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Design and Evaluation of a Game-based Language Learning Web Application for English Language Learners in Thailand

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Abstract: This paper proposes a game-based language learning web application, ELA-TIGA, developed for junior high school students to support their English language self-learning. This web application was designed by using a waterfall model and System Development Life Cycle (SDLC) on the Moodle platform and Database Management System (DBMS). The content and games in the ELA-TIGA app were framed by the Task-Input-Genre-Assessment teaching model for language learning. This preliminary study investigated the participating teachers' application evaluation. The participants were sixteen English language teachers from sixteen junior high schools in a north eastern province in Thailand. The teachers were trained how to use the ELA-TIGA app and later tried out the app with their students. After that, they were asked to complete a questionnaire with close-ended and open-ended questions. The findings reveal the teachers' positive feedback about the application's content and instructional design, user interface, and game and interaction design. Besides, the teachers claimed that a variety of games are easy to use and appropriate for their students' English ability. The application can also motivate their students to learn English. They expected to fully use ELA-TIGA in the near future and believed it would be very useful for their students, especially during an online learning period caused by the COVID-19 pandemic.

Keywords: Technology in education, technology-enhanced language learning, game-based language learning, online games, web application

1. Introduction

In Thailand, technology-enhanced language learning (TELL) has been encouraged to be used by English language teachers to assist their instruction and improve students' English ability (Ministry of Education, 2014). However, it is quite challenging for Thai teachers to use technology in their classrooms as they may not be sufficiently prepared for this pedagogical practice. Many of them may use existing applications such as Kahoot or Flipgrid in their classrooms to help the students learn English with more fun and motivation (e.g., Phenpran & Nahnjun, 2015; Swang phph, 2012). However, the use of these applications may have some limitations. They may neither be in line with learning outcomes in an English course nor related to focused content in students' textbooks. Although the use of the existing applications may help students learn English in class, it may not facilitate their language learning outside the classroom. Being exposed to English anywhere and anytime would accelerate students' success in language learning. It should then be worthwhile to develop an English learning application that can be associated with English course learning outcomes and can promote students' self-learning. This study, therefore, aims to design and develop a web application specially designed for Thai students to learn English actively and meaningfully through game-based language learning (GBLL). It is hoped to fill a gap and shed some light on TELL and GBLL studies in Thailand.

2. Literature Review

The reviewed literature focused on two main concepts used to frame the present study. These involve a

review of game-based language learning and online game-based applications used for English language teaching (ELT) in Thai contexts.

2.1 Game-based Language Learning (GBLL)

Game-based language learning (GBLL) is an approach to teaching English where students explore relevant aspects of games in a learning context designed by teachers (Ghazal & Singh, 2016; Taufik, Sabella, & Sabrina, 2020; Wu, Zhang, & Wang, 2020). It is different from gamification in that while gamification is the application of game-like mechanics to non-game contexts to encourage a specific behavior with badges, points, or levels, GBLL involves designing learning activities underpinned by game principles and characteristics and learning theories (Pickles, 2019; Vandercruysse, Vandewaetere, & Clarebout, 2012). For GBLL, games are designed with learning outcomes.

There are several reasons to use games to enhance students' English language ability. First, games provide students with an opportunity to practice vocabulary and grammar, specific functions, and other language skills (Kapp, 2012) as they add variety to the range of learning situations. Games can also increase student-centered learning because they reduce the teacher's dominating roles in the classroom (Willis, 1996). Games not only facilitate students' understanding and development of a second language (Mubaslat, 2012), but they can also engage and motivate language learners (Halleck, Moder, & Damron, 2002; Kapp, 2012; Prensky, 2001; Whitton, 2010). When using games as part of instruction, they can remove boredom without sacrificing the repetition necessary for successful learning (Chitravelu, Sithamparam, & Teh, 1995). Besides offering amusement and cooperation, games are said to help promote positive attitudes towards learning English. They encourage active participation among players and consequently boost confidence and self-esteem. Besides, language games create a relaxing atmosphere. Students are less anxious and more open, and able to communicate when they play games in a language classroom. In sum, introducing games for learners with the intention to teach and further develop their language proficiency is one effective way to enhance language learning.

2.2 Research on Using Online GBLL Applications in Thai Contexts

Online game-based learning has increasingly become popular in ELT. The advantages of games integrated with technology can draw learners into virtual environments that look and feel familiar and relevant. Online or digital games can then meet the needs and learning styles of students in the digital technology era (Prensky, 2001; Wu, Zhang, & Wang, 2020). Thus, it is not surprising to find an emergence of applications for language teaching and learning around the world.

While there are a number of researches on the effectiveness of GBLL applications in foreign contexts (e.g., Alamr, 2019; Taufik, Sabella, & Sabrina, 2020; Wu, Zhang, & Wang, 2020), only a small number of researches in this area have recently emerged in Thailand. Botmart (2019), for example, investigated the use of the application *Classcraft* in teaching vocabulary to Thai university students. The results showed the improvement of students' vocabulary knowledge after using the application and revealed the students' positive attitude towards learning vocabulary through the application. Rachayon (2019) designed digital games for university nursing students to enhance their communicative skills in a flipped environment based on the frameworks of task-based language teaching, digital game-based language learning and flipped learning. She found that not only did the students' oral communication skills improve after learning through the digital games, but the students also had positive attitudes towards the games and perceived the usefulness of the digital games in developing their oral communication ability in English. Although these kinds of studies have supported the advantages of using digital or online games to teach English and improve students' English knowledge and ability, most of them focused on the use of existing applications in ELT. There is still a gap for studies aiming to design, develop, and evaluate ELT applications driven by local English learning problems and teaching contexts.

3. TIGA Model and ELA-TIGA Application

The present study developed an English Language Application: Task-Input-Genre-Assessment (ELA-TIGA) as a web application for English language learning for junior high school students in Thailand. The application aims to enhance students' English ability based on the Task-Input-Genre-Assessment (TIGA) teaching model (Poonpon, Satthamnuwong, & Sameephet, 2016). It is also an extensive game-based learning application that can support students' self-learning. The following describes the TIGA model and how it is used to design the TIGA-based content, followed by the application's architectural and game designs.

3.1 The TIGA Model

The TIGA model was designed under the frameworks of the task-based language learning approach, genre-based approach, the Common European Framework (CEFR), and PISA's reading literacy skills (Poonpon, Satthamnuwong, & Sameephet, 2016). This model was especially developed to address the teaching and learning problems encountered by the teacher and the students in the Thai rural context (Figure 1). It focused on; 1) **Task (T)** for the student to have achievable goals, scaffolding pedagogical tasks, and an authentic target task in local and global contexts; 2) **Input (I)** for students to enhance their vocabulary and grammatical knowledge and use through listening and reading skills needed to complete the tasks; 3) **Genre (G)** as a model for the students to learn communicative functions of a particular language type, and; 4) **Assessment** to help the students evaluate their performance and learn from what they have done in each task. The model was used to design the content of KKU Smart English Books 1 and 2 (Poonpon & Satthamnuwong, 2019; Poonpon, et al., 2019), produced by the Smart Learning Innovation Research Center, Khon Kaen University, Thailand. This content was later adapted to design learning activities or games in the ELA-TIGA application.

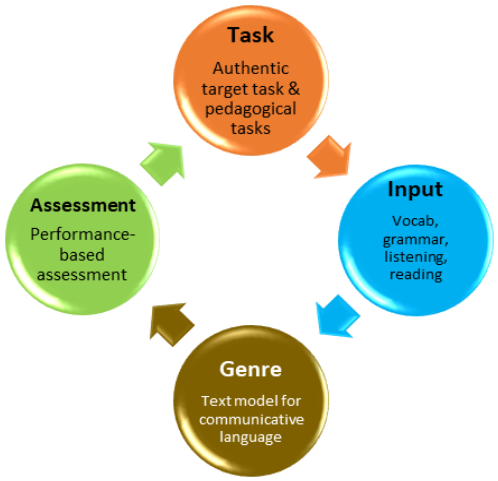

Figure 1. The TIGA Model (Poonpon, Satthamnuwong, & Sameephet, 2016).

3.2 ELA-TIGA Application' Architectural Design

The ELT-TIGA application was architecturally designed by using a waterfall model and System Development Life Cycle (SDLC). The model is a classic systematical model for developing applications (Pressman, 2005). In this model, each stage fulfills a specific purpose and task. The model includes five stages: studying, planning, creating, testing, and maintenance (Bassil, 2012).

At an initial stage in implementing the ELA-TIGA application, the analysis stage is used to determine teacher and student learning requirements, propose an explanation of an approach in the improvement of eLearning, formulate eLearning's desired ideas, and identify customer requirements. Implementing a web-based and immersive multimedia e-learning framework as features/contents that supplement e-learning is the design stage. Administrators, managers, teachers, and learners are the four main categories of users. Audio (sound effects, background sound, and music), graphics (typography, layout design, colour), creative multimedia (movie, animation), and interactive design are all facets of visual communication that must be addressed when using multimedia (navigation icons).

The open-source software Moodle and Database Management System (DBMS) were used in the development stage of ELA-TIGA construction, allowing the e-learning software to run a server. Using plugins such as H5P, PowerPoint, and other supporting applications, the multimedia capabilities incorporated audio, visuals, video, and animation.

The development of the ELA-TIGA application is defined by integrating interactive multimedia content through different activities, according to H5P (Interactive Content). The teacher/manager will use this exercise to generate content that can enhance the learning paradigm and collaborate to create full interactive content. The teacher would generate interactive multimedia-based learning material with different choices such as image hotspot, image justification, memory games, interactive images, and several more inside this framework by introducing a new functionality called Interactive Content (H5P). As a result, the developed learning media would be more stimulating. For example, several different types of questions can be asked in a quiz, including true/false, multiple-choice, multiple answers, type in, matching, series, numeric, fill in the blanks, multiple-choice, text, and so on. Academy content for a picture, accordion for text, and columns are used to regulate the style of the H5P contents. The learner can organize and apply any form of content to a column as desired.

The architectural design of the ELA-TIGA is shown in Figure 2. In this platform, a person who wants to use eLearning requires a smart device with a web browser and an operating system that supports it. Within the ELA-TIGA application, they are managed by managers and the teachers' role on duty to create and manage H5P contents, eLearning media files, and interactive contents are stored in a cloud service, including a response from the webserver.

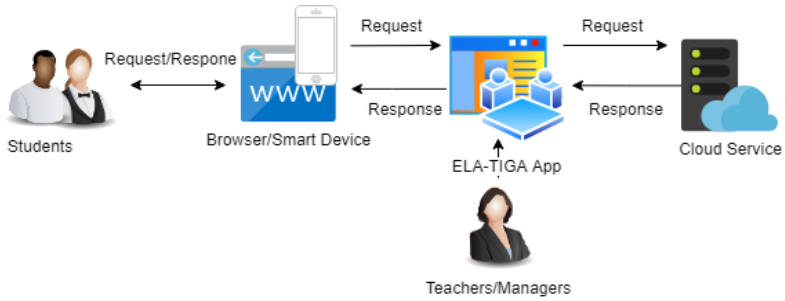

Figure 2. The ELA-TIGA Application's Architectural Design.

3.3 ELA-TIGA Content and Game Design

The application's content was adapted from KKU Smart English Books 1 and 2. There are eight units in total. In each unit, input and activities were based on the TIGA model and the four language skills.

All learning activities or games in each unit in the application were designed using the TIGA model. Each game was designed to meet the purpose of each sequence. At the "T" (Task) stage, each unit starts with an introduction to the learning objectives and a target task that students are expected to achieve. This "introduction" part is presented in "Image Hotspot" or "Find the Hotspot" content types.

The second part of the application is "I" (Input), aiming to provide the necessary vocabulary and grammar that are needed for completing the target task. There are around three to four activities under "I," covering vocabulary, grammar, listening, speaking, reading, and writing skills. They are presented in various content types such as Quizzes, Find the Words, Drag and Drop, Memory Games, Dictation, Interactive Video, and Fill in the Blank.

After learning the necessary input, students learn a model text prepared in a specific text type in "G" (Genre) parts. This part involves two activities: reordering parts in the model text and specifying communicative functions of parts of the text. To do this, two content types used in the application are Drag and Drop and Drag the Words.

Finally, "A" (Assessment) aims to assess students' knowledge through reading a model text and answering questions. The questions in this part assessed various sub-skills consisting of accessing and retrieval, integration, and interpretation, and reflection and evaluation skills. Furthermore, there was a self-evaluation form to assess students' understanding of the whole lesson at the end of each unit.

Additionally, a short personality test was also added on the announcement board at the top of the content page. The personality questionnaire, adapted from a personality test developed by Cohen, Oxford, and Chi (2009), aims to reveal students' learning styles and their learning preferences, (i.e., auditory,

visual, or tactile/kinesthetic style preferences). Teachers can also use the learning style results when designing materials or building a classroom environment to support students' learning preferences.

4. ELA-TIGA Implementation

The ELA-TIGA application was introduced to sixteen teachers from sixteen junior high schools and two supervisors from the Khon Kaen Provincial Administrative Organization, Khon Kaen, Thailand. They attended a 6-hour training on how to use the application before implementing it with their classes. The implementation was conducted for about one month before a semester ended. After the end of the semester, these teachers completed a five-Likert scale questionnaire and open-ended questions to evaluate the functions of games and give feedback about the overall usefulness of the application.

5. Results and Discussion

The results from the questionnaire show the teachers' demographic information and evaluation of the ELA-TIGA application. All of them hold a bachelor's degree in TESOL or English. About 60% of these teachers have less than 15 years of teaching experience, and the rest have more than 16-years teaching experience. About 70% of them rated themselves to have good technology skills.

Overall, the teachers were satisfied with the ELA-TIGA application. In terms of content and instructional design, all of them agreed that the app content corresponded with the book content, and it was well grouped and put in an appropriate sequence of difficulty. One-third of the teachers moderately agreed that the learning activities or games are neither too difficult nor too easy. They supported that a combination of complex and easy activities would meet the needs of groups of different proficiency levels. In terms of user interface, most teachers believed that the app contains simple components and layout with which their students can use and interact easily. The easy navigation should be practical as this does not require students' to have a great deal of experience. The app is also user-friendly in that it is full of colorful pictures and images, easy to see with appropriate font sizes. When asking about game and interaction design, most of them thought the app contained a variety of games that can encourage students' interaction. They also thought that the application was easily accessible and appropriate for their students' language learning. It is also good to show students their own performance as soon as they finished their activities.

6. Conclusion

The ELA-TIGA application was developed to support students' self-study through game-based language learning along with their Smart English textbooks. In this early stage, the ELA-TIGA application was introduced and somewhat tried out by the English teachers in provincial schools in Thailand. All the teachers' feedback is very important for our team to improve the application's quality. However, this study has limitations. It used a very small sample size and was limited to one group of participants. Future research should focus on the implementation of the ELA-TIGA application with a much larger group of both teachers and students to maximize its usefulness and successfully support Thai students' English language learning.

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