%)

Question 4: Do you think the CULI Zoo is suitable for using as a supplementary material for English for Veterinary I? Why or Why not?

Responses: Yes. (16 / 100 %) However, some students made some suggestions as follows:

- It will be better if the scores will be not be a part of their total score in the course. (2 / 12.5%)

From the interviews, a strong conclusion can be made from the students' interviews that they had positive attitude toward CULI ZOO. Although some students might not want CULI ZOO to be an assignment in the course syllabus, since it affected their grade, they still liked and agreed that CULI ZOO provided them some benefits.

Hypothesis 4: The students' scores from the GBSe program correlate to those from the posttest (the midterm and final examinations).

To test the hypothesis, the Pearson product-moment correlation coefficient was implemented to find out the correlation between the posttest scores of the students in the experimental group and their total scores of CULI ZOO. The findings are presented in the following table.

Table 4.8: Pearson Correlation of the scores between CULI ZOO and Posttest

		CULI ZOO	Posttest
CULI ZOO	Pearson Correlation	1	.345**
	Sig. (2-tailed)		.000
	N	111	111
Posttest	Pearson Correlation	.345**	1
	Sig. (2-tailed)	.000	
	N	111	111

From the table, at the significance level of .01, Pearson correlation of the students' scores from CULI ZOO and those from the posttest is 0.000. This shows that the students' scores from CULI ZOO correlated to those from their posttest.

Moreover, the scores from CULI ZOO and those from their pretest of the students in the experimental group were also compared with the Pearson product-moment correlation coefficient in order to gain their correlation. The findings are presented below.

Table 4.9: Pearson Correlation of the scores between CULI ZOO and Pretest

		CULI ZOO	Pretest
CULI ZOO	Pearson Correlation	1	.266**
	Sig. (2-tailed)		.005
	N	111	111
Pretest	Pearson Correlation	.266**	1
	Sig. (2-tailed)	.005	
	N	111	111

From Table 4.9, Pearson correlation of the students' scores from CULI ZOO and those from the pretest is 0.005, at the significance level of .01. It is clear that the students' scores from CULI ZOO correlated to those from their pretest.

To sum up, the students' scores from CULI ZOO correlated to those from posttest and those from pretest.

Summary

This chapter presented the findings of the evaluation of the effectiveness of the GBSe program (CULI ZOO). After CULI ZOO had been developed, the experts' validation in terms of IOC and their comments all agreed that CULI ZOO is suitable for implementation in the English for Veterinary Profession I course.

According to *Independent Samples t-test*, the results showed that the students' posttest mean scores in both the control and experimental groups were significantly different. Therefore, the scores of the students who were exposed to CULI ZOO were significantly higher than those of the students who were not exposed to CULI ZOO. Research hypothesis one has been accepted accordingly.

In the experimental group, the statistical value showed a significant difference of the mean scores between the pretest and posttest. It is clear that the posttest mean score of the students was statistically significantly higher than their pretest mean score. Thus, research hypothesis two has been accepted.

With regard to the students' attitude, findings from the questionnaires and the semi—structured interviews showed a positive degree of satisfaction toward CULI ZOO and provided some useful suggestions to CULI ZOO. Consequently, research hypothesis three has been accepted.

With the *Pearson product-moment correlation coefficient* showed correlation between the students' scores from CULI ZOO and posttest. Likewise, the students' scores from CULI ZOO and pretest also showed correlation. Therefore, research hypothesis four has been accepted.

CHAPTER FIVE

SUMMARY, DISCUSSIONS, AND RECOMMENDATIONS

This chapter consists of three parts. The first part begins with a brief summary of the study. It reviews the research objectives, the research hypotheses, the research design, the research procedure, and the research findings. The second part relates to the conclusions that discuss the interpretation of the findings. The fourth part provides the implications drawn from the study. The last part presents recommendations for further research.

Summary of the Study

1. Research objectives

The objectives of the study were

- 1.1 to develop an effective game-based supplementary e-learning (GBSe) program for English for Veterinary Profession I,
- 1.2 to investigate the effectiveness of the GBSe program,
- 1.3 to explore the students' attitudes toward the GBSe program for English for Veterinary Profession I, and
- 1.4 to find out the correlation between the students' listening ability from the midterm and final examinations and that from the GBSe program.

2. Research hypotheses

To evaluate the effectiveness of the GBSe program (CULI ZOO), the hypotheses are proposed as follows:

- 2.1 The posttest mean score of the students, who are exposed to the GBSe program, is significantly higher than that of the students who are not exposed to the GBSe program.
- 2.2 The posttest mean score of the students, who are exposed to the GBSe program, is significantly higher than their pretest mean score.
- 2.3 Students, who are exposed to the GBSe program, are likely to have positive attitude toward the program.
- 2.4 The students' scores from the GBSe program correlate to those from the posttest (the midterm and final examinations).

3. Research design

This study is developmental and experimental research. The main purposes are to develop a GBSe program, called CULI ZOO, as a supplement for the English for Veterinary Profession I course so that the students can use this program to review the lessons and study for the examinations and to evaluate the program. To evaluate the effectiveness of the program, the quasi-experimental design was implemented for comparing the students' posttest scores between the experimental group—receiving an exposure to CULI ZOO—and the control group—not receiving an exposure to CULI ZOO. Also, the students' scores from the posttest were compared with those from the pretest. Moreover, questionnaires and semi-structured interviews were employed to elicit students' attitude toward the program. Last but not least, the students' scores from the posttest and from CULI ZOO were analyzed to obtain correlation value.

4. Research procedure

The procedure of this research consisted of two main phrases. The first one was the development of the GBSe program, namely CULI ZOO, as a course supplement for the English for Veterinary Profession I course. The other was the evaluation of the effectiveness of the program.

4.1 Phrase I: The development of the GBSe program

There were two sub-phrases here: task design and program development. In sub-phrase one, a zoo as a setting, the tasks were designed. There were six zones in the program, based on six units in the main coursebook of the English for Veterinary Profession I course. Each zone contained three tasks. In every two zones, a game in the game arcade was presented for the player to relax and collect CULI dollars. The design of the tasks in each zone followed the game-based learning framework (Egenfeldt-Nielsen, 2005), consisting of three main aspects: learner objectives, teaching approaches, and learner outcomes. After all the tasks had been designed, three experts in ELT were asked to validate the tasks. Some modifications were made according to their comments.

In sub-phrase two, the GBSe-program was developed. It was called CULI ZOO. Once a student logs in CULI ZOO, he/she has to choose a fish tank. Scores in the zoo are rewarded to correct answers and kept in two ways: *CULI dollars* and *Total Score*. Each correct answer gains one CULI dollar. Three bonus scores are rewarded for a difficult question and ten bonus scores when the player can correctly

answer all questions in a task. Upon completion of each task, the student can spend CULI dollars buying fish and accessories in *AQUA Shop* for his/her fish tank. However, although students may repeat the tasks innumerable times, only scores from the first attempt are counted and logged into the system. Those scores are collected as *total score*. After the program had been developed, three experts in ELT were asked to validate the program. A revision was later made based on their comments. After that, a group of 30 vet students, who enrolled the English for Veterinary Profession I course in semester one of the academic year 2014, were asked to join a pilot study of CULI ZOO. After that, modification was made according to their comments.

4.2 Phrase II: The evaluation of the effectiveness of the program

Ninety-eight sophomores, who enrolled English for Veterinary Profession I in academic year 2014, served as the control group of this study while 111 sophomores, who enrolled English for Veterinary Profession I in academic year 2015, served as the experimental group. Both groups did the same pretest. *Independent Samples t-test* was used to analyze the pretest scores of both groups to ensure that they were comparable. The students in the experimental group had an opportunity to be exposed to CULI ZOO a week before they took the midterm examination and a week before the final examination. The scores from the midterm and final examinations served as the posttest scores of this study.

To analyze the data, both qualitative and quantitative approaches were taken into consideration. *Independent Samples t-test* was implemented to analyze the students' mean scores of the posttest between both groups. Moreover, *Paired Samples t-test* was employed to analyze the students' mean scores of the pretest and posttest in the experimental group. The data from the questionnaires and the interviews were analyzed by content analysis using frequency and percentage. Also, the *Pearson product-moment correlation coefficient* was implemented to find out the correlation between the posttest scores of the students in the experimental group and their total scores of CULI ZOO. Finally, the research findings and the hypothesis test were concluded.

5. Research findings

The findings were presented according to the research hypotheses. The findings from the hypothesis test indicated the effectiveness of CULI ZOO as follows:

5.1 The mean scores of the students who were exposed to CULI ZOO and those of the students who were not exposed to CULI ZOO were significantly different at the level of 0.05.

5.2 The posttest mean scores of the students who were exposed to CULI ZOO and their pretest mean scores were significantly different.

5.3 Overall, the students in the experimental group, being exposed to CULI ZOO, had positive attitude toward CULI ZOO, according to the findings from the questionnaires and the interviews.

5.4 In the experimental group, the scores from the posttest correlated to their total scores from CULI ZOO.

Discussions

After CULI ZOO had been developed, proposed, verified, and administered to the students, the effectiveness of CULI ZOO was showed. The findings of research entitled “A Development of a Game-based Supplementary E-learning Program for English for Veterinary Profession I” are going to be discussed on two main aspects: CULI ZOO per se and its effectiveness.

1. CULI ZOO

CULI ZOO was designed based on the assumption that when combined instructional designs with fun elements, the material enhances learning (Lepper and Cordova, 1992). The purpose of this “edutainment” e-learning program is to attract and hold attention of the students by engaging the students’ emotions via vividly colored animations and interactive pedagogy.

Based on the responses from the questionnaires and the interviews, the students had positive attitudes toward CULI ZOO and considered it an alternative supplement of the course which was better than dry paper-based supplements and learning materials. Although many people believe that computer has created many positive impacts and developments into learning (Pitler et al., 2007; Li and Liu, 2007; Paris, 2004). Okan (2003) highlighted one unforeseen danger of using computer technology into education that the students who were heavily exposed to the Internet or video games could develop a new attitude towards learning: learning must be fun and entertainment, and if learners are not enjoying themselves, they may suppose that they are not learning (Bloom and Hanych, 2002). Therefore, when encountered with this

change in students' attitudes toward learning, a number of teachers may hurriedly employ new technology into their classrooms in order to satisfy their students (Okan, 2003). As a consequence, when using computer technology in the classroom, the teacher must be aware of and use it in an appropriate way, not just "a harmful additive to the educational diet" that momentarily conceal bad taste that students have toward learning (Okan, 2003). However, CULI ZOO has been developed to "supplement the face-to-face learning" (Hong et al., 2001: 224), not replace the teacher.

Furthermore, CULI ZOO has been developed to promote learner autonomy since a student can log into the program anywhere and anytime as far as he/she can access the Internet. According to the findings from the students' comments in the questionnaire and the interviews, after playing each task/game in CULI ZOO, they want the program to provide the answer key for the player. However, the computer will show only the symbol \surd or X. After discussed with the students during the interviews, the students all agreed that if the program showed the answer key for each question, they would not play the game again and again. They also commented that if they did not know the correct answer of the question, they would repeat playing the game. Similarly, the students' complained and commented in the questionnaires and during the interviews that they needed to see audio script. They needed an audio script to be presented in the program. However, after discussing, they all agreed that if they read the audio script, they would know the correct answers of the question and it would not tempt them to play the game again and again. Therefore, a consensus was all set that the audio script of the task would not be presented in the game. Also, the symbol of \surd or X would be showed in order to hint the students. Accordingly, the students can play the game as many times as they prefer. This can challenge and motivate the students to learn by themselves.

Besides, students' comments in the questionnaires and interviews can be categorized into two groups: the program system and the game content. The main comments are primarily on the program system. The program stability and the background sound were adjusted and developed. Also, the scoring of the game system was modified. However, some comments could not be made. For example, the students themselves would like to locate the accessories they buy for the fish tank. Due to the limitation of the budget, this cannot be made. Regarding the content, there are a few

comments. For instance, some tasks are too easy. According to the interviews, the easier tasks are in the game arcade. The main purpose of the tasks in the game arcade is for fun and relaxation. Therefore, those tasks still exist. Moreover, some tasks are too difficult for some students. Due to a number of students, there is a variety of students' listening performance. Therefore, a high-ability student may consider a task easy while a low-ability student may think it is difficult. Also, the Input Hypothesis (Krashen, 2003)--learners improve their learning abilities when they get second language 'input' that is one step beyond their current stage of linguistic competence--plays an important role in designing the tasks of CULI ZOO. Hence, the tasks in CULI ZOO starts from the easier ones to the more difficult ones in order to challenge students and promote their learning achievement.

2. The effectiveness of CULI ZOO

From the research findings analyzed by the t-test, it obviously showed that the students' learning ability in the experimental group increased after they had been exposed to CULI ZOO. However, although the students in the control group who were not exposed to CULI ZOO rose, the increase of the students' learning ability in the experimental group was statistically significant when compared with that in the control group. This can be claimed that CULI ZOO could help the students increase their listening ability.

In addition, from the findings, the students' total scores from CULI ZOO showed a significant correlation to their scores from the posttest. To confirm the findings, their total scores from CULI ZOO also demonstrated a significant correlation to their scores from pretest. Since the pretest and posttest were constructed based on the same test specification, the findings could interpreted that the students can use their total scores from CULI ZOO (the scores from their first attempt of playing each task) to predict their achievement of the course. If a student gets a high total score in CULI ZOO, it is likely that he/she will get a high score in their midterm and final examinations, and vice versa. Besides, after the implementation with the students, the researcher found that the total score of a student in each task and each zone should be presented to him/her. Thus, the research decided to give the score of each task and each zone to the students after they finish playing all tasks so that they can know their potential and study for the examinations.

Figure 5.1: A sample of a student's score sheet

Score Board Of satita satita ✖

Culi Point : 615 || Ist Score Summary: 48

Zone	Game	Task	Name	1st Score
1	1	Task 1	Minimal Pairs	6
1	2	Task 2	Word Stress	7
1	3	Task 3	Sentence Stress	-
2	4	Task 1	A Dog Show	0
2	5	Task 2	A Dolphin Show	3
2	6	Task 3	The Marine Mammal Trainer	3
3	7	Game 1	Game 1	0
4	8	Task 1	Taking the patient's history	4
4	9	Task 2	Taking notes for the diagnosis	1
4	10	Task 3	Collecting the medication and making the payment	2
5	11	Task 1	The CULI Zoo Timeline	0
5	12	Task 2	Locations of endangered-animal cages	13
5	13	Task 3	Information of extinct animals	0
6	14	Game 2	Game 2	0
7	15	Task 1	General Information about Dolphins	0

Implications

CULI ZOO was designed to serve the needs of both teachers and students. For teachers, CULI ZOO may primarily be utilized to supplement the course; it can be used for the teachers to assign the students to review the lessons learned and study for the examinations. CULI ZOO has not been designed to replace face-to-face teaching, but enliven the content of the textbook-based course. Also, CULI ZOO can be used to assess what has been covered in the course. For example, teachers may evaluate the students' concrete knowledge, comprehension, and application abilities, which are the desired terminal outcomes of the course. The GBSe program may be seen as a solution to the obstacles faced by teachers previously when using paper-based supplements. It may be a way for teachers to encourage learner autonomy. This is because, according to the research findings, the students showed their positive attitudes toward and saw benefit of CULI ZOO. Therefore, the teacher may assign CULI ZOO to the students at the beginning of the course, and they can play CULI ZOO anywhere and anytime along the semester.

For students, CULI ZOO may draw students' attention and motivate them to utilize the program as supplementary practice for the content covered in their face-to-face course. CULI ZOO promotes learner autonomy, as the students can complete the

tasks anywhere, and anytime, as long as they have access to a computer. They may choose to do as much or as little as they desire, as the scores are recorded by the program. They can return to the program at any time and pick up where they left off. Moreover, the students may use their total scores gained from CULI ZOO to evaluate their readiness for their midterm and final examinations since, from the research findings, the total scores from CULI ZOO showed correlation to the students' midterm and final scores (posttest scores). It can be an alternative tool to assess and evaluate their course achievement.

CULI ZOO fits the criteria for edutainment, and thus, it may be predicted that students will have more positive attitudes towards learning English (Nimitvilai, 2008; Phanarangsarn, 2000). They will likely have fun (Buckingham & Scanlon, 2000). Their motivation is likely to increase, as they are engaged in rich, interesting learning experiences (Okan, 2003). Setzer and Monke (2001) likened the use of computers to the introduction of an artificial sweetener, to decrease the bitterness of the medicine of learning.

Recommendations for Further Research

CULI ZOO is CULI's first foray into a fully-integrated technological edutainment learning experience. There are a number of recommendations for further research. First of all, this kind of GBSe program can be developed and utilized for other types of English for Specific/Academic Purposes (ESP/EAP) courses and content-based courses. Also, the effectiveness of the developed GBSe programs for many courses can be investigated and compared to obtain the students' overall attitudes and opinions. Next, various task types or activity types should be added to CULI ZOO to provide variety, provide challenges, and stimulate learner interest. Moreover, using a variety of task types will help the course appeal to and help learners of different learning styles. Another needed component is an area to provide activities to improve speaking skills.

Conclusion

Modern students (or Net Gen learners) require learning options that are congruent with the fast-paced world in which they live--though the medium of instruction may be changed, the need for skills has not been altered. Thus, it is up to teachers to choose and find new, alternative instructional modes to meet the needs of

students and to optimize the teaching and learning experience. Technology and edutainment are based on similar assumptions and they are state-of-the-art solutions for the question, “How do I help my students to learn?” How they are utilized, however, is very much dependent on the desired educational outcomes. The development of CULI ZOO took into consideration various desired instructional goals, and these informed the final product – the Game based Supplementary e-learning course. A game-based e-learning program like CULI ZOO can be an alternative tool developed to “supplement the face-to-face learning” (Hong et al., 2001: 224) seeing that game-based learning is now considered as an alternative pedagogy, adaptable for Net Gen learners (Sanchez, 2011). Game based learning has been shown to increase students’ learning ability (Kerans, 2005), promote learner autonomy (Sanchez, 2011), motivate the students to learn (Batsun & Feinberg, 2006), and engage students in a meaningful, interactive environment of learning (Klopfer, et al., 2009). CULI ZOO is yet another edutainment instructional alternative for teachers and learners, to be used to assist in the optimization of learning for English for Veterinary Profession I.

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APPENDIX 1

A Sample of Task/Game Design

Zone 3: Vet Hospital (Talking to the Pet's Owner)

Objectives	By the end of the unit, the students are able to 1. Taking a patient's history 2. Taking the patient's information
Zone Introduction	🔊 <i>“Welcome to the Vet Hospital. If your animals or your pets are sick or have any health problems, you can bring them here. We have professional veterinarians and nurses to help you”</i>

Task 1: Taking the patient's history

Learning

Objectives	Students can analyse the listening text and correctly take the patient's information by completing the client form.
Setting	At a receptionist counter in the Vet Hospital
Mission Introduction	🔊 <i>“An old man brought her pet to the Vet Hospital. He is having a talk with a receptionist.”</i>
Mission Instruction	🔊 <i>“During the talk, the old man has to complete a client form, but he hasn't brought her eyeglasses along. Can you help him complete this form?” You can listen to their conversation twice. Before you start, you have one minute to look through the form, and after listening, you have one minute to finish your task.”</i>
Expected Outcomes	The students can analyse the listening text and take the patient's information by completing the client form.

Instruction

Game Explanations	At the reception counter in a Vet Hospital, an old man is talking to a receptionist. There is a client form for the player to complete. The player has to type in the blanks on the form. Before starting listening, the player has one minute to look through the form, and after listening he/she has one more minute to complete the task. It is allowed to listen to the conversation twice at most. When the player types or clicks on the answers, the letters (answers) are in blue colour. Also, the answers given on the sheet are in blue. Other letters on the sheet are in black.
Content: There is a button 🔊 for the student to click when he/she is ready for listening. The student can listen twice at most.	<p>🔊 <i>Receptionist: Good afternoon mister, how can I help you today?</i></p> <p><i>Jacob: Something is wrong with my cat. I would like to see a vet please.</i></p> <p><i>Receptionist: Do you have a record at this hospital?</i></p> <p><i>Jacob: Yes, my name is Jacob Fox, spelling J-A-C-O-B Fox, like the animal “fox”. My home phone number is 02-9524-2000 any my mobile phone number is 04-8124-9119. It should be in the system. My pet ID number is 365.</i></p>

	<p><i>Receptionist:</i> OK. Let me look up your information quickly. Ah yes, here it is. May I reconfirm your address? It is 40 Shepherd Street, Chippendale, Sydney, New South Wales. Right?</p> <p><i>Jacob:</i> Right!</p> <p><i>Receptionist:</i> Oh, what is your post code? There is no post code provided in your database.</p> <p><i>Jacob:</i> 2008.</p> <p><i>Receptionist:</i> What is your e-mail address?</p> <p><i>Jacob:</i> I just got my e-mail address. It is jf6543@yahoo.com.au.</p> <p><i>Receptionist:</i> All right! Now we've got all of your information. May I confirm that your pet is a female Persian cat? And her name is Annie.</p> <p><i>Jacob:</i> That is correct. Dr. Robertson is the vet who treated Annie last time.</p> <p><i>Receptionist:</i> Doctor Robertson is currently on a holiday in Hong Kong. Doctor Sue is covering for him. Is that ok?</p> <p><i>Jacob:</i> Yes sure.</p> <p><i>Receptionist:</i> Could you take Annie to diagnosis room No. 2A on the ground floor? Doctor Sue will be with you in a moment.</p>
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OWNER / PET INFORMATION SHEET

Owner information

Name 1) _____

Telephone No. (Home) 2) _____

Telephone No. (Mobile) 3) _____

Address 4) _____ Shepherd St., Chippendale, 5) _____

NSW

Post code 6) _____

E-mail address 7) _____

Pet information

ID Number 8) _____
Species feline
Breed 9) _____
Name 10) _____
Sex 11) _____


Veterinarian

Doctor on duty 12) _____
Diagnosis room 13) _____

Answer Key (13 answers)	<ol style="list-style-type: none">1. Jacob Fox2. 02-9524-20003. 04-8124-91194. 40 (forty / Forty)5. Sydney6. 2008 (two thousand and eight / two thousand eight)7. jf6543@yahoo.com.au8. 365 (three six five)9. Persian10. Annie (Anny)11. Female (female)12. Sue (Dr. Sue / Doctor Sue)13. 2A (2a / two A / Two A / two a / Two a)
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Assessment

Feedback	After each listening, the player has one minute to do the task. After the second listening, he/she clicks on the button “Answer Key”, and then the feedback of the correct answers will be shown.
Debriefing	<ul style="list-style-type: none">- One correct answer equals one CULI dollar.- If all answers are correct, the player gets 10 CULI dollars as a bonus.

Notes: The icon  shows the spoken scripts.

APPENDIX 2

The Questionnaire for the Experts CULI ZOO

PART 1

Directions: Answer all of the following questions based on your opinions by marking X in the box.

Pedagogical Usability

1. Acceptability (students, teachers, institution)

		0	1	2	3	4	5	
1.1	The content is not accurate.							The content is accurate.
1.2	The content does not fit the experience of the students.							The content fits the experience of the students.
1.3	The content does not fit the characteristics of the students (age, prior knowledge, etc.).							The content fits the characteristics of the students (age, prior knowledge, etc.)
1.4	The content is not relevant to the learning objectives / curriculum.							The content is relevant to the learning objectives / curriculum.
1.5	Not integrated into teaching-learning framework							Integrated into teaching-learning framework

2. Usability (scaffolding, technology, pedagogy)

		0	1	2	3	4	5	
2.1	The time devoted to learning how to use the game is not reasonable.							The time devoted to learning how to use the game is reasonable.
2.2	The time allocated for each task is not proper.							The time allocated for each task is proper.
2.3	The game does not provide guidance and affordance.							The game provides guidance and affordance.
2.4	The game does not provide clear and relevant feedback.							The game provides clear and relevant feedback.
2.5	Help is not available for the students.							Help is available for both teachers and the students.

3. Utility (didactics)

		0	1	2	3	4	5	
3.1	The game is not suited to the pedagogical approach of the teacher: Behavioural Model (drills and practice) and Constructivism Model (students exploring and building their own knowledge).							The game is suited to the pedagogical approach of the teacher: Behavioural Model (drills and practice) and Constructivism Model (students exploring and building their own knowledge).
3.2	By playing the game, the students cannot improve their English language skills.							By playing the game, the students can improve their English language skills.
3.3	By playing the game, the students cannot develop relevant competencies (e.g. problem-solving skills).							By playing the game, the students can develop relevant competencies (e.g. problem-solving skills).

Additional Comments

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General Usability

1. Motivation (Competence)

		0	1	2	3	4	5	
1.1	Goals: unclear							Goal: clear
1.2	Level of difficulty: too high or too low							Level of difficulty: adapted
1.3	Unawareness of achievement							Constant awareness of achievement
1.4	Not motivating challenge							Motivating challenge (Cognitive challenge)

2. Motivation (Autonomy)

		0	1	2	3	4	5	
2.1	The range of choices within the game is narrow.							The range of choices within the game is wide.
2.2	Strategy is imposed by the game.							Strategy can be chosen.
2.3	Students cannot monitor and record their own process.							Students can monitor and record their own process.
2.4	Students cannot receive suitable feedback.							Students can receive suitable feedback.
2.5	No rewards for each task							Rewards for each task

3. User-friendly & Navigation

		0	1	2	3	4	5	
3.1	Not user-friendly							User-friendly
3.2	Unclear rules							Clear rules
3.3	Not sure about what action to take in the game at each stage							Feel sure about what action to take in the game at each stage
3.4	Unclear visual design that supports predictability/usability							Clear visual design that supports predictability/usability

4. Game environment

		0	1	2	3	4	5	
4.1	No humour							Humour
4.2	Unattractive interface							Attractive interface
4.3	No fantasy elements							Fantasy elements
4.4	No element of surprise							Element of surprise

5. Progress through the game

		0	1	2	3	4	5	
5.1	Beginning of the game: not clear							Beginning of the game: clear
5.2	End of the game: not clear							End of the game: clear
5.3	No summary of progress							Summary of progress

Additional Comments

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APPENDIX 3

แบบสอบถามความคิดเห็นของนิสิตปีที่ 2 คณะสัตวแพทยศาสตร์ จุฬาลงกรณ์มหาวิทยาลัย
ต่อการใช้เกมภาษาอังกฤษ CULI ZOO

คำสั่ง: กรุณาเลือกคำตอบที่ตรงกับความคิดเห็นของท่าน และใส่ข้อเสนอแนะ (ถ้ามี)

ตอนที่ 1: ข้อมูลส่วนตัว

1. เพศ: ชาย หญิง
2. อายุ: 16 ปี 17 ปี 18 ปี 19 ปี 20 ปี
3. เกรดเฉลี่ย: 4.00– 3.501 3.50– 3.001
 3.00– 2.501 2.50– 2.001
 2.00– 1.501 1.50– 1.001
 ต่ำกว่า 1.00
4. เกรดรายวิชา Experiential English I: A B+ B C+ C D+ D F
5. เกรดรายวิชา Experiential English II: A B+ B C+ C D+ D F
6. ท่านประเมินความสามารถทางภาษาอังกฤษของท่านในแต่ละด้านต่อไปนี้ได้อย่างไร
- | | | | | |
|----------|--------------------------------|-----------------------------|----------------------------------|--|
| การฟัง | <input type="checkbox"/> ดีมาก | <input type="checkbox"/> ดี | <input type="checkbox"/> ปานกลาง | <input type="checkbox"/> ยังต้องปรับปรุง |
| การพูด | <input type="checkbox"/> ดีมาก | <input type="checkbox"/> ดี | <input type="checkbox"/> ปานกลาง | <input type="checkbox"/> ยังต้องปรับปรุง |
| การอ่าน | <input type="checkbox"/> ดีมาก | <input type="checkbox"/> ดี | <input type="checkbox"/> ปานกลาง | <input type="checkbox"/> ยังต้องปรับปรุง |
| การเขียน | <input type="checkbox"/> ดีมาก | <input type="checkbox"/> ดี | <input type="checkbox"/> ปานกลาง | <input type="checkbox"/> ยังต้องปรับปรุง |
7. ท่านคิดว่าวิชาภาษาอังกฤษ (ตอบได้มากกว่า 1 คำตอบ)
- | | |
|---|--|
| <input type="checkbox"/> ยาก | <input type="checkbox"/> ง่าย |
| <input type="checkbox"/> จำเป็นต่อการประกอบอาชีพของผู้เรียน | <input type="checkbox"/> ไม่จำเป็นต่อการประกอบอาชีพของผู้เรียน |
| <input type="checkbox"/> ควรเป็นวิชาบังคับของคณะ | <input type="checkbox"/> ไม่ควรเป็นวิชาบังคับของคณะ |
8. ท่าน
- ชอบเรียนรายวิชาภาษาอังกฤษ
- เพราะ (ตอบได้มากกว่า 1 คำตอบ)
- | | |
|--|---|
| <input type="checkbox"/> ชอบผู้สอนตอนเรียนชั้นประถม | <input type="checkbox"/> ชอบเรียนไวยากรณ์ |
| <input type="checkbox"/> ชอบผู้สอนตอนเรียนชั้นมัธยม | <input type="checkbox"/> ชอบเรียนการอ่าน |
| <input type="checkbox"/> สามารถทำคะแนนสอบได้ดี | <input type="checkbox"/> ชอบเรียนการพูด |
| <input type="checkbox"/> อยากติดต่อกับชาวต่างประเทศ | <input type="checkbox"/> ชอบเรียนการฟัง |
| <input type="checkbox"/> คิดว่ามีประโยชน์ต่อการทำงาน | |
| <input type="checkbox"/> อื่นๆ (โปรดระบุ) _____ | |
- ไม่ชอบเรียนรายวิชาภาษาอังกฤษ
- เพราะ (ตอบได้มากกว่า 1 คำตอบ)
- | | |
|--|--|
| <input type="checkbox"/> ไม่ชอบผู้สอนตอนเรียนชั้นประถม | <input type="checkbox"/> ไม่ชอบเรียนไวยากรณ์ |
| <input type="checkbox"/> ไม่ชอบผู้สอนตอนเรียนชั้นมัธยม | <input type="checkbox"/> ไม่ชอบเรียนการอ่าน |
| <input type="checkbox"/> ไม่ชอบท่องศัพท์ | <input type="checkbox"/> ไม่ชอบเรียนการพูด |
| <input type="checkbox"/> ไม่เห็นประโยชน์ของการเรียนรายวิชานี้ | <input type="checkbox"/> ไม่ชอบเรียนการฟัง |
| <input type="checkbox"/> คะแนนสอบไม่ดี แม้ว่าจะพยายามทบทวนสิ่งที่จะสอบอย่างเต็มที่แล้ว | |
| <input type="checkbox"/> อื่นๆ (โปรดระบุ) _____ | |

ตอนที่ 2: ความคิดเห็นโดยรวมต่อ CULI ZOO

หัวข้อ	0 ไม่ดีเลย ไม่มีเลย ไม่ชอบเลย	1 ไม่ดี ไม่มี ไม่ชอบ	2 ดีบ้าง มีบ้าง ชอบบ้าง	3 ดี มี ชอบ	4 ดีมาก มีมาก ชอบมาก	ข้อเสนอแนะ
Organization & Design						
รูปแบบ (Layout & Design)						
การใช้งาน (Navigation) ของเกม						
ธีม (Theme) หรือแนวคิด (Concept) ของเกม						
เกมมีความน่าสนใจ (Interest)						
ความรู้สึกโดยรวม (Overall Attitude)						
Game-based Learning						
ความสอดคล้องของวัตถุประสงค์ (Objectives) กับเนื้อหาวิชา						
คำสั่ง (Instructions) และกฎกติกา (Rules)						
เป้าหมาย (Goals) ของเกม						
การมีปฏิสัมพันธ์ (Interaction) กับผู้เล่น						
การส่งเสริมทักษะการฟังภาษาอังกฤษของผู้เล่น						
ความหลากหลาย (Variety) ของเกม						
ระดับความยาก (Level of Difficulty)						
การเล่นซ้ำได้ (Repeat Play)						
ความชัดเจนของขนาดตัวหนังสือ (Fonts)						
ความชัดเจนของเสียง (Sound)						
การให้ feedback กับผู้เล่น (เช่น การให้คะแนนเฉลี่ย)						
การให้คะแนน (Scoring)						

ตอนที่ 3: ความคิดเห็นต่อเกมใน CULI ZOO

หัวข้อ		0 ไม่ชอบ เลย	1 ไม่ชอบ	2 ชอบบ้าง	3 ชอบ	4 ชอบมาก	ข้อเสนอแนะ
Zone 1 Bird Park	1: Minimal Pairs						
	2: Word Stress						
	3: Sentence Stress						
Zone 2 Animal Shows	1: Dogs can speak!						
	2: The secret language of dolphins						
	3: Interview of the marine mammal trainer						
Game Arcade 1: Guessing the word stress pattern							
Zone 3 Vet Clinic	1: A talk of a pet's owner and a receptionist						
	2: A talk of a pet's owner and a vet						
	3: A talk of a pet's owner and a receptionist						
Zone 4 Museum	1: The timeline of the Zoo						
	2: Locations of the animal cages in the zoo						
	3: Information of extinct animals						
Game Arcade 2: Categorizing the animals into birds, aquatic animals, reptiles, amphibians or mammals							

Zone 5 Aquarium	1: About dolphins						
	2: About whales						
	3: Similarities and differences between dolphins and whales						
Zone 6 Wildlife Park	1: Distinguishing Fact / Opinion						
	2: Distinguishing For / Against						
	3: Categorizing for & against arguments of a discussion						
Game Arcade 3: Animal Trivia							
Aqua Shop							

ตอนที่ 4: ข้อเสนอแนะอื่นๆ ต่อ CULI ZOO

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