

# Improving Language Learning through the Use of Natural Language Processing

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## Abstract

This paper examines how Natural Language Processing (NLP) could bring improvement to language learning of primary school students who live in rural areas. NLP has been used in many ways to improve human way of life. Nowadays, in the cities of Thailand many teachers and students already take advantage of the various NLP systems available to aid language learning in their schools. However, in rural areas it is difficult for students and teachers to implement these technological systems. The paper aims to address how NLP could improve language learning in the rural area of Khao Kho district, Phetchabun Province. The study focuses on how the researcher introduced the NLP application to the school in order for it to be used as a tool to improve English language learning in the area of correct pronunciation of English words. The study follows qualitative approach and focuses on primary school students from grades 4 to 6 from Nong Mae Na school. The data was collected from the primary resources in order to identify problems faced by the students in understanding the correct method of pronunciation as well as the obstacles Thai elementary students face in language learning. The population of this study consisted of 60 students categorized into three groups. The DetectMeEnglish application was used for the study, processing the attempts of the sample group and forming correct English pronunciations during the pre-test. Moreover, it was used in various activities through out the course of two days.

The learning activities targeted developing the students' pronunciation ability and included teaching related to the English Phonics rules, the English final sounds with "s" and "ed" etc. The NLP application was then used again for the post-test to record the improvement of the sample groups English pronunciation. The words used were carefully selected from the English Standard Curriculum set up by the office of Basic Education Commission according to the grades represented in the tests. Nevertheless, each sample group was tested with all the selected words in order to gauge and compare the initial level of understanding and the overall

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improvement of each group. The results show the effectiveness of the NLP application as a productive resource in language learning for primary school students who lived in rural areas.

**Keywords:** Language Learning, Natural Language Processing, Natural Language Processing Application

## Introduction

To find methods to improve students' language learning ability is one of the most challenging things that most language teachers have to face. For the past decade, NLP has become a useful tool to improve many facets in education system especially in language learning. NLP systems are becoming more and more recognized as effective tools that teachers can use in their teaching (Burstein, 2009, pp.6-27). However, the researcher became aware that there are still many rural areas where NLP is yet to reach. It is new and unknown which makes it daunting for teachers welcome this kind of technology into their schools.

This study focuses on the application of NLP in language learning. This study will look into the role NLP can have in language learning in rural areas. It will also define NLP in English language and the implementation of NLP in the language learning framework. The procedure, method, materials are detailed and provide in this paper to allow the work to be used again by other researchers. While not all of the results could be displayed the results and discussion show detailed analysis of the data collected from the study with the most interesting and compelling trends being displayed. The conclusion is the last part of this study, which summarizes the useful implementations and gives recommendations for further research.

### Background of the Study:

The application of NLP is new to education especially when it involves language learning or language assessment. Shermis, &Burstein (2013) see it could be used as a tool to evaluate students' second language proficiency in reading, writing, or speaking. NLP can be used by students independently but also coupled with teachers tutoring to improve students second language proficiency. Thus, it is an effective use of technology to develop approaches to improve language learning.

There are many aspects of NLP one of which is phonetic analysis to detect and potentially correct pronunciation errors such as incorrect final sounds of "s" in English of ESL students (Leacock, Chodorow, Gamon, &Tetreault, 2010, pp.1-134). This research utilizes the DetectMeEnglish application which is a software which is able to identify the sounds produced by the learners and motivate language learning in natural settings. The application also provides an effective approach for improving and developing an efficient system of managing phonetics input in natural settings. NLP uses English Phonics rules according to the science of phonetics such as consonants, short vowels, long vowels, silent, soft sound, syllable etc (Wahl, Winiwarter, &Quirchmayr, 2010, pp.381-388). This approach can use as a tool to help students improve their pronunciation abilities. Thus, the method of using NLP for this research aims to emphasize improving language learning through NLP applications.

### Educational Inequality in Thailand:

An issue in Thai education is that rural schools are resourced and staffed unequally to that of city schools. It is recognized all over the country that small schools lack both sufficient state funding as well as the teachers needed to increase the quality of teaching and

academic performance levels in students (Bangkok Post, 2017). The difficulty for many rural teachers is that they must teach multiple subjects. Small schools don't have enough funding to employ specialized English teachers.

NLP is an applicable and useful tool to aid language learning in rural areas as many studies have shown the effectiveness of using NLP as a tool to develop and improve aspects of the educational system and language learning curriculums. In rural areas where the schools are situated in the mountains, far from civilization, the NLP technology seems too new and complicated to adopt into their curriculum. Many schools seem either unaware or too wary to attempt using an NLP approach in their teaching methods. This being the case there are many people all over the world using it to improve their language learning (Johnson, W., L., 2007). This research hopes to develop awareness in rural communities that many schools are losing the opportunity to improve their teaching methods and utilize this fascinating setting to develop a better education standard.

## **RESEARCH METHODOLOGY**

### **Objectives of the Study**

The main objective of this research was to investigate the efficacy of using NLP applications to develop and improve language learning of primary school students in rural areas. The researcher also aims to create awareness for rural teachers to see the benefits of NLP applications in their classroom so that in the future NLP applications designed to improve language learning will reach further into the rural schools of Thailand.

### **Sample Group, Tools and Method**

The population of this study consisted of 60 students categorized into three groups, group A was grade 4 age between 9-10 years old: 6 boys which was 30 percent and 14 girls which was 70 percent, group B was grade 5 age between 10-11 years old: 12 boys which was 60 percent and 8 girls which was 40 percent and group C was grade 6 age between 11-12 years old: 14 boys which was 70 percent and 6 girls which was 30 percent.

The DetectMeEnglish application was used for the study, processing the attempts of the sample group and forming correct English pronunciations during the pre-test. Moreover, it was used in various activities though out the course of two days. The learning activities targeted developing the students' pronunciation ability and included teaching related to the English Phonics rules, the English final sounds with "s" and "ed" etc. Additional activities were planned to encourage the students to enjoy learning English such as games that were still related to English pronunciation but less of an academic setting so the students could have fun (Mitchell, Evanini, & Zechner, 2014). The NLP application was then used again for the post-test to record the improvement of the sample groups English pronunciation. The words used were carefully selected from the English Standard Curriculum set up by the office of Basic Education Commission according to the grades represented in the tests. There was a total of 30 words

chosen; 10 for grade 4 level, 10 for grade 5 level and 10 for grade 6 level. Nevertheless, each sample group was tested with all the selected words in order to gauge and compare the initial level of understanding and the overall improvement of each group.

### **Data Collection**

The data for this research were collected at the beginning of the first day with each student being given the opportunity to pronounce each word three times and the number of correct and incorrect pronunciations recorded. Data were then once again collected in the same way at the end of the second day in order to measure the overall improvement of the sample groups.

### **Data Analysis**

The average results from the pre-tests and post-test were compared to acquire the overall percentage of improvement of the students. Then the researcher analyzed the sample groups further to see the individual trends in each group and the levels of phonic awareness and understanding of the phonic rules each group displayed.

### **Improving Language Learning Therapy**

NLP provides theoretical grounds and practical implementation for teachers to use technology-based computer systems in their classrooms to improve the experience students have in language learning (VanLehn, 2011, pp.197–221). The linguistic aspects of NLP systems in educational contexts can assist in managing and dealing with the complexities Thai teachers have when teaching English speaking. Many Thai teachers lack confidence to teach English and those that do can never be absolutely certain that they haven't mispronounced a word when it comes to speaking. This can promote negative language transfer in students for example they may remain unaware of the final sounds that are present in the English language because their teachers suffered from interlanguage fossilization and were unable to pronounce the final sounds themselves (Richards, & Rodgers, 2011; Branden, 2012, pp.140–148). NLP can prevent this by enabling Thai teachers to analyze the phonetic, syntactic and morphological factors by using the NLP systems. The use of NLP systems can also motivate students in language learning as they can be applied to enhance the educational practices and the overall academic performance of students. Nowadays, technology is something that the younger generation is excited about so by using it in education teachers can motivate students to focus and develop understanding of the content the teacher provides during their lesson (Benson, P., 2013). The linguistic tools assist in the process of evaluating and managing the problems teachers have when teaching the phonetics and morphological composition of speaking but also in many of the other components and skills in English as well. Hence, it can be said that NLP applications have unlimited potential in educational environments (Eskenazi, 2009, pp.832– 844; Evens, & Michael, 2016)

### Research Conceptual Framework

This results from the research can be conceptualized and shown in the figure below.

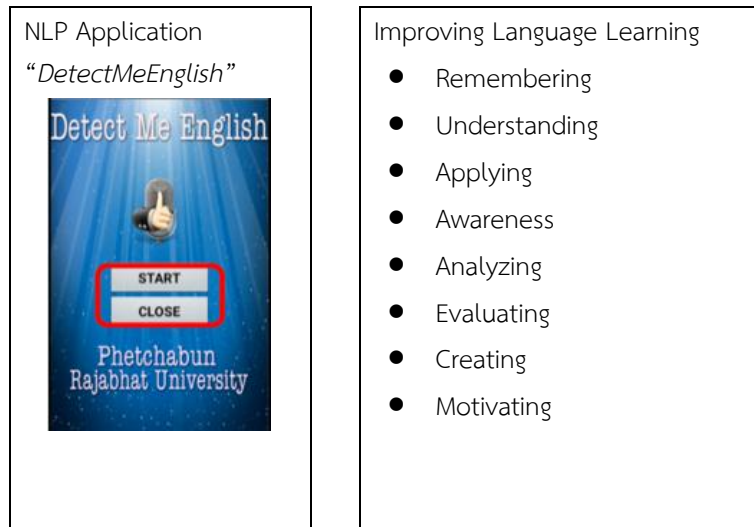


Fig. 1 Research Conceptual Framework.

The eight identified ways that NLP can improve language learning include 1) Remembering: students ability to re call, express and reproduce information about the English language, 2) Understanding: their ability to interpret English and give examples of their own, 3) Applying: students ability to implement and apply what they have learnt from the NLP application to answer questions and problems, 4) Awareness; ability to recognize their own mistakes and errors, 5) Analyzing: their ability to compare and explain the features of their own language and that of the L2, 6) Evaluating: students ability to look at English critically and judge how it can be used appropriately 7) Creating: students ability to make sentences and English words, finally 8) Motivating; students are given extrinsic motivation when they are allowed to use an NLP application in education.

### RESEACRH RESULTS

Population of this study consisted of 60 students categorized into three groups. The overall results showed that when displayed in a pie graph the students achieved 26% accuracy on the pre-test and 74% accuracy on the post-test see Fig.2.

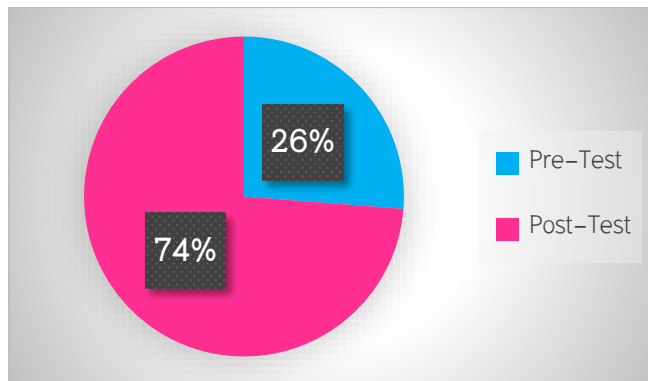


**Fig. 2** Overall pronunciation accuracy before and after using the NLP training application.

This shows the level of improvement after using the NLP application for only two days. All of the sample groups improved significantly supporting the concept that NLP can be utilized effectively to promote language learning of students in rural areas.

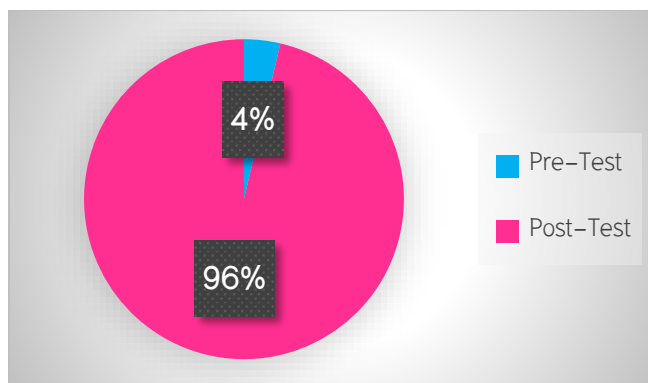


**Fig. 3** Grade 4 student's pronunciation accuracy of the higher level standard words before and after using the NLP training application.

Upon further more detailed analysis of the results, it became apparent just how effective NLP is for improving the English pronunciation of rural students. Initially the sample group was unable to pronounce the grade 5 and 6 level standard words correctly; achieving only 4 percent accuracy however after being exposed to the NLP application for two days their accuracy improved dramatically achieving a 96 percent level of accuracy according to the Fig 3. The NLP application was able to equip the students to achieve a higher percentage of correct pronunciation of the words which were even beyond their level of learning. Even for the words that were at their level of understanding, the NLP application was able to take them from a 31 percent accuracy rate to a 69 percent rate of accuracy according to the Fig 4. This supports the

evidence that NLP applications are great tools to improve language learning in rural areas where there is a lack of resources and learning opportunities.

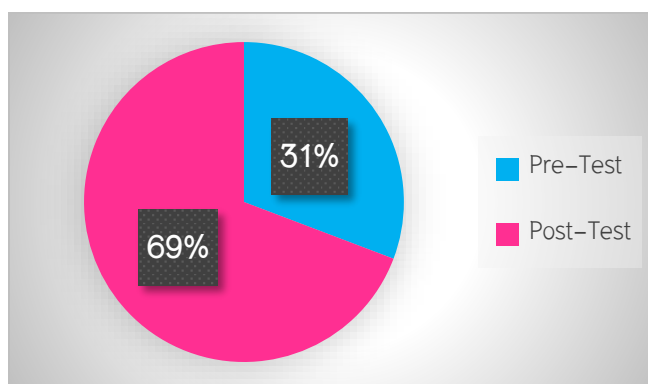


**Fig. 4** Grade 4 student's pronunciation accuracy of their level standard words before and after using the NLP training application.

## DISCUSSION

All sample groups showed the same trend however not to the extent of which it is seen in the data recorded from the grade 4 students. The fact that in the pre-test all the sample groups showed an extremely low level of understanding of the English phonological rules was surprising. The pre-test results of the grade 4 students vary only slightly to that of the students in grade 6 who should have already acquired the grade 4 and 5 level words in general education. Where general education seemed to fail the students in developing the students lexicon within two days, the NLP application had motivated the students to self-correct to the point that when they spoke into the android smart phone's microphone the written font would turn green to show a correct pronunciation. The machine developed awareness in the students by reiterating the correct pronunciation over and over again until the students were able to pronounce the words for themselves. This two day study is undeniable evidence that the NLP application if used continually in the rural school's curriculum the students would achieve higher academic results in language learning, especially in the area of pronunciation.

## CONCLUSIONS

In conclusion, NLP provides perfect solutions to the many of the problems and barriers rural teachers face in the current Thai educational system. The results of this research emulate how much the current method of education is affecting the academic progress and learning of the students in regards to correct English pronunciation. NLP applications in the classroom are a cost-effective method to assist the progress and improvement in the learning ability of students. This is not only in the area of pronunciation but NLP can be implemented to improve

all English skills and the assessment of texts. It is inequitable to presume that rural teachers will be able to teach all the subjects required of them in the current system. When it comes to pronunciation the benefits of using NLP systems are unquestionable in that students can be assured that they are receiving accurate native like pronunciation training. This reinforces the importance of incorporating NLP into English teaching curriculums. Not only this, but the use of NLP devices to check grammar, syntax, and sentence composition will save teachers time and provide assistance for both teachers and learners. Learners can receive intrinsic motivation by using NLP applications like that of the DetectMeEnglish software. Through these applications students are encouraged to self-correct and practice even when a teacher is not present.

### SUGGESTION

In the future further research could be conducted to identify the impact of ongoing individual learning, using NLP applications because NLP provides theoretical grounds and practical implementation for teachers to use technology-based computer systems in their classrooms to improve the experience students have in language learning (VanLehn, K., 2011, pp.197–221). The linguistic aspects of NLP systems in educational contexts can assist in managing and dealing with the complexities Thai teachers have when teaching English speaking. Hence, it can be said that NLP applications have unlimited potential in educational environments (Eskenazi, 2009, pp.832– 844; Evens, &Michael, 2016)

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