



ARTIFICIAL INTELLIGENCE CHATBOT APPLICATION FOR IMPROVING TEACHERS' SPOKEN GRAMMAR IN SPEAKING IN BINA BHAKTI SCHOOL

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Abstract

The number of grammatical errors often occurred during conversations in English by teachers in school. Those grammatical errors led to several fatal misunderstandings during some visits from foreign institutes and guests. There were 30 teachers consisting of both Primary and Kindergarten school teachers who were participants in English class for teachers. The purpose of this study was to improve the spoken English grammar of Bina Bhakti school teachers by using artificial intelligence-based application called chatbot which assisted participants to improve spoken grammar with Inductive-Deductive method. The research design was Classroom Action Research (CAR), which was done in two cycles with explanations as opening and chatbot as tool to encourage participants' speaking ability. The findings showed that there was an improvement in spoken English grammar by giving participants feedbacks regarding their English learning progress. The improvement was made by all participants by number of accuracies to 87.60% from 38.75% in term of number of grammatical errors.

Keywords: chatbot; grammar; speaking; inductive-deductive; CAR

Abstrak

Jumlah dari kesalahan penyusunan letak kata sering terjadi saat melakukan percakapan dalam Bahasa Inggris oleh guru-guru di sekolah. Kesalahan penyusunan kata tersebut menimbulkan beberapa kesalahpahaman pada saat kunjungan oleh institut dan tamu dari luar negeri. Terdapat 30 guru sekolah yang terdiri dari jenjang Sekolah Dasar dan Taman Kanak-kanak yang menjadi partisipan dalam kelas bahasa Inggris untuk guru. Tujuan penelitian adalah untuk meningkatkan kemampuan berbicara bahasa Inggris dari guru-guru Sekolah Bina Bhakti dengan menggunakan aplikasi berbasis kecerdasan buatan bernama chatbot yang membantu partisipan dalam meningkatkan kemampuan berbicara dengan metode induktif-deduktif. Rancangan penelitian menggunakan Classroom Action Research (CAR), yang dilakukan dalam dua siklus yang dibuka dengan penjelasan dan chatbot sebagai media untuk mendorong kemampuan berbicara. Hasil penelitian menunjukkan terjadi peningkatan dalam penyusunan pola kata bahasa Inggris dalam berbicara dengan memberikan timbal balik kepada partisipan mengenai hasil pencapaian pembelajaran bahasa Inggris. Peningkatan terjadi pada seluruh partisipan dengan akurasi hasil yaitu 87.60% dari 38.75% dalam kesalahan pola penyusunan kata.

Kata Kunci: chatbot; grammar; berbicara; induktif-deduktif; CAR

INTRODUCTION

Grammar is one of most important aspect in language system. It forms the way of how information is conveyed and determines the meanings of each word within

sentences. The way an information is conveyed shows significant impacts in daily communication. Each language has their own grammatical system. Therefore, a system within a language does not always have any counterparts in another language system. Grammar is one part of the language system, which varies in other language systems. This poses challenges for many learners, who learn their second language. Many learners fail to master and acquire the second language due to many hindrances during the learning process. Grammatical system is one of the hindrances that learners face. The difficulties of grammar comprehension cause misunderstandings in language learning (Pawlak, 2019). Those misunderstandings create some barriers in global interactions with other individuals with different and various backgrounds.

Some cases happened in a private school in Kubu Raya, West Borneo. A school called Bina Bhakti School is a private school founded in 2013 by Yayasan Kuning Agung Pontianak. It is located in Adi Sucipto street on the kilometer 8.2 in Kubu Raya regency in West Borneo, Indonesia. It is a trilingual school which focuses on the global communication achievements where Indonesian, English, and Mandarin languages are taught and practiced throughout the daily activities within school environment. The mission of the school is to produce high-quality students who are capable of making global communications and interactions with people from different countries. There are in total of 30 teachers consisting seven kindergarten teachers and 23 primary school teachers. Thus, all teachers and students are required to learn both English and Mandarin languages for global communications.

There were two fatal cases which is caused by foul grammar in speaking. The first one was during a visit from guests from China, when one of the guests got offended by one of Bina Bhakti school teacher due to wrong pronoun. The first mistake was the wrong use of pronoun and noun. The teacher somehow used the word “he” when referring to the toilet and referred the calculation of “second” as its raw form which is “two” because of lack of basic English grammar. The guest asked where the lavatory was and the teacher said “he there two time floor” instead of “it is on the second floor”. This caused the guests to get into anger because the guest



thought that the teacher insulted him by saying he was a two-timer. The second one was a visit from university professors from Hong Kong. One teacher actually wanted praise the professor by saying she is beautiful but the teacher instead said “you was beautiful” which caused the professors to get mad thinking she was not beautiful. This was caused by misunderstanding of tenses in sentences.

There was an observation made throughout the year 2021 to 2023 in a private school called Bina Bhakti Private School in relation to English learning and teaching activities. There was a problem with the English language speaking on the all teachers there from the kindergarten to primary school level in daily conversations. Most of the teachers tended to speak English incorrectly, especially English grammar, which led to several misunderstandings in a few visits from foreign institutes. During the period the school held an English class for teachers of Bina Bhakti School in order to correct and to improve their English-speaking skills especially in term of grammar lesson.

Every learner has their own method of learning a language. This makes the learning even more difficult than it seems, as a single learning method do not compatible or suit every learner in their way of learning language. A chatting robot or chatbot was implemented to assist the learners to master and comprehend the English grammar system. Chatbot itself is an artificial intelligence application which is used to create virtual conversation or imaginary conversation between humans and machines (Barata et al., 2022). It is considered as a strategy to improve spoken grammar Bina Bhakti School teachers by its ability to give feedbacks and simulate learning condition (Chaves & Gerosa, 2021). The chatbot itself will improve the ability of teachers to speak more freely in which teachers are able to speak with more confidence and obtain feedbacks from the chatbot regarding the grammatical errors in their speaking (Suarez et al., 2022).

Some studies had been conducted related to this research. A study by (Wahyuni, 2022) implemented the chatbot to improve the English learning for foreigners in order to be able to communicate with native speakers and others-speaking language. It results in a successful experiment where learners feel more interactive to learn by getting feedbacks from their learning in term of vocabulary

and grammar. Another study which was conducted by (Kim et al., 2021), conducted an experiment regarding the chatbot impact on the EFL students' communication skill with purpose of testing its capability to improve English grammar skill in Korean students. It shows improvement as students learn English grammar easier through the interface feedback given by chatbot. (Han, 2021) conducted a study to analyze the effectiveness of chatbot in Korean EFL learners by gathering data regarding Korean EFL learners' experience using chatbot in English lesson in classes. The result is that students are more motivated as they are guided by getting feedbacks during the lessons which led to increased speaking accuracy especially in term of grammar and tenses.

Another study by (Niswah, 2022) related to this study is a quantitative with an experimental method between two classes, which are experimental and control class. The subjects of the study were 20 participants. As a result, the ability of participants who took advantage of the game application increased significantly than participants who did not use the application. It was proven by the value of the pretest and post-test results. During the pretest, the experimental class had a score of 64.70, and the control class had a score of 65.50. Meanwhile, after practicing six times with a duration of 30-50 minutes, the posttest score for the experimental class was 89.60, and the control class was 79.40. Another accurate proof as the answer to the research results of a 2-way (t-tailed) significance value between the two classes shows the number 0.000 on the posttest, so there is a very significant difference. The conclusion again states that the Speedy Grammar game application can be used to solve problems when learning English grammar.

This research is aimed to improve the spoken grammar in English language in daily conversations. This study involved the implementation of artificial intelligence-based application called chatting robot to improve spoken English grammar of Bina Bhakti school teachers in the academic period of 2022/2023. From the literatures, there is a need to conduct a similar study by using inductive-deductive teaching method and Classroom Action Research. There is a lack of studies regarding adult learners in English language learning improvement. Adult learners learn differently from young learners (Anh et al, 2021). They tend to learn by



analyzing and making perceptions from many contexts, rules, and environments related to their study in the learning process instead of given rules about language comprehension.

METHODS

A Classroom Action Research (CAR) was conducted in this study with the method of direct testing as data collection method, in which 30 teachers from a private school in Kubu Raya regency named Bina Bhakti School are selected as samples for this study. Our proposed method for this research is Inductive-Deductive teaching method with some assistances from artificially-programmed artificial intelligence called chatting robot. The process of how the method was carried out is in form of classroom action research model. Classroom Action Research is model of carrying out lessons to give room for improvement in learning (Meesuk et al., 2020). The Classroom Action Research (CAR) was used as strategy for improving the speaking skill to improve spoken grammar. This research involved teachers within the teacher class to work together along with the researcher during the lesson. The researcher acted as an assistant or a collaborator toward the teacher to study the problems. Thus, the teacher in the English class for teachers was the main teacher, whilst the researcher acts as collaborator. Classroom Action Research is divided into four stages which are planning, acting, observing, and reflecting (Setiawan, 2020).

The procedure of this study starts with the planning stage of Classroom Action Research (CAR). In this stage, the researcher submits lesson plan for teaching activity. The teacher analyzes the lesson plan and sets some lists of activities and how teaching activities should go. Then, the process continues to the acting stage, where teacher teaches the lesson based on the lesson plan made by the researcher. The researcher also gives treatment in form of teaching some part of materials based on the lesson plan. After giving explanations, the teacher asks participants to simulate a conversation with the chatting robot. The chatting robot gives information regarding their errors in grammar during conversation and replies to the participants according to the interactions made by participants.

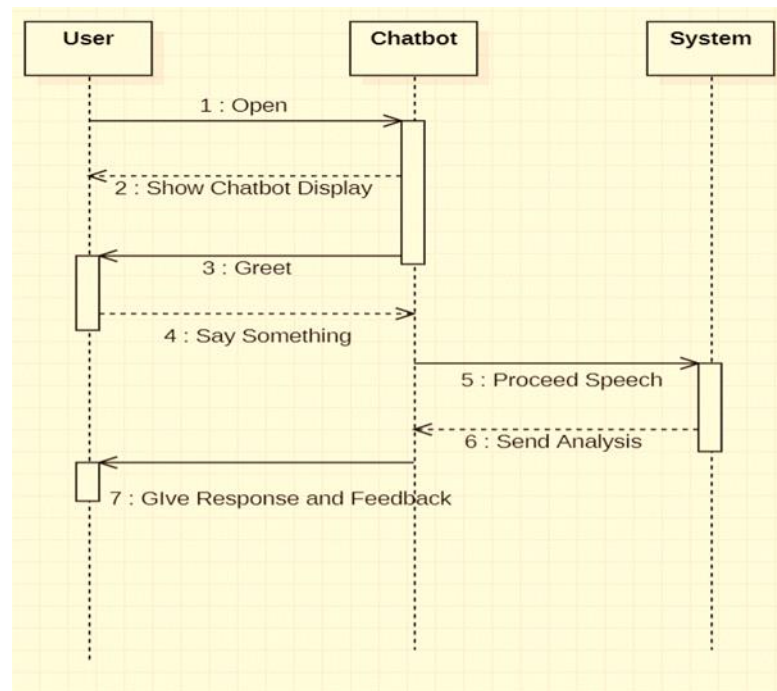


Figure 1 Sequence Diagram of Human-Chatting Robot Interaction

The teacher then asks all participants to communicate in pairs related to the lesson topic. The researcher then records their conversations to collect data for analysis. After giving treatments along with teacher to the participants, the researcher and the teacher summarize the results from the recorded data. The results of the collected data are analyzed to determine whether the expected results have been achieved or not. In case of insufficient target in a cycle of Classroom Action Research, another cycle with the same process is conducted once more.

Inductive-deductive method was chosen because it is more suitable to be used for teaching adult learners with the implementation of chatting robot to enhance and support the learning process. The tested areas of the spoken grammar were self-introductions, greetings, askings for permissions, and showing directions. The aim of Classroom Action Research in this study was to investigate the implementation of chatbot in improving the speaking skill by having all teachers who are considered as students to learn about speaking skill from both the teacher and with the assistant of chatbot during the lesson to improve the knowledge about the fluency that leads to proper grammar usage in speaking. Classroom Action Research has the advantage of improving the current class condition or to increase the quality of any educational



matters (Syakur, 2020). The results will provide insights about improvement made by chatting robot within inductive-deductive teaching method in Classroom Action Research.

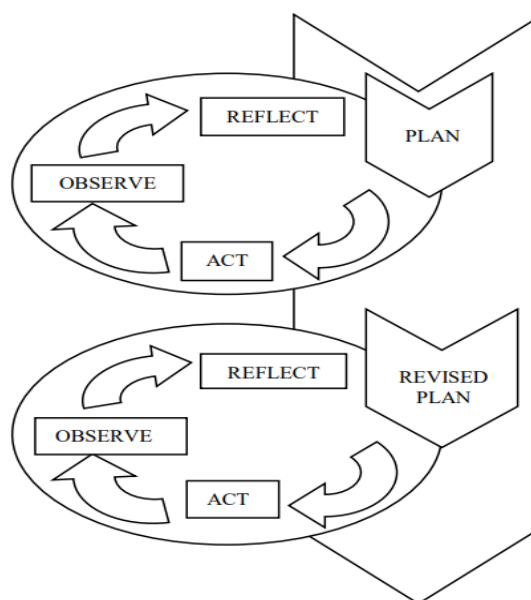


Figure 2 Classroom Action Research Process (Setiawan & Islami, 2020)

The parameters which are used to measure the improvement of spoken English grammar in participants are accuracy, speech rate, number of grammatical errors, and total number of words spoken during data collecting process. Those parameters are measured from every cycle in Classroom Action Research with some observation results to determine whether the expected results are achieved or there is a need for another cycle to achieve such results (Lampe et al., 2023).

Analyses are made by making comparisons between the second cycle and the first cycle of Classroom Action Research (CAR). The improvement made during the chatbot use in the second cycle compared to the first cycle shows some gaps and differences between results of both cycles. Then all the results within the speaking rubrics and field notes from both pre-chatbot use and post-chatbot use is compared with each other to signify how well the spoken grammar of all teachers of Bina Bhakti has improved. The statistical analysis uses the mean score for each cycle of the pre-chatbot and post-chatbot use for both monologues and dialogues. The mean score is calculated based on total both the participants' score in the accuracy of

spoken grammar divided by total number of words, which is divided by the number of participants.

RESULTS AND DISCUSSION

In the collected data, it is essential to find the source of the grammatical errors in spoken grammar. Those errors can be identified from several factors such as anxiety, lack of English grammar comprehension, and insecurity of speaking English. The problems which were faced by the participants as adult learners in learning English were that they often learnt without getting enough feedbacks which caused them to have less information whether their learning was correct or not. This caused them to speak directly without knowing that the grammar was foul or incorrect, which led to improper grammar usage in English speaking. Since not all participants came from the English education background, they tended to be nervous when it comes to speaking English, which caused them to speak English with foul grammars that also caused some misunderstandings with other speakers. The grammatical error in speaking was also caused by insecurity of participants whenever they communicate in other languages. Learners were often inhibited about trying to say things in foreign languages, worried about making mistakes and fear of criticism during their learning of English-speaking. Participants often ignored the grammar due to the mindset of catching the point of conversations and the influence of their first language. This also occurred in daily conversation, which became an issue when it came to professional speeches or language proficiencies.

Based on the process of Classroom Action Research (CAR) teaching method on the spoken grammar of Bina Bhakti school teachers, which had been implemented during the two meetings speaking class every Friday on March 24th and April 14th. There are some findings which were taken from the teaching and learning activities. First, the first cycle of Classroom Action Research did not manage to achieve the expected results. It was caused by participants' anxiety of learning new thing, which was English grammar. The second finding is that participants who do not understand the English grammar tended to omit the proper grammar during conversation. Judging by participants' accuracy score of grammar



usage and speech rate in both cycles, some managed to identify the proper grammar in self-introduction, showing directions, asking for permissions, and greetings with minimum errors when speaking. Those participants were also able to speak more confidently whilst maintaining the proper spoken grammar without thinking about which grammar should be used for speaking, which most of the time lead to errors in spoken grammar. While the ones who lacked understandings and had anxiety has lower accuracy with great number of grammatical errors. According to (Chen, 2020), learning anxiety always leads to many negative factors in during learning process.

Tabel 1 Results of Learning

Participants	Accuracy		Speech Rate (s)		Grammatical Error		Number of Words	
	First	Second	First	Second	First	Second	First	Second
Wendy	65.00%	89.33%	131	53	36	16	54	58
Januerty	51.53%	88.53%	164	64	35	15	56	58
Julieta	12.09%	88.31%	167	88	40	20	44	57
Tiara	23.77%	85.67%	159	78	38	18	42	59
Tina	21.84%	81.55%	151	75	33	13	48	53
Evi	30.55%	81.38%	156	89	31	11	56	58
Sriyanti	25.96%	76.50%	175	90	31	11	56	58
Alexander	15.01%	88.42%	168	95	32	12	49	58
Inti	12.45%	76.34%	175	81	39	19	50	58
Afifah	12.78%	75.90%	167	83	38	18	45	58
Ryan	83.79%	99.32%	115	35	10	2	43	58
Hendi	81.65%	99.97%	115	30	14	1	42	58
Amos	38.44%	88.54%	155	42	33	13	47	58
Kornelis	22.45%	83.88%	165	47	34	14	48	55
Retno	19.10%	87.88%	162	55	34	14	56	58
Jannati	83.59%	97.99%	126	36	12	6	58	60
Septi	45.88%	86.76%	168	60	30	10	57	58
Hafizd	47.82%	88.32%	164	60	25	5	58	58
Dewi	34.55%	85.69%	153	65	31	11	56	58
Aisyah	22.23%	82.15%	158	77	40	20	43	58

Resna	18.76%	88.43%	169	71	32	12	40	58
Restu	76.93%	95.56%	112	40	25	8	55	58
Ulfi	71.36%	94.69%	134	50	22	10	51	58
Dio	13.58%	85.50%	155	68	35	15	50	58
Albert	13.63%	81.11%	170	82	38	18	40	58
Nina	18.65%	86.32%	178	44	40	15	42	58
Tata	30.55%	88.91%	170	55	40	15	43	58
Oktavia	12.67%	90.85%	183	41	34	10	40	58
Yubilta	80.25%	99.43%	169	75	15	9	45	58
Yuda	75.67%	95.65%	162	79	26	9	59	58
Mean	38.75%	87.96%	156.53	63.58	31	12	49	58

There are four indicators which are used for measurement of spoken English grammar improvement of Bina Bhakti School teachers. Those indicators are accuracy, speech rate, number of grammatical error and total number of words, which were spoken during the sample collecting. Each indicator has their own mean score for each cycle of Classroom Action Research (CAR). The mean score of accuracy describes the total number of correct grammars which were made in each participant's speech in each cycle based on the total number of words spoken by participants. The mean score of speech rate indicates the average time participants took to finish their own speeches. The lower the mean number of speech rate means the participants are more fluent and able to speak more freely without thinking or making pauses between sentences or words too much. The mean of grammatical error is the average number of grammatical errors which were made during speaking session. The mean contributes to the mean of accuracy of spoken English grammar, where it shows that the higher the mean score of grammatical error means the lower the mean of accuracy. The last indicator which is total number of words is the total number of words spoken by participants. The mean of number of words indicates how many words were spoken by participants on average. The level of fluency determines the confidence of students' speaking skill. Higher level of grammatical mastery and comprehension in language speaking gives speakers more confidence in and self-esteem (Tiana, Jimi, & Lestari, 2023).



In the first cycle, participants were not able to comprehend the contexts of conversation and which grammar form should be used for such contexts by just given some rules or simply analyze and formulate the grammar pattern toward contexts. Many grammatical errors were made as most of the participants lack the basic English grammar comprehension regarding how to use and place those grammar patterns. Some also were not quite responsive and tended to think too much and too long before speaking. A chatbot or chatting robot was implemented after some explanations from teacher and participants' self-understanding of grammar formula taught in Inductive-Deductive method. While speaking with the chatting robot, participants made some mistakes or errors in their speaking especially in term of grammar. Those caused grammatical errors to occur often in the first cycle. In the second cycle, the same chatbot was implemented on the learning process along with the same learning method and model as that of first cycle. Participants were able to speak more freely and more fluently as they got used to knowing directly about the grammar patterns for the conditions of showing directions, asking for permissions, greeting others, and making self-introduction. Because of the deeper understanding of basic form of English grammar, more words are used in the recorded tests in form of monologues and dialogues as participants know understand which words can be used the grammatical pattern to deliver the same meanings (Nurhasanah et al., 2020).

There are points to be noted when implementing the chatting robot as tool to improve the spoken grammar of all Bina Bhakti teachers. The first point is that teachers who are the participants in English class for teachers in Bina Bhakti school learnt from the pattern which the chatting robot showed to them during conversation indirectly. Apart from the direct notes shown to participants, the notes also indicate the deductive method of the teaching method, in which the participants understood from the given conversation in term of contexts, grammars, and grammar usage by looking and analyzing the patterns (Shirav, & Nagai, 2022). Those indications mark the errors the participants made during the first cycle and how the spoken grammatical error in be revised. The second point is the use of chatting robot to once again highlight the problems of foul grammars in spoken grammar really enables the participants to analyze the how to speak fluently in proper grammar which

participants creates their own comprehensions and methods of how to learn proper grammar in speaking with great fluency. The comprehension was created during the first cycle where chatting robot showed the main errors in their spoken grammar. The chatting robot allowed them to speak with it, and the chatting robot replied and responded based on the context, style, and situations of the speakers. From the results of both cycles in term of average accuracy of spoken grammar, average number of words, average grammatical error number and average speech rate of all participants within the English class for teachers, it can be implied that the chatting robot implementation on English teaching actually increases the speaking performance of all Bina Bhakti teachers who are the participants in the English class for teachers.

The chatting robot gave feedbacks and showed which part of grammatical error every student made during the lesson. It also gave more comfortable atmosphere for participants as most of the participants tended to be afraid to make mistakes during speaking session or tended to think quiet long about what words should be used, which indirectly led to less fluency and more grammatical errors in saying particular words order and form in sentences.

The results of the chatbot implementation on the English-speaking class through by using chatting robot was proven useful and effective to solve the problem of foul grammar which was commonly made in any conversations by Bina Bhakti school teachers. According to (Benitez-Correa et al., 2019), inductive and deductive approach was mostly suitable to be used to teach grammar for learners as it gives the learners clue and freedom of making analyses based on the context of learning. It can be seen that the teachers of Bina Bhakti School who were the participants seemed to have their own way of analyzing the context of conversation even with the lack of English basic grammar. From that point of view, participants were able to guess in what context the situation of conversation should be by given some rules or simply let to analyze grammar pattern within sentences.

The implementation of chatbot actually gives a better point of view toward action research for this case. Chatbot itself is effective in giving learners some deeper interaction whilst lessen the pressure in conversations, as well as giving feedbacks regarding the results of learners' achievement and faults (Kim et al., 2021). The



technological aspect is the benefit it offers in place of traditional way of teaching. Innovation is a must go tool for teaching and improving knowledge and analysis. One of the implementations is chatbot in language learning (Haristiani et al., 2019). The improvement is seen from Table 1, where accuracy of spoken grammar really increases by 49.21%. This indicates the improvement made in Classroom Action Research with inductive-deductive method along with chatting robot implementation as the assisting tool. Another improvement is seen by the duration of every speech the participants were tasked. Participants were able to communicate more fluently without thinking too much about the grammatical rules, which decreased the duration of speech rate as they spoke with less pressures and completed their speeches in shorter time. The mean of duration of speech was lessened or decreased by 92.95 seconds. The implementation of chatting robot helped the participants remember their parts of errors in their speaking in term of grammar. Higher accuracy also means shorter duration of speech for every participant. These results were also achieved because of lower anxiety level where participants do not think too much and got used to speaking English properly (Jupri et al., 2022).

CONCLUSION

From the results and discussions, implementation of chatting robot in inductive-deductive method in Classroom Action Research process is able to improve spoken English grammar. By reducing anxiety of learners and giving sufficient feedbacks to improve grammar comprehension and knowledge to learners. Participants were able to make analysis from the contexts and patterns of English grammar by themselves due to their new understanding of it. In addition, they could relate every rule in the grammar pattern with the environment and real life conditions. This makes a new understanding where adults learn by relating everything in their environment to their knowledge and learning.

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