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A Development of a Game-based Supplementary E-learning Program for *English for Veterinary Profession I*

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Abstract

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 second-year university students in Bangkok, Thailand. This course focuses on improving 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 considered an alternative pedagogy adaptable for Net Gen. The purposes of the study are to develop an effective game-based supplementary e-learning program, called CULI ZOO, for students in *English for Veterinary Profession I* and to evaluate the effectiveness of the program. The study sample was the second-year Veterinary Science students enrolled in the *English for Veterinary Profession I* course in 2014 and 2015. An experimental and a control groups did the same pretest at the beginning of the course. The results from an

Independent Samples t-test, at a significance level of 0.05, confirmed that both groups were comparable. Only students in 2015 were exposed to CULI ZOO. Scores from the midterm and final examinations were used as posttest scores. After the experimental group students finished using CULI ZOO, they completed a set of the questionnaires that elicited their opinions toward CULI ZOO. Sixteen students were randomly selected for interviews. The results obtained from the t-test showed a statistically significant difference in the posttest scores between both groups. Likewise, there was a significant difference between the pretest and posttest scores of the students in the experimental group. The data from the questionnaires and interviews showed that the students in the experimental group had positive opinions toward CULI ZOO. In the experimental group, the students' total scores from CULI ZOO correlated with their scores from the posttest.

Keywords: edutainment, English for veterinary profession, e-learning, gamification, game-based e-learning program, Net Gen learners

Introduction

In teaching languages, including English as a foreign language, 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 an *English for Veterinary Profession I* (ENG VET PROF I), an ESP course, to the second-year Veterinary Science students to enhance their English for specific purposes. This course emphasizes learning by doing rather than only listening to the lecture. Furthermore, other key tenets of teaching are to take into account affect, 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 course. As a consequence, it was deemed necessary to create supplementary materials for students to accomplish the set program objectives. In general, the existing supplements are paper-based, distributed during classes and used at teachers' discretion. As such, they may not motivate students to learn and may not raise their autonomy. The students may have been bored by such non-interactive, uninteresting tasks.

One approach that attempts to alleviate these obstacles to learning is "edutainment". It is the merging of entertainment and education, and is defined by Buckingham and Scanlon (2005: 42) 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". 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), primarily those which focus on improving students' listening and speaking skills in veterinary science context and situations, edutainment was seen as a good fit for the program.

Furthermore, the role of technology and its importance in modern teaching cannot be denied (Watanapokakul, 2015). Students born after 1980 are called Net Generation (or Net Gen) learners (Oblinger & Oblinger, 2005; Howe & Strauss, 2000), and their lives nowadays are surrounded by technology, especially the Internet. 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 was made to develop an e-learning program rather than a more traditional face-to-face 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.

According to a preliminary study (Watanapokakul, 2015), the Veterinary Science students showed their interest in the use of e-learning/online educational games and the belief that those games can help them improve their English skills. Therefore, an idea for a game-based supplementary e-learning program for an ESP course, *English for Veterinary Profession I*, was initiated to help with reviewing lessons learned, increasing students' learning ability, promoting learner autonomy and motivation, and enhancing learning experience.

Literature Review

Nowadays, there are a number of state-of-the-art approaches and strategies used in the language classroom. One of them is "edutainment," derived from two words: "education" and "entertainment" (Singhal & Rogers, 1999). 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" (Rapeepisarn, Wong, Fung & Depickere, 2006: 29). Many EFL/ESL teachers use the concept of edutainment in their classrooms (Schon et al., 2008; Abbott, 2002; Cady, 1995), and as the 21st century progresses, the field of second (or foreign) language pedagogy has become more technology-oriented (Figueroa, 2015). The range of technologies available for use in language learning and instruction has become more varied, and the ways they are implemented in classrooms around the world have become central to language practice. Gamification (including online games and e-learning games) is an alternative used in language

learning and teaching (Lee & Hammer, 2011; Muntean, 2011) to suit the lifestyles of these Net Generation (or Net Gen) learners (Oblinger & Oblinger, 2005). Having come of age in a technology-rich environment, the modern generation of learners act and think in ways vastly different from previous generations (Thorne & Payne, 2005). These digital-age foreign language learners require pedagogy that acknowledges 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 online games.

Apart from increasing students' motivation and authentic communicative practices (Warschauer, 1998), games create a fun environment for students, and even teachers, that can make the learning and teaching process more interesting (Klopfer et al., 2009). Moreover, games promote learner autonomy as they include essential factors for fostering learning autonomy: voluntariness, learner choice, and flexibility (Lee, 1998).

According to Ashraf, Ghanei Motlagh, and Salami (2014), games can be used in both formal and informal contexts for education. In formal contexts, games can be employed to provide stimulation and simulation while, in informal contexts, they can be used in free-time activities as outside-school practices. Moreover, most interactive games give the opportunity to players to participate in communicative activities as they play the game. Therefore, the players have to use language and accordingly, learn it in order to play the game (Watanapokakul, 2015; Sørensen & Meyer, 2007).

It is clear that online games can be an optimal tool for language learning and teaching in the 21st century and can promote education in the entertainment milieu. A key supposition underlying the use of interactive online games in language classrooms is that games provide students a hypothetical environment in which they can explore different options without the risk of failure while thought and action are combined into

purposeful behavior to accomplish a goal (Martinson and Chu, 2008: 478).

Research Objectives

This 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' opinions toward the GBSe program for *English for Veterinary Profession I*, and
4. to determine the correlation between the students' listening ability as measured by the midterm and final examinations and the GBSe program.

Statement of Hypotheses

Based on the literature, the hypotheses of the study were set as follows:

1. The posttest mean score of the students who are exposed to the GBSe program will be 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 will be significantly higher than their pretest mean score.
3. Students who are exposed to the GBSe program will have positive opinions toward the program.
4. The students' scores from the GBSe program correlate with those from the posttest (the midterm and final examinations).

Research Methodology

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

Research Procedure

Two main phases of the research procedure are presented as follows:

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

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

In sub-phase 1, the literature regarding serious games and online games will first be reviewed. Students' opinions toward online games will also 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 GBSe program contents were drawn from the coursebook entitled the *English for Veterinary Profession I* developed by CULI. There are six units in the program, focusing on improving the students' listening and speaking skills, which are 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 in the midterm and final examinations. The latter is based on five assignments by the end of units three to six.

In developing the e-learning program, to supplement the ENG VET PROF I course, the content of each of the six mentioned units of the coursebook was 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 was 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 through listening, reading, and writing. Speaking is not yet possible on this platform. Since the

course is for veterinary science students, the GBSe program was designed using a zoo as a setting. The GBSe program is thus 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 frameworks and a consideration of the grouped game elements and instructional categories, Van Staalduinen and de Freitas (2011) have combined all they reviewed and integrated it into a new game-based learning conceptual framework within a constructivist perspective. This is presented in Figure 1.

Figure 1: The game-based learning framework

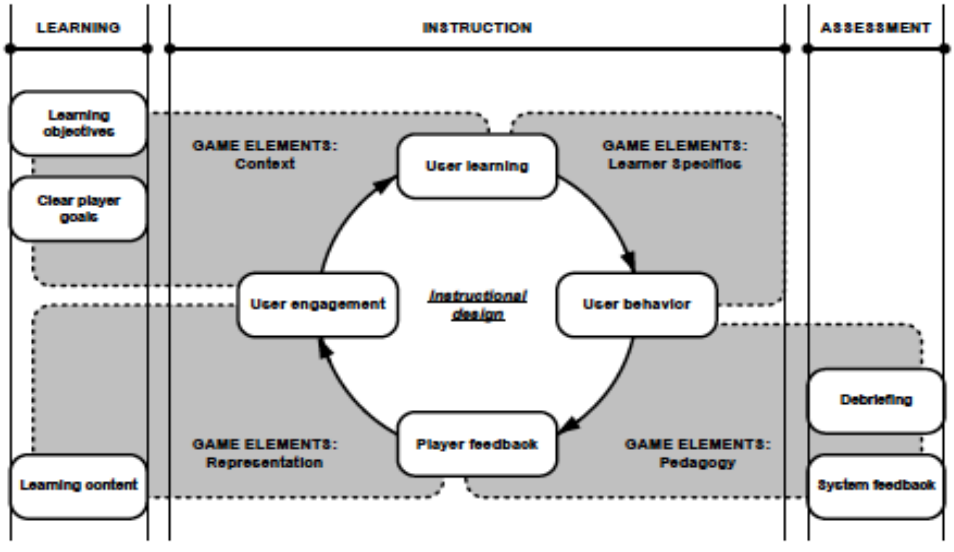


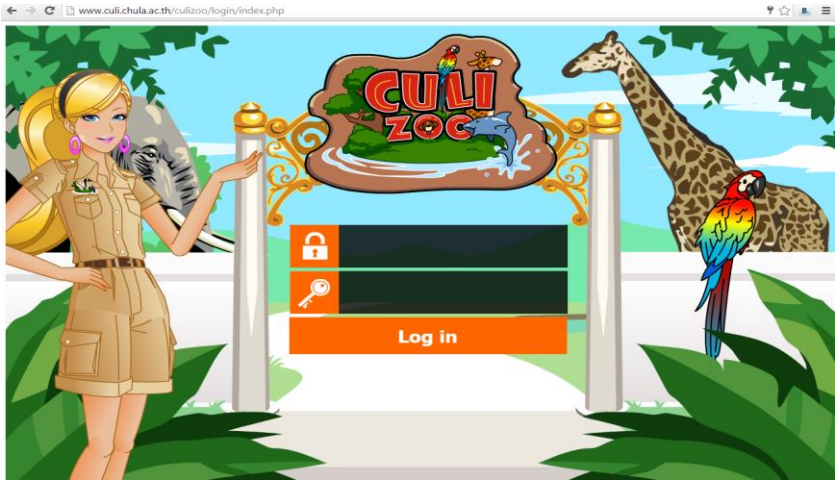
Figure 1 presents the framework, developed by Van Staalduinen and de Freitas (2011, p. 49), that combines what they found to be the best aspects of game-based learning. The Learning Column shows a game designer needs to define (1) the learning objectives, (2) clear player goals (goals in the game need 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 to

consider: (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 and Oliver, 2006): 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 the learner's gameplay.

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.

In sub-phase 2, the GBSe program (CULI ZOO) was developed. Once a student logs into CULI ZOO (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 to a zoo (Figure 2).

Figure 2: The entrance of CULI ZOO



After logging into CULI ZOO, the student will see a map of the zoo showing six clickable areas (Figure 3), paralleling the six units in the coursebook, and three game arcades. Before starting in the first zone, he/she is asked to choose a fish tank. After completing each station, the player can go to *AQUA Shop* to buy fish and accessories for his/her fish tank (Figure 4). This was designed to motivate students to do their best in CULI ZOO (Murphy et al., 2015).

Figure 3: The CULI ZOO map

Figure 4: AQUA Shop

Scores in the zoo are kept in two forms: *CULI dollars* and *Total Score*. Each correct answer earns the user one CULI dollar. There are three bonus points for a difficult question and ten bonus points 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 at 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. When there is at least one fish in the tank, the player must 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 before the program exits automatically to the main page.

Corresponding to each of the six coursebook units, the e-learning program contains six zones: Bird Park, Animal Shows, Vet Clinic, Museum, Aquarium, and Wildlife Park. In every two zones, students will be exposed to a game in game arcade. There are three

games altogether, which give an opportunity for the players to relax and collect CULI dollars. The student has to progress from zone 1 (unit 1) to zone 6 (unit 6). 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. Table 1 (See Appendix 1) is a summary of the tasks in every zone of the game.

After CULI ZOO was 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 showed quite positive responses to the program. A revision to the program was made based on their comments. After that, a group of 30 vet students, who enrolled in *English for Veterinary Profession I* in semester one of the academic year 2014, were asked to join a pilot study for CULI ZOO. A set of questionnaires was given to the students after they played CULI ZOO to elicit their opinions toward the program. Six out of 30 students were randomly selected to be interviewed in order to get in-depth information. The responses from the questionnaires and interviews showed positive opinions toward the program. CULI ZOO was further revised based on their comments and suggestions.

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

To determine the effectiveness of CULI ZOO, a study was conducted with vet sophomores in 2015.

Population and sampling

The population was Chulalongkorn University (CU) sophomores, enrolled in 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, exposed to paper-based supplementary materials, 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 and posttest were constructed based on the content of the coursebook. However, the posttest was divided into two parts: one for the midterm examination, consisting of the content in Units 1 to 3, and the other for the final examination, consisting of the content in Units 4 to 6.

A set of questionnaires was designed to collect students' demographic characteristics and their opinions toward CULI ZOO. There were four parts to the questionnaire. The first part asked the students about their demographic information, their grades in the prerequisite courses, Experiential English I and Experiential English II, and their general opinions toward learning English. The second part asked the students about their opinions toward the overall 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 about CULI ZOO.

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

All research instruments were validated by three experts in the field of English Language Teaching using Index of Item-Objective Congruence (IOC) to obtain the content validity. The IOC index of the pretest, the posttest, the questionnaires, and the semi-structured interview questions were .75, .79, .85, and .90 respectively. Revisions were made based on their comments. Also, Veterinary Science students, enrolled in the *English for Veterinary Profession I* in semester one of the academic year 2014, were asked to join a pilot study with these research instruments (except the posttest). More modifications were 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. All of the students were willing to participate in the study and signed the consent form. 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 an Independent Samples t-test at a significance level of 0.05 to ensure that the English listening ability of both groups was not significantly different, $t(205.14) = -0.477$, $p = 0.634$ (See Table 2 in Appendix 1). This means that the pretest scores of both groups were comparable.

The experimental group was asked to play CULI ZOO (www.culi.chula.ac.th/culizoo), specifically 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 sixteen of them were randomly selected to be interviewed. The interviews were tape-recorded. Paper-based supplementary materials were distributed to control group 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 and were evaluated with the same assessment criteria. The key difference was that the experimental group was exposed to CULI ZOO, which was able to be played anywhere and anytime with the Internet access, while the control group was exposed to 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 the paper-based supplementary materials and the 2015 students' scores from CULI ZOO accounted for 10% of their total assessment score.

Findings

The students' pretest and posttest scores in both groups were quantitatively compared using the SPSS Program (Version 20). 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, mean scores, and standard deviation. Also, to analyze the differences between the posttest scores of the students in 2014 and those in 2015, an Independent Samples t-test was implemented. The findings are presented in Table 3 (See Appendix 1).

On average, the posttest scores of the control and experimental groups were significantly different at the level of 0.05, $t(204.57) = -1.9899$, $p < .05$. This means that the posttest mean score of the experimental group (52.71) was statistically significantly higher than that of the control group (49.82).

In conclusion, research hypothesis 1 was 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, a Paired Samples t-test was used to determine the differences between their pretest and posttest scores. The findings are presented in Table 4 (See Appendix 1).

On average, the pretest and posttest scores of the students in the experimental group were significantly different at the level of 0.05, $t(97) = -6.315$, $p < .001$. The control group students' scores were also analyzed using descriptive statistics and a Paired Samples t-test. The findings are showed in Table 5 (See Appendix 1).

On average, the pretest and posttest scores of the students in the control group were significantly different at the level of 0.05, $t(97) = -14.061$, $p < .001$.

In conclusion, research hypothesis 2 was 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 mean posttest scores of the students in both groups were statistically significantly higher than their mean pretest scores.

Hypothesis 3: Students who are exposed to the GBSe program will have positive opinions toward the program.

This hypothesis was concerned with the students' opinions regarding the implementation of CULI ZOO. The data were 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 complete the questionnaires after playing CULI ZOO. There were four main parts to the questionnaires.

Part one of the questionnaires collected to students' demographic data. The findings from the students' responses are presented in Table 6 (See Appendix 1).

As seen in Table 6, the sample group consisted of 111 Veterinary Science sophomores: 35 males and 76 females, aged between 19 and 20, whose English ability was 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%), though 28.8% claimed that they did not like learning English, with the main reason being "I can't have good scores in the exam even though I have well studied for it" (13.5%). Second and third were "I don't like learning grammar" (9.0%) and "I don't like memorizing vocabulary" (7.2%).

The second of the questionnaires was concerned with the students' opinions toward the overall of CULI ZOO. The findings from the students' responses are arranged based on the mean scores and presented in Table 7 (See Appendix 1).

As seen in Table 7, there were two main categories of CULI ZOO that students commented on: organization and 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 and design (2.83), and navigation (2.65), respectively. The total mean score of the program's organization and design was 2.85, showing a positive response.

In the 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 feedback giving of the games (2.16) respectively gained the three lowest mean scores. The total mean score of the program's feature was 2.82, showing a positive response.

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

The third part of the questionnaires was concerned with the students' opinions toward each task of CULI ZOO. The findings from the students' responses are presented in Table 8 (See Appendix 1).

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 six zones (2.79).

The fourth part of the questionnaires was an open-ended question, asking the students to make suggestions about CULI ZOO. The responses from thirty-nine students (35.1%) who made some suggestions were tallied and categorized in Table 9 (See Appendix 1). Most comments were about the system of the program, like the background sounds and program stability. Also, presence of the answer key was another suggestion from the students.

To summarize, from the questionnaires, the students showed their positive opinions toward CULI ZOO. However, there are some flaws to 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 students' opinions are unedited and 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 for 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 that needs 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 use 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 were not be a part of their total score in the course. (2 / 12.5%)

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

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

To test the hypothesis, the Pearson product-moment correlation coefficient was determined to find 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 Table 10 (See Appendix 1).

As seen, at the significance level of .01, the Pearson product-moment correlation coefficient of the students' scores from CULI ZOO and those from the posttest was 0.000. This shows that the students' scores from CULI ZOO correlated with those from their posttest.

Moreover, the scores from CULI ZOO and those from the pretest of the students in the experimental group were also compared with the Pearson product-moment correlation coefficient

in order to discern their correlation. The findings are presented in Table 11 (See Appendix 1).

From Table 11, the Pearson product-moment correlation coefficient 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 with those from their pretest.

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

Discussions

After CULI ZOO was proposed, developed, verified, and administered to the students, its effectiveness was showed. Two main aspects of this research: CULI ZOO per se and its effectiveness, will be discussed.

CULI ZOO

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

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

change in students' attitudes toward learning, a number of teachers may hurriedly employ new technology in 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 and use it in an appropriate way, not just "a harmful additive to the educational diet" that momentarily conceals bad taste that students have toward learning (Setzer and Monke, 2001 as cited in Okan, 2003: 259). 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 was developed to promote learner autonomy since a student can log into the program anywhere and anytime as long as he/she can access the Internet. Moreover, from the students' comments in the questionnaires and the interviews, after playing each task/game in CULI ZOO, they wanted the program to provide the answers to the player. However, the computer would show only the symbol √ or X, indicating true or false answers. After discussion with the students during the interviews, the students all agreed that if the program showed the answer for each question, they would not play the game again and again. They also commented that if they did not know the correct answer to the question, they would repeat playing the game. Similarly, the students complained and commented on the questionnaires and during the interviews that they needed to see the audio script to be presented in the program. However, after discussion, they all agreed that if they read the audio script, they would know the correct answers to the question and it would not tempt them to play the game again and again. Therefore, a consensus was reached that the audio script of the task would not be presented in the game. Also, the symbol of √ or X would be showed in order to identify the correct or incorrect answer. Accordingly, the students can play the game as many times as they like. This can challenge and motivate the students to learn by themselves (Okan, 2003) and promote learner autonomy (Sanchez, 2011).

In the questionnaires and the interviews, students' made comments on two main aspects: the game system and the game content. The main comments were primarily about the game system. The program's stability and the background sound were adjusted. Also, the scoring of the game system was modified. However, some advice could not be used. For example, the students themselves wanted to locate the accessories for the fish tank. Due to the limitation of the budget, this could not be done. Regarding the content, there were a few comments. For instance, they said some tasks were too easy. According to the interviews, the easier tasks were in the game arcade. The main purposes of the tasks in the game arcade were fun and relaxation. Therefore, those tasks would not be removed. Moreover, some tasks were too difficult for some students. Due to the number of students, there was 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, according to the Input Hypothesis (Krashen, 2003), which says that learners improve their learning abilities when they get second language input that is one step beyond their current stage of linguistic competence, played an important role in designing the tasks of CULI ZOO. Hence, the tasks in CULI ZOO start from easy to more difficult in order to challenge students and promote their learning achievement.

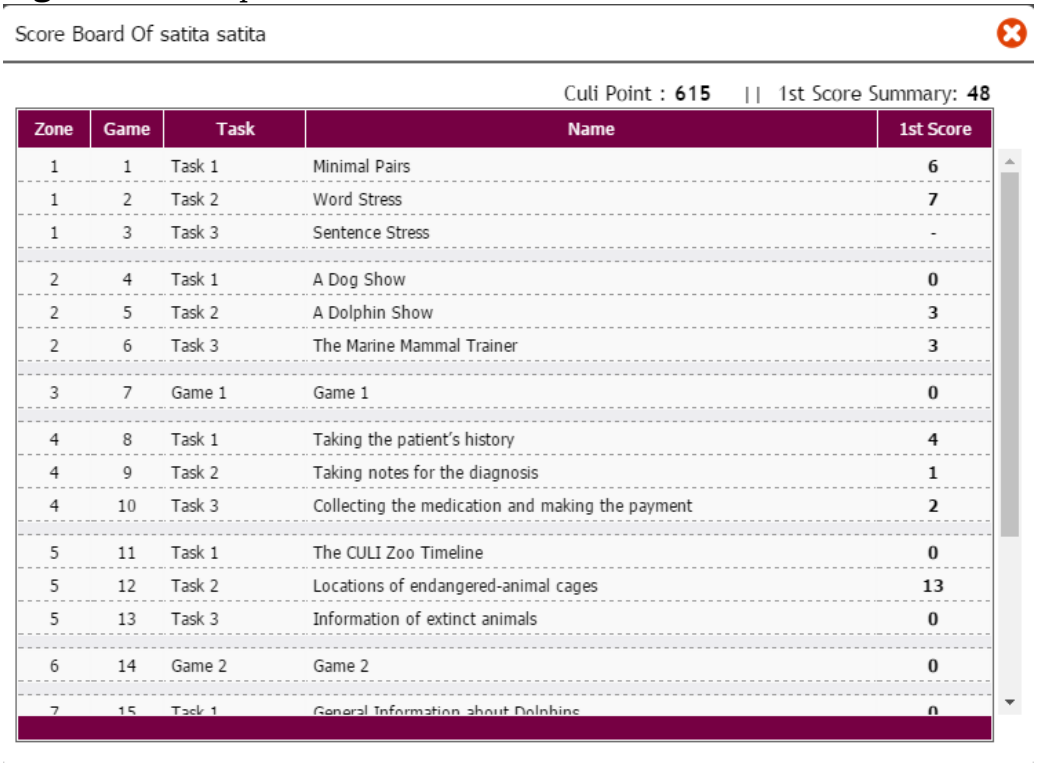
The effectiveness of CULI ZOO

From the research findings analyzed by the t-test, it was showed that the experimental group students' listening ability increased after they had been exposed to CULI ZOO. However, although the students in the control group who were not exposed to CULI ZOO also saw increased scores, the increase of the students' listening ability in the experimental group was statistically significant when compared with that in the control group. This supports CULI ZOO helping students increase their listening ability.

In addition, as seen in the findings, the students' total scores from CULI ZOO showed a significant correlation with their scores

from the posttest. Also, their total scores from CULI ZOO demonstrated a significant correlation with their scores from pretest. Since the pretest and posttest were constructed based on the same test specifications, the findings could interpreted to mean that the students can use their total scores from CULI ZOO (the scores from their first attempt at doing each task) to predict their achievement in 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. Additionally, after 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 finished doing all tasks so that they could know their potential and study for the examinations (See Figure 5).

Figure 5: A sample of a student's score sheet


Score Board Of satita satita

Culi Point : **615** || 1st 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 by the teachers to help students review the lessons learned. CULI ZOO has not been designed to replace face-to-face teaching, but enliven the content of a textbook-based course. Also, CULI ZOO can be used to assess what has been covered in the course. For example, teachers may evaluate 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. As seen in the research findings, the students showed positive opinions toward, and saw the 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 throughout the semester.

For students, CULI ZOO may draw their 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 the Internet. They may choose to do as much or as little as they desire since 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 with the students' midterm and final scores (posttest scores). It can be an alternative tool for students 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 opinions towards learning English (Mohideen, 2017; Phanarangsan, 2000) and will likely have fun (Buckingham and 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 that decreases the bitterness of the medicine of learning.

Recommendations for Further Research

As 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 opinions. Various task types or activity types should be added to CULI ZOO to provide greater variety, pose additional 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.

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 their 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, which 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 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 in Veterinary Profession I*.

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Appendix 1

Table 1: Summary of Zones and Tasks of CULI Zoo

Zone	Task	Type of Game	Setting
1 Bird Park (Pronunciation Practice)	1. Minimal Pairs	Clicking on the correct answer	In a macaw cage
	2. Word Stress	Clicking on the correct syllable	In a bird show dome
	3. Sentence Stress	Clicking on the correct answer	In an open bird park
2. Animal Shows (Listening Strategies)	1. Matching: Dogs can speak!	Matching	At a dog show
	2. T/F Questions: The secret language of dolphins	Clicking on the correct answer	At a marine mammal show
	3. Multiple-choice Questions: Interview with the marine animal trainer	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: a conversation between a pet's owner and a receptionist	Typing the correct answer	At a reception counter in a vet's clinic
	2. Checking the symptom-treatment list: a conversation between the pet's owner and a vet	Typing the correct answer	In a diagnosis room
	3. Directions for medication use, making payment, and making the next appointment: a conversation between the pet's owner and the receptionist	Typing the correct answer	At a reception counter in a vet's 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 on 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 park
	2. Distinguishing for / against	Typing the correct answer	At the park
	3. Categorizing for or against arguments of a discussion	Dragging and Dropping	At the park
Game #3	Animal Trivia (multiple choice / true or false Questions)	Clicking on the correct answer	In a game room

Table 2: 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		

Table 3: 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		

Table 4: 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		

Table 5: 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		

Table 6: 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 do you evaluate your English skills?	Poor	Moderate	Good	Excellent					
6.1 Listening	29 (26.1%)	57 (51.4%)	23 (20.7%)	2 (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 answer.)	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 answer.)	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%)								

Notes: N = 111

* These are students' unedited comments/opinions.

Table 7: Students' opinions toward the overall 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**	
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**	

Notes: * These are students' unedited comments/opinions.

Table 8: 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**	

Notes: * These are students' unedited comments/opinions.

Table 9: 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%

Notes: N = 39
* These are students' unedited comments/opinions.

Table 10: 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

Table 11: 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