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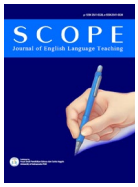

Research Article

Using PRAAT in Teaching the Monophthongs to the EFL Students in Indonesia

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KEYWORDS

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A B S T R A C T

PRAAT software can easily and rapidly improve the students' ability in pronouncing monophthongs in Phonetics class. The effectiveness of this software can help the students acquire the quality of monophthongs sounds. Furthermore, this software could reduce the problem of students in learning sounds of monophthongs accurately such as the accuracy of F1 and F2 that is contained in monophthongs. It provided many programs on how to record, to analyze, to measure, and to save in the wave file. This research aims to investigate to what extent this software affects teaching monophthongs sounds in Phonetics class for students. This research was conducted with 40 samples of students. They are divided into two groups, 20 students for the control group and another 20 students for the experimental group. This quasi-experimental was to determine the best treatment before and after giving the treatment by using CALL for the experimental group and NON-CALL for the control group. Before using the software, the students were given the pre-test . Finally, they sat for post- test in the last meeting. The result was exposed through analysis of a t-test. It showed a significant difference in learning through PRAAT software ($p<.05$). In addition to that, teaching vowels sounds proved to be more successful using PRAAT than the traditional method.

INTRODUCTION

Every language in the world has its own unique phonetics system. Even though the symbol in each languages seem similar, every respective sounds has a different quality. In Indonesia, there are 722 languages. Most Indonesians are able to speak two languages; Indonesia as a second language and a regional language as a first language, while English as a foreign language in Indonesia, is usually learnt as a thirdd language. In Aceh, a regional language is Acehnese. Such as , All of these languages absolutely have different quality of phonetics, or way of pronouncing. English vowels are different to Indonesia in terms of their quality and length while Indonesian and Acehnese vowels are different only in terms of quality as the differences in length of a vowels . There are some English vowels that are absent from the Indonesian and Acehnese vowel system for example, [æ], [I], [ʊ], [ɑː] and [ɝ]. Some are identical such as /ʌ/ and /ɛ/, while others are similar but produced with a shorter duration such as /iː/, /uː/, and /ɔː/ (Masykar et al., 2022). As far as the features of English concerned, Acehnese- Indonesian bilingual may face difficulties in

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pronouncing the vowel sounds. In addition for the EFL English not used every day,as they usually study at school and university. Thus, fluency of using English appears to be lower than in ESL (Larassati et al., 2022).

Vowel and consonants are a part of phonetics that should be studied by university students, especially students in the English department. This subject becomes one of the crucial subject for them. It has a significant impact on their pronunciation and speaking class. Furthermore, it will be a good contribution to being an exemplary Indonesian teachers teaching English in the future. The main problem that should be considered is that, the dissimilarity between the native (Indonesia) or the regional language (Acehnese) and the target language (English) could trigger difficulties within the language learning process. This problem may be related to the recent case. The candidate of English teachers from Aceh produced the similar sound such as /I/ and /i/, /e/ and /a/, /u/ and / ʊ/, and / ɒ/ and / ɔ/. They found it difficult to distinguish the short and the long of the monophthongs (Fata et al., 2017). Another important finding was that all the students were unable to identify the vowels that were present in the short story. They found some difficulties and established different qualities of vowel sounds (Evans & Alshangiti, 2018). This problem also appeared in the phonetics class at the Universitas Jabal Ghafur. The students were not able to distinguish the short and the long vowels in the lesson. Usually, they made mistakes in articulating the sounds. As a result, the long and short vowels found in monophthongs become a case, and they are also quite distinctly different from each other in the vowel space.

In spite of these recent findings about the role of how to study the vowel sounds, CALL tends to be more diversified in solving the above problems. The advantage of CALL promotes language interaction between teachers and learners, hence developing their intellectuality in using the technology efficiently and improving the learning process (Dina & Ciornei, 2013). The other effect of CALL in teaching language is that, CALL could provide immediate feedback for the teachers and learners, and is more exciting, fun, and flexiblefor using (Hani, 2014). Turning now to the other experimental evidence on the use of CALL, which enhances the teachers and students' ability in pronunciation by using the *Pronunciation Power* (PP2), this software had a great potential in providing new pronunciation learning and teaching opportunities for both learners and teachers (Gilakjani et al., 2019)

PRAAT is a software which can give significant results for the pronunciation and play a more active role in promoting the teaching of English phonetics (Li, 2019). Regarding the great advantages of studying vowels, as a matter of fact, it can make the learners improve their naturalness in pronunciation, and intelligibility of speech, and also allow the learners to become more confident in speaking. A great tool or software is needed in the language classroom to teach and measure vowels more accurately. In turn, the EFL studentsshould be correct and be able to pronounce the vowel sounds. Besides this, they should also know how to measure the vowels, especially in monophthongs. As some of them will become English teachers in the future. It is crucial for them to learn how to analyze the sounds of vowels accurately, aiming to avoid ambiguity in communication.

In this case, PRAAT was one of the appropriate software to face the problem as described before. This software was always upgraded every year. It was conducted at the Department of phonetics, University of Amsterdam. PRAAT is one of the best software for the students and teachers in measuring vowels sounds. It is an opened source acoustic analysis software (Pillai & Delavari, 2012).

Furthermore, several reasons can be discussed why the PRAAT should be used by students. First, technology can help EFL learners to achieve their ability to produce vowels. In addition, it is free software that can be installed on any version of windows. This is easy to use for learners or teachers. PRAAT is used to create a cater with an easy interface. The interface provided in PRAAT can try searchable, manual, and various possibilities of analysis, manipulation, and labeling. PRAAT is one of the tools that can be a standard and an integral part of a phonetician's toolkit to measure the acoustic speech signal in phonetics class (Buech et al., 2022). Another significant aspect of this software, is that it can assist the user in recording and editing the sounds in measuring the vowels sounds for the acoustic analysis (Ghafur, 2022). In addition, it can set up the wave form and narrow and wide bands of the spectrogram. Moreover, several Indonesian researchers also used this software as a tool to measure their findings such as (Firdaus et al., 2020; Larassati et al., 2022; Mulansari et al., 2014; Studies et al., 2022).

Primarily, PRAAT is commonly used by linguists, phoneticians, and dialectologists in Indonesia. However, in Aceh, most lecturers and students rarely use this software in teaching pronunciation and phonetics. Many of them used the traditional way of teaching vowels in phonetics classes. They still teach with monotonous ways such as using books, repitition based on the instruction from the audio. The other aspects, the lecturer was still unfamiliar with this software as well. As a result, the students became bored in the classroom, and they often found some difficulties in pronouncing the vowels sounds accurately.

In this study, the researchers would like to conduct this research by using CALL with using PRAAT software. The advanced in speech technologies is possible in sharing and implementing better ways to learn and teach the prosodic feature of intonation. CALL is able to demonstrate pitch contours and waveforms by visualizing and representing them graphically (Hamlaoui & Bengrait, 2016). As pointed out, many aspects could be enhanced by using PRAAT. This modern way of teaching seems more effective and interesting for learners. This software is an effective software in teaching prosodic features of English. The learners were more active in recording, measuring, and analyzing their sounds using the technology (Gorjian et al., 2013). It was supported by the new curriculum and the revolution of the 4.0 Era. They did not need to listen and repeat the words pronounced the way the teachers usually did, which is the traditional way. In other words, the teachers were more active than the students in the language classroom. Therefore, this research can be a result of filling the gap from the previous studies.

Hence, this study only focused on teaching vowel sounds, especially for the monopthongs in long and short vowels. These sounds often confused the learners in phonetics classroom. Hence, the reseacher used PRAAT as a software that could examine the effectiveness or the improvement of the learners' ability through teaching monophthongs by using CALL. Therefore, it can be formulated that "To what extent does the PRAAT software affect the teaching vowels in pronouncing, recording, measuring, and analyzing the monophthongs?", and "Is there any significant difference after giving the CALL with using PRAAT and NON-CALL for teaching Phonetics class?"

METHOD

Subjects

The researchers used purposive sampling. This technique used the judgment sampling in which particular settings persons or events select deliberately to gain important information that cannot be obtained from other choices. It is where the researcher includes cases orparticipants in the sample because the researcher believes that they need inclusion (Hameed & Taherdoost, 2016). The researchers selected the learners who fulfilled specific criteria. There were 20 respondents for the experimental and 20 for the control groups. All of them were EFL students of University from Acehnese. They were English Education department students in the sixth semester. The aims of this technique of sampling could provide the source of data with a certain consideration. They never used PRAAT in studying the learning of measuring vowel sounds in class. The main point, they have the same dialect and region. To gain good articulation, they did have problems with their dental and lips deformation, such as harelip or orofacial cleft.

Instruments

The elicitation sheet of monophthongs test was applied as an instrument. Ten target words usually used to measure the monophthongs sounds *Heed, hid, head, had, hudd, hard, hood, who'd, hudd, herd.* All of these target words were put in the carrier sentences *"Please say .....again.* It aims to help the informants insert the words in the elicitation (Ladefoged & Johnson, 2011). It can be denied that the entire word elicitation contained unfamiliar words, especially for foreign language or EFL learners. It was necessary to provide supporting or rhyming words to make students pronounce them.

Another instrument was PRAAT version 6.3.0.3. This software can be downloaded freely by the subjects on their laptops.This software can be compatible with different hardware such as, Macintosh,Linux, and also Windows (Cruselles, n.d.). This software was helpful to the informant in gaining the WAV file. As explained in their PRAAT software tutorial, a WAV file is the standard readable sound in PRAAT.

Furthermore, laptop and headphone were also tools to filter the sounds in keeping the quality of voice spoken by the informants. They recorded their voicesusing headphones through PRAAT on their laptops. The informant should record their sounds in the phonetics laboratory.

Collecting the Data

To collect the data in this research, a word list was administered to elicit the speech. It was a way that couldbe used to ensure all the data or the target sounds. All the students were asked to elicit the target words from the word list one by one. It aims to help them measure and analyze their sounds during the post-test. The word list provided in the test sections was unfamiliar words, especially for the second and foreign languages. Hence, it needed supporting words or rhyming words to make it easy for the students to pronounce the monophthongs (Ladefoged & Johnson, 2011).The numbers of words list is shown in the table below:

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Table 1. Word List of Monopthongs

No	Monophthongs	Target Words
1.	iː	Heed
2.	ɪ	Hid
3.	ɛ	Head
4.	æ	Had
5.	ʌ	Hudd
6.	ɑː	Hard
7.	ɒ	Hod
8.	ɔː	Howed
9.	ʊ	Hood
10.	uː	Who'd

The similarity of quality sounds would be the best answer for students. Hertz and Bark had to be concerned by the students while taking the examination in the last session. The students put the words listed above into the carrier sentences *Please say ..... again* clearly and naturally. The students were encouraged to say the word list 3 times to obtain the data accurately. Ten sounds must be measured analyzing both the control and experimental groups.

Research Procedure

This research focused on teaching to pronounce, measure, and analyze the vowel sounds for monopthongs using the PRAAT. It was divided into twelve sections. The first section was for Pre- Test. In this section, the informant provided the test to determine their knowledge about the issue before joining the lesson in the class. In the second up to eleventh sections, the researchers provided to the students how to pronounce and measure the vowel sounds by using PRAAT for the experimental group and provided NON-CALL treatment for the control group. Each section spent around 200 minutes in once a week for study the lesson. In the last section,all the respondents provided the post-test provided in Table 2:

Table 2. Control and Experimental Groups

First meeting	Pre-Test
Second–eleventh meeting	Treatment
Twelfth meeting	Post-Test

Based on the table above that for the second until the eleventh meeting, both the experimental and control groups got the treatments. The control group students, they studied the vowel sounds by using the NON-CALL way. The researchers taught the students how to produce the sounds by using the phonetics chart and phonetics book. While the experimental group used the CALL, which was PRAAT software. In this group, the researchers made sure the students downloaded the software in their laptops in the first meeting of the lesson. Then, they taught how to open, record, save, analyze, and measurethe monophthongs sounds during treatment sections.

RESULTS AND DISCUSSION

Data Analysis

This research was divided into two steps in analyzing the data. Before administering the t-test using SPSS, see to what extent the PRAAT software did the effect or the improvement of students' quality in producing and analyzing the quality of monopthongs. The students took the test how to pronounce the accurately. It was not only for the control but also for the experimental class. The researchers measured the quality of Hertz and Bark that produced both control and experimental groups. The formants' value in Hertz should be converted into a Bark scale because the frequency produced designates the frequencies in the way that they hear. Stevens (2000) said that a bark scale design was used to filter the analysis of auditory signals such as speech. The formula is presented below:

$$\boldsymbol{Z_c} = 13 \arctan (0.76 * F) + 3.5 \arctan (F/7.5)\ 2$$

Where:

Zc = critical-band rate in Bark

Arctan = applied to numbers in radians

F = frequency in kHz

The formula above was provided to know the monophthongs' quality in the spectrogram. The formant frequency was used to analyze the characteristic of monophthongs sounds. The articulation of vowels is a relative statistic from beginning to end, and it does not also glide up or down except toward a new point of articulation subsequent sound (Lee & Lim, 2000). Furthermore, in measuring the monophthongs, it only measured at the midpoint of monophthongs. This result is considered sufficient for the F1 and F2. It is caused by the characteristic of the monophthong itself that does not change throughout the articulation. But it will be somewhat influenced by the neighboring sounds (Ladefoged & Johnson, 2011). The entire result of monopthongs that produced by the control and experimental class. Then, it would be compared by using T-test, a test through SPSS. It

aims to know the effect of PRAAT in teaching measuring, analyzing, and pronouncing monophthongs in control with using NON-CALL and experimental with using CALL.

Descriptive Acoustic Analysis

The descriptive acoustic analysis of F1 and F2 of experimental and control groups after ten meetings studied the monopthongs.

Table 3. F1 and F2 Average Value and SD of Experimental-Group

Vowel	Target word	Duration (Sec)	F1 (Hz)	F2 (Hz)	F1 (Bark)	F2 (Bark)
i:	Heed	0.365	450	2937	4.299	15.477
ɪ	Hid	0.133	455	2881	4.337	15.364
ɛ	Head	0.194	927	2418	8.034	14.304
æ	Had	0.225	811	3078	7.222	15.753
ʌ	Hudd	0. 23	887	1664	7.758	11.895
ɑ:	Hard	0.199	865	1552	7.603	11.428
ɒ	Hod	0.223	847	1552	7.483	11.428
ɔ:	Howed	0.195	630	1312	5.834	10.299
ʊ	Hood	0.179	450	1216	4.293	9.790
u:	Who'd	0.223	472	1262	4.488	10.038
Average		**0.214**				

The table showed that the average duration was 0.214. The quality of students' monopthongs in the experiment group produced good sounds. These qualities were compared with the SSB (South Standard British) quality of monopthongs sounds. The EFL learners were almost similar to the standard quality of monophthongs. It could be concluded that their results were successful, while the Control-Group was significantly different from the result of the experimental group. The quality of monophthongs based on their measurements were described in the following subsection.

The students in the control group could not distinguish long and the short sounds such as the sound [i:] and [I], the average of these sounds were 410 with 0.195 duration. Thenthe similar sounds of [ɛ] and [æ] in short vowels, the quality of Hertz was 612 Hertz, and the last one was the back sounds of [ʊ], [u:], they also produced with the same Hertz. The numbers of their quality were 421. The average total numbers of duration were 5.674.

Table 4. F1 and F2 Average Value and SD of Control-Group

Vowels	Target Words	Duration	F1 (Hz)	F2 (Hz)	F1 (Bark)	F2 (Bark)
i:	Heed	0.195	410	2063	3.937	13.304
ɪ	Hid	0.354	410	2063	3.937	13.304
ɛ	Head	0.206	612	2012	5.683	13.143
æ	Had	0.222	612	2012	5.683	13.143
ʌ	Hudd	0.181	769	1389	6.912	10.682
ɑ:	Hard	0.219	691	1279	6.315	10.128
ɒ	Hod	0.185	663	1201	6.096	9.707
ɔ:	Howed	0.258	489	1370	4.643	10.589
ʊ	Hood	0.165	421	1252	4.037	9.985
u:	Who'd	60.244	421	1252	4.037	9.985
Average		**5.674**				

Descriptive Analysis

The finding data evidence after calculating from the measurement quality of monophthongs result from both two groups, the description of statistics consists of experimental and control groups.

Table 5. The Descriptive Statistic of the Two Groups

Group	Test	N	Mean	Std. Error Mean	Std. Error Mean	Df	T	Sig(2-tailed)
Experimental	Pre-Test	20	59.2500	9.35766	2.09244	19	-10.64	.000
	Post-Test	20	80.2500	7.85979	1.75750			
Control	Pre-Test	20	63.0000	10.05249	2.24781	19	-7.712	.000
	Post-Test	20	75.0000	8.42927	1.88484			

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As Shown in table 5, it can be seen that the use of PRAAT software showed a significant difference between traditional and NON-CALL. The t sig (2-tailed) .000<0.005 means the experimental score was higher than the control with 19 df. It means that there was a significant difference after giving the CALL with using PRAAT and NON-CALL for teaching Phonetics class.

PRAAT was contributed in phonetics class. All of these contributions of this software could impact the student's ability in pronouncing, analyzing, saving, and measuring the monopthongs independently. The result showed that the number of students who were selected for the experimental class learned something new for them. The providing score between the pre-test and post showed a significant difference. There was an improvement in their ability before and after they got the treatment in the experimental class. The average score of the mean before providing the treatment was 59. There was a significant increase in their score after teaching the use of PRAAT, their scores were 80. As a result, the value of the experimental class was 10.641. It means that the null hypothesis was rejected at the significant level of ($p<0.005$) with df =19. In this case, PRAAT was a significant contributor to increasing the student's ability to pronounce, record, analyze, and measure vowel sounds.

Furthermore, by analyzing the duration and comparing the two groups' data, there was a significant difference inHertz of monopthongs quality between the experimental and control class after analyzing both these groups. The average data of F1 and F2 of the control group for the sound [ɛ] and [æ] was similar in the word list *head* and *had*. Besides the numbers, the students found it hard to distinguish between the sound of [i] and [I], and the acoustic distance between both of these sounds was very close. As previously stated, the students in the control group cannot distinguish long and short sounds, it also occurred in the sounds of [ʊ] and [uː] in the word *hood* and *who'd.* They produced the same quality, Hertz. The result finding of a previous study that most students college students' China in the phonetics class, they were able to move the position of the tongue, but the error in the position of the lip during pronounce vowels. They got the problem of producing the quality of long vowels.The duration vowels of Mandarin Chinese has no difference. It was caused by teaching English phonetics classes that still used the traditional explanation, imitation, and training with old fashion methods (Huang, 2016).

The result of this research compared the students' ability to produce vowel sounds, especially for monophthongs, it showed that PRAAT or CALL was more accurate than the traditional way or NON-CALL. At this point, the students can produce the sounds by recording their own at home or everywhere. They can be targeted or corrected when they found their mistake with rerecording and reanalyzing until they provided the sounds based on the standard quality of vowel sounds. The other advantage, the students in the computerized environment appeared to become more active, and enthusiastic and enjoy their learning in every section of the class.

CONCLUSION

In summary, PRAAT is proven as software that helps students in learning vowels in phonetics class. The students was able to pronounce and know the differences of long and short in vowels space. The accuracy of the quality can be measured independently with using PRAAT. They can compare the quality of their sounds with the standard of vowels quality undoubtly, pointing out the F1 and F2 in spectogram , subsequently they can also find where they made their mistakes. PRAAT can be easy and quick to determine the mistake of the students in pronunciation, and also which of the students need additional assistance by checking the visual feedback that was shown on the students' PRAAT screen (Le & Brook, 2011).

Furthermore, the finding of this study indicated that the experimental class and control class have different contrasting results. Teaching using PRAAT had a tendency to be more interesting, and provided a wide outcome in the learning process. PRAAT changed the learning method from being teacher-centered, to student-centered. The students was motivated and became active in the class. They were interested and motivated to test themselves outside of the classroom. In contrast, NON CALL did not show the significant effect for the students. The way of NON-CALL is still concerned with the teacher-centered learning method. The students cannot measured their sounds and lso found it difficult to distinguish long and short vowels. They produced the same sounds in the Phonetics class.

Notwithstanding, this study has some limitations; the first was the small scale of the sample. There were only 20 students. Further research should do on a large scale. The object of this study was only for the students, yet the results should also cover teachers and lecturers for the following study. However, this research needed to explore the other effect of this PRAAT, such as the vowels in diphthongs, word stress and sentences stress.

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