

The Development of iCALL Application for Thai Learners to Study a LAO Language

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Abstract—Language is a method of human communication and essential to express ourselves, e.g., ideas, feelings, thoughts. With an agreement of ten ASEAN nations in 2007, the regional economic integration, also known as the ASEAN Economic Community (AEC), will be established by 2015. In particular, Thailand is currently the largest trading partner of Laos with an estimated value of annual merchandise export to Laos over \$1000 billion per year. For Thai people, studying a Lao language is a great advantage to better understand each other, such as relationship, tradition and culture. Afterwards, it can increase opportunities for prospective merchandise between two countries. This paper presents the development of “Interactive Computer-Assisted Language Learning (iCALL) Application for Learning a Lao Language”. The objective of iCALL is to provide Lao language learners with extra materials for self-study support. The system was designed based on the Learning Theories, Educational Psychology and Human Computer Interaction. The iCALL was developed as a Windows 8 application to support touch-screen devices with enhanced illustration of learning lessons using audio, animatic and animation.

Keywords—*iCALL: Interactive Computer-Assisted Language Learning, AEC: ASEAN Economic Community, Lao Language, Learning Theory, HCI: Human-Computer Interaction, Interactive Media.*

I. Introduction

ASEAN Economic Community (AEC) is the integration of ten ASEAN countries in Southeast Asia, i.e., Thailand, Laos, Myanmar, Vietnam, Malaysia, Singapore, Indonesia, Philippines, Cambodia and Brunei. AEC is targeted to be the regional economic integration (similar to European Union) by 2015. The mutual benefit of AEC is to reduce the economic gap between ASEAN member countries, to increase bargaining power, and to enhance competitive advantage in the global market. After the establishment of AEC in 2015, it is expected that there will be a large number of communications and business transactions from nine ASEAN countries to Thailand and especially in business sectors such as financial trading, insurance, pharmaceuticals, automotive, and telecommunications. Laos is a member of the Association of Southeast Asian Nations (ASEAN) that share a common border with Thailand more than a thousand kilometers. In addition, the two countries have a similar language and cultures. Thai and Lao languages are closely related in that both are rooted in the same Semitic language (Tai Language Family). Thailand is also a primary trading partner of Laos. The value of export of goods and services to Lao has averaged approximately over \$1000 billion per year [1]. The trade value between two countries also continually increases every year especially among border

provinces. For Thai people, studying Lao language can create opportunities for business and make people from two countries to understand each other better.

In this paper, we introduce the development of Interactive Computer-Assisted Language Learning (iCALL) Application for Learning Lao Language. This paper is focused on implementing the iCALL system that provides an interactive learning media for teaching a Lao language on a personal computer or tablet. The system was developed as a Windows 8 application using C# language.

The remainder of this paper is organized as followed. Section 2 reviews the related theories, supporting the design of our developed system, such as the Learning Theories, the Educational Psychology and the Computer-Assisted Language Learning (CALL). In section 3, we present a detailed description of software development process including system analysis and skill lessons taught in iCALL. Results of the implementation such as iCALL interfaces are given in Section 4. Finally, Section 5 presents our conclusions.

II. Related Work

There are many existing CALL applications supporting language learning; however, most of them focus on popular languages such as English [2], German [3] and Japanese [4]. Having implemented our iCALL for Lao, we reviewed literature and conducted a survey of related applications that instruct ASEAN languages. Here we outline two simple applications teaching Lao.

A. “Sawasdee ASEAN”

“Sawasdee ASEAN” is a computer-assisted instruction (CAI), developed as a desktop application [5]. It offers only basic information about ASEAN countries and was *not* designed for touchable displays, as such limiting users interactions with learning media. The contents of the software include history, culture and very rudimentary lessons of ASEAN languages. Furthermore, the system neither focus on teaching any ASEAN languages nor provide a complete material of language lessons. The system only contains information in digital format and allows little interaction of users with it. As a result, learning of learners is restricted and therefore the system does not achieve the purpose of using a computer as an instructional assistant. An example of the system’s interface is shown in Fig. 1.



Figure. 1: An example interface of Sawasdee ASEAN, teaching a greeting word in Burmese

B. “Vocabulary Thai-Lao”

An application “Vocabulary Thai-Lao” is developed for the Windows 8 operating system [6]. It contains a set of basic Lao vocabularies and of commonly used Lao phrases, written in a Thai language (see Fig. 2). In this application, the vocabularies are categorized into ten groups such as food, sport, pronoun and so on. By doing this, it is useful for learners to memorize words easier. Nevertheless, the number of vocabularies is limited and insufficient for beginners to use Lao in daily life. For presentation, the system uses only static media, i.e. by text, without pictures or animations to engage users with the system. Therefore, the learners have to remember the vocabulary manually by themselves.



Figure. 2: Screenshot of the Vocabulary Thai-Lao, which displays a Lao word, meaning dinner, written by Thai characters and its Thai translation

III. System Development Methodology

For the process of developing the iCALL, we started by reviewing related theories that lie behind the design and implementation of a five lesson teaching-learning sequence. These theories reinforce users’ engagement, comprehension and skills. We aim to build the learning sequence by attempting to associate each lesson together. Learner can utilize their knowledge from one lesson to practice in another later lesson as well as a gradually progressive addition of new materials and a small repetition of previous ones for rehearsal within

the same lesson [7]. Consequently, learners are able to better internalize knowledge, building up their understanding and translating their ideas and concepts into practice. We will go through such theories along with the system design and implementation in section IV.

Next, we surveyed several CAI and CALL applications as mentioned in section II. For learning materials, we consulted a Lao linguist and selected them attentively. In our iCALL development, we followed the principle of System Analysis and Design using an Iterative Model of System Development Life Cycle (SDLC). Object-oriented concept was also used to design and implement the system in #C with Unified Modeling Language (UML). Finally, we performed software testing to ensure that the software works correctly. In the following subsections, we describe skill lessons and system requirement analysis of the iCALL.

A. Skill lessons

The system consists of five skill lessons including alphabet, spelling, vocabulary, grammar and basic conversation. All the lessons are carefully analyzed, revised and selected by us under the supervision of a Lao linguist (See acknowledgment). The details of five lessons are given as follows:

- **Alphabet** – This lesson consists of three subsections, including 27 consonants, 29 vowels and 5 tones of a Lao language. This objective of this lesson is for learners to recognize Lao consonants and vowels, and to remember tones. Each section is divided into chapters (i.e., 3-5 characters in a chapter). By doing so, it helps learners remember characters more easily than by providing all characters together [7].
- **Spelling** – In this lesson, learners will learn how to spell Lao words correctly. We aim to design the system by relating gained knowledge from previous lesson to currently learning lesson. After learning consonants and vowels, learners will use such knowledge to practice word spelling recorded from voice of a Lao native speaker.
- **Vocabulary** - A collection of words contained in this lesson are chosen from a book, titled “Glossary of Fundamental Literacy Terms” [8]. It comprises words commonly used in daily life. The vocabulary is categorized into 25 groups such as animal, family, food and so on. Categorizing words can help learners think about how words are related rather than trying to memorize random words [9]. Kluger and DeNisi [10] suggest that continuous and repetitive practice can make learners more effective learning. Thus, this lesson provides interactive media which repeats and progressively adds more contents in order to help learners remember words.
- **Grammar** - Understanding the basic concept of Lao grammar is essential for communication. An aim of this lesson is to train learners to create their own sentences. This lesson provides a lot of example sentences and interactive practice on constructing sentences by words learned from the past lesson.

- **Basic conversation** – This lesson contains sample conversations in daily situations such as greeting, traveling, shopping, asking for helps or directions, expressing feelings and so forth. Each conversation comes with spoken voice from the native Lao.

Every lesson has interactive learning media that allows interaction with learners, e.g., text, images, audio, animatic and animation. Learners will get immediate feedback from the system and can repeat any lesson as they wish.

B. Systems analysis

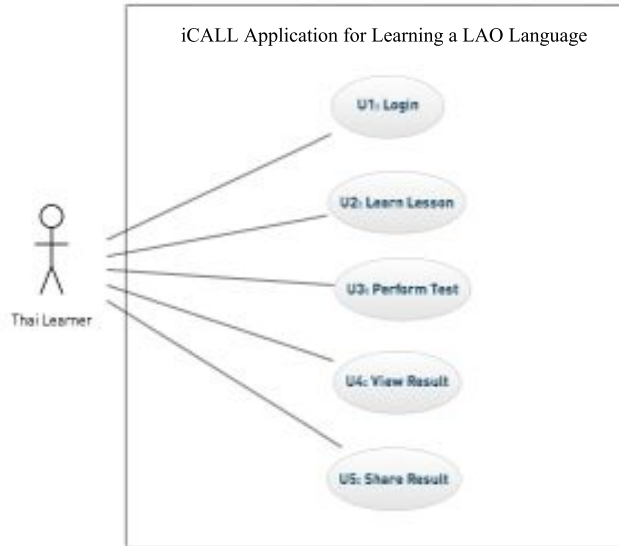


Figure. 3: Use case diagram of iCALL application

Fig. 3 demonstrates a use case diagram of iCALL, representing all functional requirements employed by a user. The details of its components are described as follows:

- **Actor: Thai Learner** - iCALL's target audience is a Thai learner who is interested in studying a Lao Language.
- **U1: Login** – This function is for user authentication to use the system and remember a user's identity.
- **U2: Learn Lesson** - A user can select any skill lessons to learn (i.e., alphabet, spelling, vocabulary, grammar and basic conversation).
- **U3: Perform Test** - After learning the lesson, a user can take an exercise to test his knowledge .
- **U4: View Result** - This function allows a user to view the results of his test.
- **U5: Share Result** - A user can share his results to social media, e.g., Facebook, in order to encourage more users to use the iCALL.

IV. System Design and Implementation

This section illustrates the design and implementation of user interfaces of iCALL. We also describe related theories applied for developing our system. Fig. 4 shows



Figure. 4: Screenshot of iCALL main menu

the main menu interface, providing options to access five learning lessons as previously explained in section III-A.



Figure. 5: Overview of the alphabet skill lesson

According to the schema theory [11], user will be able to use their newly acquired knowledge when they can associate *new* information with their existing schema (i.e., units of human knowledge). We therefore provide an animatic overview of Lao alphabets (see Fig. 5), displayed as a series of chapters. The overview is an animated picture to highlight a currently chosen chapter. Each chapter is composed of 3-6 words to teach as seen in Fig. 6. By giving this overview, learners can understand and remember a sequence of characters better.



Figure. 6: An example chapter of teaching alphabets

Fig. 6 shows a interface of teaching alphabets. By teaching the character called “ngaw” (the leftmost icon), the system provide its related image, animation and a native speaker voice “ngaw ngua” accordingly. By doing so, the user can recognize the character, its meaning, and its pronunciation.

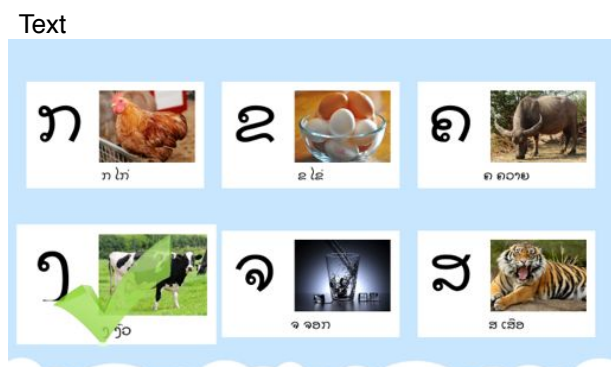


Figure 7: Alphabet exercise

Thorndike [12] introduced the learning theory, called a law of exercise. Practice is necessary for learning. The more a learner practices, the more effective learning becomes. As a result, learning will be strengthened and tend to be permanent. We thus provide the exercises for reviewing their knowledge at the end of every chapter (see Fig. 8). For instance, after hearing the pronunciation of “ngaw ngua”, a learner has to select a matching image of the character “ngaw”. Afterwards, our system promptly gives a positive feedback for a correct answer or otherwise shows the correct answer for a wrong selection. This is to avoid discouraging a learner from learning as suggested by Skinner [13].



Figure 8: Spelling lesson

Based on the observational theory [14], learning can occur from remembering, observation and imitation behavior executed by other people. We opt for an approach to teaching by giving examples of word spelling and allow learners to learn by imitating and recognizing spelling voice. In Fig. 8, the system teaches the spelling of word “wa” (located in upper right) by splitting a word into syllables. Subsequently, a native speaker pronounces the consonant “waw” and vowel “ar” as well as the word “wa” combined from its syllables. As a result, learners can recognize how to spell the word “wa”.

Using images for vocabulary learning can help the learner remember the vocabulary more easily [15]. Accordingly, we teach the vocabulary by using real-life images related to their word meanings, along with animation and their spelling voices (see Fig. 9).

V. Conclusion

In this paper, we proposed an interactive media for learning Lao language. Additionally, we surveyed several CALL and CAI applications for language learning. We studied the learning theories and principle of educational psychology to

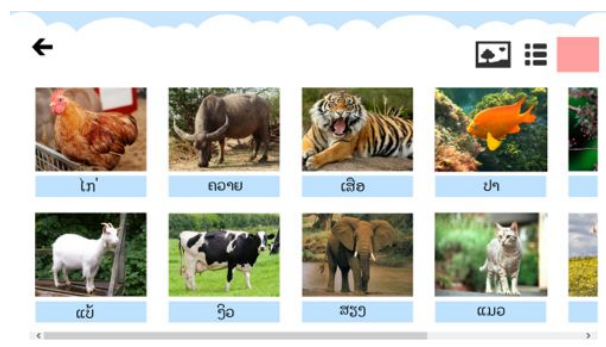


Figure 9: Vocabulary lesson

design and implement our iCALL application. We studied a Lao Language from a Lao linguist for creating suitable learning materials. For future work, we plan to evaluate the effectiveness and efficiency of iCALL by conducting a comprehensive user study with general Thai people and students in sister schools for ASEAN.

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