

REVIEW OF RELATED LITERATURE ON RESEARCH METHODS APPLIED IN TEACHING GRAMMAR USING EDUCATIONAL TECHNOLOGY

Maulina Maulina^{1*}, Muhammad Ilham¹, Andi Hamzah Fansury²

^{1*} Assistant Professor, Department of English Education, Universitas Muhammadiyah Kendari

¹ Student, Department of English Education, Universitas Muhammadiyah Kendari

² Assistant Professor, Department of English Education, Universitas Bosowa

ABSTRACT

This paper involves researching, reading, analyzing, evaluating, and summarizing related scholarly literature about research methods used in teaching grammar, utilizing educational technology as one of the research learning sources for future related research. First, the reviewed scholarly article describes how the writers conducted their research. Then, using descriptive analysis, varieties of research methods in teaching grammar utilizing educational technology are investigated. Among the investigated research methods are quasi-experimental, phenomenology, ethnography, true experimental, pre-experimental, descriptive, mixed method of an exploratory study, mixed method of explanatory study, case study, survey method, classroom action research, and collaboration research. However, due to the limited space, the paper only describes popular methods of quantitative approach, including quasi-experimental, pre-experimental, true-experimental, survey studies. Besides, the qualitative approach involves case study, descriptive study, and phenomenology. Also, one of the most popular mixed-method used is explanatory study. The description of each method is supported by examples found in international and national journal articles published worldwide. This paper is expected to be beneficial to readers and researchers in English language teaching (ELT) worldwide.

Keywords: educational technology; literature review; research methods; social media; teaching grammar

INTRODUCTION

English is a communication tool used by many countries to communicate with different cultural, ethnic, skin, and linguistic backgrounds. English is considered an international language, meaning that almost all countries know or use this language in communicating, whether it is used as a second language or a third language. Children also use English, teenagers, adults to the elderly. Even every state leader or state staff must be able to use English to attend meetings or talk with leaders of other countries to discuss a problem or talk. English is also

very popular in Indonesia, not only used as a third language after Indonesian and regional languages but also used to improve skills that are useful in finding work or for use in college exams abroad and domestically.

Educational technology is not only used in terms of having fun, but with the progress of the times, it has turned into a place of learning that can be used by everyone. One sample of educational technologies is social media. Khang et al. (2012) studied social media usage patterns and trends for more than a decade. Their study views advertising, communications, marketing, and public relations as crucial variables. For example, when someone has followed a blog or learning account that teaches various kinds of skills in which there is grammar learning, they are learning individually and able to interact with other learners about the material they are learning. It serves to accelerate the understanding gained than learning independently.

There are some language skills in English. One of them is grammar. Grammar is a rule used to communicate appropriately and correctly according to the context in English. Along with the times and technology, there are lots of social media and learning applications that can improve students' ability to speak English, especially for grammar. Examples of social media applications that can be used in educational settings include Instagram, YouTube, Facebook, WhatsApp, and others (Maulina et al., 2019; Maulina et al., 2020; Maulina et al., 2021; Saputra et al., 2021; Rasyiid et al., 2021; Andriyani et al., 2022). Social media as a learning tool is due to the large number of learning accounts that present or teach English (Maulina, 2015; Maulina, 2019; Maulina & Rusli, 2019; Zainal et al., 2022; Putra et al., 2021; Lar & Maulina, 2021;), one of which is the use of sound and correct grammar. One account as an example is English Village which is an account as well as a place to learn that is not only available in offline or face-to-face learning located in East Java but also provides online learning that can be reached or learned from various groups in Indonesia just by following blogs or their accounts.

Research activities are sometimes directed to prove a hypothesis or reveal a new substantive theory. Some experts use four different research approaches in scientific investigation, namely quantitative, qualitative, mixed-method, and action research. The quantitative approach refers to research design involving deductive thinking to prove hypotheses that will support or reject a theory. The data under analysis are quantified and, therefore, numerical in nature, leading to statistical formulas in the analysis. This approach generates research methods such as surveys, experiments, quasi-experiments, and correlation studies.

Conversely, the qualitative approach refers to research designs involving inductive thinking to reveal hypotheses, which will become substantive and formal theories. The data under analysis are verbal descriptions poured into field notes. Educational research is usually classified into two broad categories: quantitative and qualitative research. Each approach has its methodology and terminology. Quantitative research measures are the objective way to gather numeric data to answer research questions or test hypotheses. It always requires a well-controlled situation. Qualitative research, in contrast, relies much on

understanding social phenomena from the perspective of human participants in natural settings. The formal hypotheses do not begin, but they may result in hypotheses as the study unfolds. Considered a new methodology in which the same study uses quantitative and qualitative approaches is called mixed methods research. The result of mixed methods research is findings that may be more dependable and provide a complete research problem explanation than either method alone could provide. The two words themselves, action and research, indicate the two core components of this approach. Action research is about action based on research and researching the action taken. In addition, action research has been used in various settings, including schools, hospitals, health clinics, community agencies, government units, and other environments. It can be used to enhance everyday work practices, resolve specific problems, and develop special projects and programs. Also, action research is on the premise that local conditions vary widely and that the solutions to many problems cannot be found in generalized truths that take no account of local conditions. (Ary et al., 2010; Maulina et al., 2022; Maulina & Sari, 2022).

There are numerous journals of research methodology in teaching grammar using educational technology. Many research articles can also be found by searching scientific journals through the search engine and reading at the local library like at the university/s library. We can easily find scholarly journal articles about language studies covering studies of English language teaching, pragmatics, sociolinguistics, language acquisition, or psycholinguistics using new educational technology by searching journal platforms of English language teaching research. This conceptual study examines the research methods commonly used by today's researchers in language education. The analysis results are addressed to reveal the current practice in research tradition in this field. From this, the readers will learn different types of research methods implemented by researchers around the world, specifically research methods that have been used during the last ten years in teaching grammar using educational technology.

METHODS

After reviewing more than twenty journal articles in terms of teaching grammar skills in English using educational technology, we found that many methods were used in qualitative, quantitative, and mixed methods in terms of data collection used during the last ten years from 2011 to 2021. The scholarly research articles, both national and international journal articles, were read, analyzed, evaluated, and summarized descriptively.

FINDINGS AND DISCUSSION

As a part of the findings of this conceptual research, under this section, we briefly describe the kinds of research methods that may be beneficial in the research of teaching grammar on educational technology. The quantitative approach includes quasi-experimental, pre-experimental, true-experimental, survey studies. Besides, the qualitative approach involves a case study, descriptive

study, and phenomenology. Further, we found that one of the most popular mixed-method used is an explanatory study. These three approach types are amongst the popular methods employed by today's researchers in teaching grammar utilizing educational technology. Thus, from the journal articles analysis, the writers generate an explanation of these methods followed by examples of each.

1. Quantitative Approach

a. Quasi Experimental Studies

Quasi-experimental is used to see cause and effect using a control group and an experimental group. This group collection is done by selecting participants, not randomly. From a study of 20 articles published in various scholarly journals on teaching grammar using educational technology, we found some titles used and developed from the descriptive analysis. Examples of quasi-experimental studies are as follows:

The first example is Kashanizadeh and Shahrokhi (2021). This study is designed to determine whether grammar learning application has any significant effect on the grammar knowledge of Iranian EFL learners. 50 EFL participants were involved as a comparison to form 2 groups. The two groups have the ability in the field of English based on the nelson English language test results and are grouped into a control group and an experimental group with different age intervals of about 17 to 21 years, where the participants are native Persian speakers. After doing several tests, including pre-test and post-test grammar, to see if there is a significant ability in improving grammar for students in Iran. After going through all these tests, they revealed that the participants in the experimental group experienced a significant improvement through the application of grammar compared to the control group by comparison through statistics. The use of M-learning has a positive impact on grammar or grammar skills. Mobile learning focused on grammar in an EFL context can improve the ability of EFL learners. The research results that use the help of mobile learning technology show how an increase in students' grammar. Comparing the control group with the experimental group showed that the control group got a lower score than the experimental group in the post-test. This research uses mobile assistance; namely, grammar learning can be successfully applied to EFL learners.

The second example is Pudín (2017). This study is designed to answer the students' perceptions of the flipped classroom in learning grammar. In his study, quantitative methods were used to collect and analyze data from several students who were selected to become volunteers in this study. In collecting data, he used questionnaires divided into three types, namely flipped learning, the role of video and social media, and time. Data collection procedures are carried out sequentially according to the arrangement in the questionnaire. This study used 120 respondents with 37.5% female gender and 62.5% male gender with an age interval of 86.7% aged 18-25% and 13.3% aged 22-25%. Various studies conducted on flipped classrooms resulted in positive responses from students; from several experiments, students preferred flipped learning to teach over traditional classes. With this learning, students are more active in interacting to

achieve more meaningful learning. Students feel an improvement in grammar when using the flipped classroom. In the percentage of research on grammar development, five students (4.1%) chose strongly disagree or disagree, 35 students (29.2%) disagreed with this statement, and 80 students (66.6%) agreed or disagreed. He found that the study proves the main purpose of exploring and investigating students' perceptions of the flipped classroom. Some students were asked to participate and give their feedback about this class, and the results of this study showed that most of them gave positive comments that they liked the flipped classroom in teaching grammar. He further says that teaching grammar is more fun and interactive to apply in teaching.

The third example is Kayan and Aydin (2020). They design their study to answer whether there is a statistically significant difference in the pre-tests, post-test, and the comparison of both tests between the experimental and control groups, comparing grammar achievement results, attitudes toward grammar, and attitudes toward the Turkish course of students. They investigated the effect of computer-based games on improving the academic achievement of grammar and attitudes in face-to-face language. Participants consisted of two classes with 6th-grade students who were middle-class students. This game was designed and practiced for 12 weeks in the experimental group. The study results showed that the value of the control group showed a significant difference over the experimental group. The results of the first research objective were answered by carrying out the Mann-Whitney U test. Before implementing educational games that used computer assistance, there was no statistically significant difference in the grammar pre-test scores, grammar attitude pre-test, attitude pre-test scores of Turkish grammar for the control group and the experimental group. The second question based on the trial data of Mann-Whitney U showed significant differences in the post-test scores of grammar achievement, post-test of language attitudes, post-test of attitudes of the Turkish language course participants in the experimental group and the control group after performing computer-based educational games. Shows the results that the difference favors the experimental group, which gets a higher score than the control group. The third problem based on data shows positive results, which have a positive, moderate, and statistically significant relationship in the pre-test scores of grammar attitudes and pre-test attitudes of the Turkish language course for the experimental group. Therefore, they concluded that increasing the pre-test scores of attitudes and grammar will affect a moderate and significant improvement in the post-test of course students. Based on the data that has been done, it shows that the experimental group who played computer-based educational games that were practiced increased compared to the control group. The combination of games in computer-based education is an obligation in teaching language and grammar skills in an educational environment where technological developments are increasingly widespread.

The fourth example is Al-jarrah et al. (2019). Their study aimed at investigating whether using educational games to teach eleventh-grade students in East Jerusalem improves achievement in grammar and whether there are any significant differences between the experimental and control groups in terms of

grammar achievement in the pre-tests and post-tests. Their study was assisted by 62 students who were divided into the experimental group and the control group. The pre-test and a post-test were administered in both groups. The experimental group focused on grammar using educational games for two months, while the control group focused on traditional teaching methods. In hypothesis 1, the researchers conducted a pre-test using a T-test to see if there was a difference between the two groups. Results showed no significant change in the teaching of grammar by the experimental group and the control group. In hypothesis 2, a post-test was conducted, and the researchers used a T-test to determine the differences between the two groups. The experimental group showed significantly higher results than the control group. The conclusion that can be drawn is that the use of games in teaching grammar can improve learning outcomes. This study indicates that the use of educational games in education helps students more effectively in learning English grammar. They further conclude that educational games have an essential role in the learning process because they have mechanisms that students can use to practice their knowledge in an exciting and fun way.

The fifth example is Hashim et al. (2019). Their study investigated the effectiveness of using online language games in improving Malaysian secondary school students' English grammar. They used an experimental method to help 30 participants in the pre-test and post-test in three intervention sessions. Students' proficiency level varies from moderate to low. The questions given to participants were 20 grammar questions, which were then followed by three intervention sessions using online language games, including socrative, PowerPoint challenge game, and Kahoot. The data collected is recorded in terms of frequency, and the test scores are converted into percentages where each value has a different class. Based on the data collected and shows the results in the first table, class A showed an increase of one participant in the pre-test. Class b in the pre-test results, only five participants got scores, while as many as 16 participants got grades in the post-test. The results between the two tests above show an increase in participants who got a b. while the number of participants who got a c score was 15 participants in the pre-test and only 12 participants in the post-test. The above results show that the participants are better in the post-test than in the pre-test. Eight participants scored a-d in their pre-test, and none in the post-test got a score. This study shows that gamified learning can improve grammar, and the use of technology has advantages for students in learning grammar. Based on the results of this paper that gamified learning has effectiveness in improving grammar. Students can get better results from using online games when they learn grammar due to motivational factors and fun in an online game. They suggest that teachers use technology effectively to help students get efficient results.

The sixth example is Khan (2018). Their study was to answer to what extent the D2L educational software effectively teaches English language grammar and investigate Saudi EFL learners' attitudes towards using the D2L educational software in teaching English language grammar. Two groups of students consisting of an experimental group and a control group in Saudi Arabia, precisely at a public university, were participants in the study. Enrolled students

are third-level students in the undergraduate program. The experimental group was taught using CALT-D2L, while the control group used face-to-face and talk methods. Data analysis from experiments that have been carried out shows that the experimental group outperformed the control group in learning grammar. This study uses two forms, namely posttest achievement scores and attitude questionnaires. In this test, three types of sentences are used: true/false, completing the blank using the correct verb, and selecting the correct subject (noun, pronoun, and verb). The questionnaire results in this study showed a positive attitude towards using CALT-D2L and deductive methods for teaching grammar 53.56% of students strongly agree, 26.90 agree, 11.89% are neutral about this system and method, while only 7.61% disagree. Overall, 80.46% of participants' attitudes toward using CALT-D2L and the deductive method showed positive results. Experimental results using CALT-D2L and deductive methods based on the research of Negahdaripour and Amirghassemi (2016), Kubra Sik (2015), Berendse (2012), Al-Mansour and Shorman (2011) that teaching grammar deductively using computer technology is better than an inductive method for Saudi EFL students. The study shows that the use of CALT-D2L in learning and the deductive approach in teaching grammar has a high value. This indicates the hypothesis that the use of CALT-D2L improves participant achievement along with the use of deductive methods. The participants' attitude in using D2L with a deductive approach was seen in teaching English grammar, resulting in a much better combination of language teaching and learning achievement.

The seventh example is Ahmed (2016). His research was to determine the effect of Facebook use on grammar discussion and writing skills for university students. He investigated the effect of the Facebook application on grammar and English writing skills involving participants as many as 60 students from Oklt Al Sqoor College of Science and Arts in Saudi Arabia divided into two groups, namely 30 participants in the experimental 30 participants in the control group. The control group participants and the experimental group were tested using grammar and writing tests. Facebook utilization was used in the experimental group, while the control group was taught using the traditional method. Based on research conducted on the use of Facebook as a learning tool that can develop grammar and writing skills. After doing several pre-test and post-test, it resulted in a high score. Grammar and writing competence increased within three months of using Facebook for learning. According to students using Facebook, the application is a social networking site that is easily accessible. The researchers of this experiment said that English grammar skills could improve their writing skills, based on the proven hypothesis that the research results show a significant correlation between scores in grammar and writing. Some researchers who have done this research say that grammar instruction helps to improve their ability. He concludes that student performance increases with Facebook, which drives the learning environment to make it more meaningful, and the comment feature makes the learning process easier and more fun. In addition, he said that Facebook also allows students to discuss with their peers, provide feedback, and comment on writing activities synchronously and asynchronously.

b. Pre-Experimental Studies

This method can be said that use does not include an actual experiment because external variables still influence the formation of the dependent variable. So the experiment, which is the dependent variable, is not solely influenced by the independent variable. It can happen because there is no control variable, and the sample is not chosen at random. Several forms of pre-experimental designs include One-Shot Case Study, One-Group Pretest-Posttest Design, and Intact-Group Comparison.

The first example is Ahmad and Arifin (2021). The study investigated the implementation of online flipped learning on the students' grammar achievement and measured the students' overall perceptions of the course. Using a pre-experimental method, that is by using pre-test and post-test, and the group used is only the experimental group without a control group which is carried out for one month. The interview data and the questionnaire given it positively impact students in flipped learning. The learning carried out is also liked by students because it uses various platforms such as zoom, LMS, and synchronous and asynchronous modes. After several pre-test and post-test tests, they were collected using statistical data. The results showed that students could improve their ability to use flipped learning in online learning with grammar material for one month. The second data was used to determine the students' feelings based on the questionnaires and interviews conducted; as many as 64 students said flipped learning was perfect for improving grammar skills and TOEFL scores. Students also said it was very flexible regarding the location or time to watch learning videos and answer questions. Although the course has a deadline, the students have plenty of time to submit it, which is about three days. Based on the first question, it was found that after participating in flipped learning, students' abilities increased within a month. This study used a pre-experimental method without a control group. Some factors that lead to student satisfaction with the course include a well-organized and easily accessible syllabus that can increase student interest, learning enthusiasm, maintained synchronized sessions, direct and clear questions, and virtual meetings support.

The second example is Rashid and Almoswai (2017). This study is designed to answer the following question: 1). To identify and classify the effectiveness of using video lesson-based grammar on EFL Iraqi college students in Misan. The use of YouTube was carried out with the help of 30 participants in their third year at the Iraqi College conducted to see the effectiveness of the use of YouTube on the achievement of Iraqi EFL students by giving a pre-test and post-test as a test to see the development of the two groups formed, namely the control group and the experimental group using YouTube. The first hypothesis, based on the data carried out, shows that in the first hypothesis the mean value for the experimental group is 28.56 and for the control group is 16.23, so "There are no statistically significant differences between the experimental group performance, and that of the control group in the grammar score. of the post-test" was rejected. In the second hypothesis, there are significant differences between pre and post-

administration and the questionnaire, indicating no statistically significant differences in the experimental samples' YouTube Video Lesson Based Grammar between the pre - post-administration questionnaire" is rejected. This study concludes that YouTube does have a positive impact when we use it in watching English videos to improve English language skills. However, this use cannot be helpful for students who do not have time to study English or expose themselves to an English-speaking environment. English grammar videos are hard to reach for today's English learners.

The third example is Ekinici and Ekinici (2021). This study is designed to investigate the use of online grammar teaching whether it affects the grammar achievement level of EFL students and to figure out students' perceptions of online grammar teaching. Participants were 43 EFL students selected using a convenience sampling strategy and age intervals ranging from 17-25 years. Data was collected by giving a pre-test, post-test, and also questionnaire. The researchers collected data using a questionnaire and resources from the English primary school teacher's book. The researchers prepared questions used for participant achievement, which contained five separate sections, in which there were 25 items. After being given a test to see if there is an effect on students' grammatical abilities, based on data that has been collected for 14 weeks, it shows that 43 participants were involved in this study. The results of test results in the value of the pre-test test are 51.13%, and for the post-test test is 61.32%, a significant difference. Therefore, it can be concluded that the participants showed improvement during the treatment period. Furthermore, they found that students' perceptions of online grammar showed that online teaching benefited the participants during the treatment period. Comparing the pre-test and post-test results showed a significant difference from the statistical comparison showing that language teaching through online learning can improve students' grammatical skills.

c. True experimental

An experimental design is when the researcher controls the treatment and uses randomization to assign subjects to treatments called true experiments since subjects are randomly assigned to groups. Because of the control they provide, they are the most highly recommended designs for experimentation in education (Ary et al., 2010).

The first example is Saeedi and Biri (2016). This study is designed to measure whether an animated sitcom has any significant effect on students' learning of conditional sentences and investigate students' attitudes toward using an animated sitcom in teaching conditional sentences. Applying true experimental, researchers divided participants into two groups: a control group and an experimental group, to produce data regarding the sought problem. Data collection was carried out using pre-test and post-test for both groups. In the final result, the experimental group increased the pre-test and post-test compared to the control group. Based on statistical data on animated sitcoms in teaching, divided into two control groups scored 16.8 in the pre-test to 17 in the post-test, and the

experimental group got 17.41 in the pre-test and 18.17 in the post-test. It shows an increase experienced by the experimental group participants in the pre-test and post-test and students' feelings in using this sitcom based on the results of interviews found positive and negative impacts. The positive impact is that they can see firsthand the use of conditional sentences in a natural context, and their negative opinion says that this is a waste of time. In another interview question, other students said they liked using this sitcom in their language learning and that it could improve their language skills. This study aims to see how they influence and feelings of students in teaching conditional sentences using animated sitcoms. The result shows a positive impact on the students' learning. This research is a breakthrough for teachers and students where learning grammar becomes something that is not fun in the eyes of students.

The second example is Kurniawati (2013). This study is designed to investigate the effect of using YouTube videos in teaching English grammar. The researcher used experimental research to see the relationship between learning using YouTube and students' attitudes. From 162 students, the researcher decided to randomly choose 72 participants involved in this study which was divided into the experimental class and the control class. The data analysis using ANOVA and the turkey test in this study showed that the use of YouTube in learning grammar got a score (27.75) while learning carried out with textbooks only got a score (24.41). The use of YouTube in learning grammar attracts students' interest and increases their curiosity about the material presented by the teacher. Scrivener (1998: 350), in teaching and learning, found that the use of video will have a positive effect on students' performance and participation; (1) it will be a great starting point for communicative activities to introduce the topic area of discussion, (2) there are a fast play or fast play facility which is much clearer, allowing students to watch pictures while the teacher plays, (3) a teacher can also pause one image more clearly, (4) many videos have isolated sound and music cues, (5) videos can provide exciting discussion material. The thing that affects the effectiveness of using YouTube is the nature of the participants, divided into 2, namely negative and positive. Based on research data, students with a positive attitude get a value (29.11) while students with a positive attitude get a value (23.03) which is concluded that student attitudes affect the achievement results in learning grammar. The conclusions that can be drawn after going through a series of tests are that the use of YouTube in learning grammar is more effective than textbooks, students with positive attitudes are superior in achievement compared to students who have negative attitudes, and there is an interaction between students and learning media in teaching grammar. Based on the three essential points above, the use of YouTube is superior to textbooks and can improve student achievement with a positive attitude.

d. Survey Studies

Survey research, also called descriptive research, chooses instruments such as questionnaires and interviews to gather information from groups of individuals. Surveys permit the researcher to summarize different groups' characteristics or

measure their attitudes and opinions toward some issue. Education and social sciences researchers commonly use surveys (Ary et al., 2010).

The first example is Wang and Smith (2013). This study investigates whether students are ready to read foreign languages, take grammar quizzes on their mobile phones, and determine students' general perception of reading and grammar using mobile phones. The data used in this research is a survey by sending a survey URL to students and the reasons and questions contained in the survey. In this study, 56 respondents presented learning materials developed by ten people who had been recruited, which resulted in 36 (64%) saying they enjoyed grammar quizzes and the remaining 20 (36%) chose neutral. It proves they are receptive to both the material and the developed reading material. As many as three questions were given to see students' perceptions. 40 (71%) said they had read nearly all of the material, 11 (20%) said they had read all of it, and five (9%) indicated that despite being enrolled in the project, they had never read any content. Forty (71%) reported positively, saying that they found the project, in general, very helpful in developing their reading and grammar skills. The data is stored in registration records, questionnaire results, comments, and learning history. Learning utilizing mobile phones is considered helpful in improving students' reading and grammar skills. Before sending questions to students, the thing that must be considered is internet security and the place of the platform that is considered safe for monitoring student progress.

The second example is Arikan (2014). This study investigates the nature of online grammar teaching materials in terms of being traditional instead of communicative materials. Also, it finds out potential material in learning and teaching grammar, especially when young learners. The online sources are used to understand better the potential value of classifying traditional or communicative materials by looking at the development of each material. Online grammar can be traditional rather than communicative because the teaching taught is a copy of the material or grammar teaching directly from the traditional grammar teaching material or situation. Besides, this study focuses on rules-based grammar, not viewing Communicative Language Teaching and other current approaches that prioritize communication over learning rules. Foreign language learning must have a feedback loop that actively makes online material. In some grammar materials, students are given a functional opportunity to complete sentences by choosing the correct option among the available options. In traditional grammar teaching, these materials can help improve knowledge of structures, although their value as communicative material is debatable. However, there are some listening exercises for young learners where the learner should listen to the script and tick the item described or discussed. Although weak, these materials can be communicative material because they have information gaps when asking students to participate in learning activities Listening process. If grammar is taught in a way that relies too much on rules and memorization, young learners lose their interest and motivation (Yolageldili & Arikan, 2011). Online activities used for learning for traditional teaching must still pay attention to the aspect of the goal

that prioritizes the learning environment to obtain the language used for natural communication.

2. Qualitative Approach

a. Case Study

A case study is an ethnographic research study that focuses on a single unit, such as one individual, one group, one organization, or one program. According to Ary et al. (2010), the goal is to arrive at a detailed description and understanding of the entity (the “case”). In addition, they say that a case study can result in data from which generalizations to theory are possible.

The first example is Octaviani (2021). She investigates teacher obstacles to using Zoom Cloud Meeting for teaching English Grammar in an online class, and she observes ways the teacher solves obstacles to using Zoom Cloud Meeting for teaching English Grammar in an online class. This method aims to provide up-to-date information by conducting in-depth observations and interviews. This is illustrated in real situations in the classroom about the teacher's experience of common phenomena through their stories. This study aims to implement teacher constraints and use zoom in teaching English. Her study shows that the effect shows why teachers rarely use the zoom application in learning. The researcher found that the difficulties encountered were technical problems with media and devices, internet network access, and facilities. Sometimes teachers experience problems operating online teaching platforms due to a lack of experience in using these platforms. The teacher is also in the duration of using the zoom because it is limited to 40 minutes and has to pay for unlimited time. In analyzing teacher problems in learning barriers, teachers use other applications such as Google meet because of unlimited time and use WhatsApp, Google Classroom instead of zoom. The conclusion of this material is the use of zoom, which has many obstacles, such as network access between teachers and students used in teaching and learning grammar. The teacher teaches about passive voice by using beneficial zoom features. These features are used in teaching because they are challenging if not explained directly.

The second example is Singh and Harun (2016). They find out about Diploma students' experiences of learning English grammar through flipped classrooms and gamification and determine the challenges Diploma students face during the 14 weeks of the BIL1033 English Grammar 1 course. This study uses a case study to determine the experience and challenges of diploma students at teacher education universities in Malaysia. Participants in this research were 90 diploma students. This research was conducted by asking students to take part in an introduction to grammar flip, fox type, Padlet, Kahoot, and quizzes workshops. All data obtained were analyzed qualitatively using questionnaires, focus group interviews, and evaluation of semester courses in collecting the data. Results showed that D3 students showed positive results in learning grammar using flipped classrooms and gamification. Based on percentage data, 63 participants (70%) strongly agree that the use of flipped classrooms and gamification has benefits. Some students say that flipped classrooms and gamification make them

easier to understand and make them feel happy. Overall the participants liked learning grammar using this method. Challenges that participants face when using this method are weak Wi-Fi signals and slow cell phones. In addition, participants could not complete the quiz given because of the influence of the internet connection in the middle of the quiz. Several problems must be overcome from the study results, such as poor Wi-Fi signal, slow cell phones, competition among participants to get high scores without reading the questions correctly, and procrastination. The way to deal with this problem is that the institution must prepare a good Wi-Fi connection, while the teachers must implement flipped learning and gamification on a small scale.

b. Descriptive Study

Descriptive is one of the research methods whose purpose is to present a complete picture of the social setting or aims to explore and clarify a phenomenon or social reality by describing several variables relating to the problem and the unit under study between the phenomena being tested. In this study, the researcher already has a clear definition of the research subject and will use questions to explore the required information.

The first example is Issahaku et al. (2020). This study is designed to answer the reasons and rationales for using social network sites, investigate the benefits of using social network sites, and explore the implications of social network sites on teacher trainees' grammar and spelling skills. This study was conducted to determine the teacher's ability in grammar and spelling by using social networking sites. The technique is done by selecting as many as 335 respondents from 3 different universities. In the findings during the analysis, the teachers used jargon, acronyms, and abbreviations, which affected grammar and spelling, resulting in poor performance during the test. This can be done well if the teachers continue to use good words during communication. Communication and information sharing can become faster and easier. Also, they show that blogs and LinkedIn are educational and information-sharing sites that enhance or complement formal educational activities and improve learning outcomes. The main benefit of using social media is promoting and speeding up communication. Another result of using the application is to help participants in teacher training upload or download literature, videos, music, and pictures. The results of the observation using regression analysis that the impact of social networking sites on teachers' grammar and spelling abilities. Differences in grammar and spelling skills were explained on social networking sites, and other influences were also due to family background, availability of teaching and learning materials, and commitment to teaching. The variable coefficient shows that WhatsApp, Twitter, and Facebook can affect changes in grammar and spelling. Despite the negative impact of social media, this study shows several benefits of social media networking sites for prospective teachers. This study indicates that social networking sites are an effective way to promote teacher involvement in training to reduce boredom. The important thing that must be adhered to on social networking sites is to use standard spelling and sentence construction to improve

grammar and spelling skills and is expected to avoid the use of unknown abbreviations, jargon, or acronyms.

The second example is Yolageldili and Arikan (2011). This study is designed to explore teachers' attitudes towards using games in grammar teaching and assess what teachers think about using games in teaching grammar to young learners. This research uses questionnaires and spreadsheets to collect data and then is made in tables and percentages. Teachers participated to see concepts in the use of games in teaching grammar to young students. This study indicates the effectiveness of using games in teaching grammar. After giving the questionnaire, the results of each questionnaire were analyzed using a spreadsheet. The collected data is then tabulated and presented in tabular form. This study shows that teachers disagree with the idea that games prevent teachers from assessing students' grammatical knowledge. Other results do not believe that games can distract students from teaching grammar. The result shows that using games in teaching grammar takes time, and the results from other tables believe that using games in teaching grammar reduces students' anxiety. The study results indicate that the use of games in teaching grammar is due to the minimal time, the tight schedule to understand all the content of the material, and the teachers' difficulty finding games in each area of grammar. This study concludes that the game is necessary for learning English grammar because it has many instructional advantages for teachers.

c. Phenomenology

Phenomenological studies assume that multiple realities are rooted in subjects' perspectives. Thus, an experience has different meanings for each person. Through unstructured interviews, the investigator explores the subject's thoughts and feelings to elicit the essence of an individual's experience (Ary et al., 2010).

We analyzed and interpreted one sample of phenomenology research methods in teaching grammar using educational technology, namely research conducted by Nanquil (2020). This study is designed to figure out the existing ideas and information in English learned by the participants using social media networks like Facebook and investigate on problems of the participants in communication using Facebook. This research was conducted by describing the involvement of researchers with the Facebook application. The participants were then researched to see the relevance of the application platform in their lives, which was used to learn English through posts and things shared by others. They also enjoy various benefits, such as fluency in English, gaining valuable information, and increasing knowledge through communication within the application. Facebook helps people to connect and know what is happening or news from distant friends. not only that, Facebook also improves everyone's ability in the field of English because everyone shares or writes news using English, so it helps add vocabulary, spelling, and also grammar and correct punctuation. Some people say that they also collect ideas, information, vocabulary, and news that include grammar, spelling, and punctuation updates

from trusted sources. However, fake news and also wrong spelling are obstacles found in the use of Facebook. Some people say common mistakes on Facebook are grammar, spelling, and punctuation because often, in posts on the Facebook application, there are errors that often occur in grammar resulting in both negative and positive impacts. Negative impacts include communicating and transacting with unknown people. In contrast, positive impacts include exchanging ideas and fluency in English. Some essential things in learning through applications to interact in the Facebook application include updating news, social problems, grammar, vocabulary, and the number of errors in grammar, spelling, and punctuation. Participants proved a positive influence in communicating well and believed the learning is run well through the Facebook application.

3. Mixed-Method: Explanatory Study

According to Ary et al. (2010), a mixed-method is the same study's methodology that applies quantitative and qualitative approaches. As a result, the mixed methods research results provide a more complete explanation of the research problem than either method alone also are more dependable.

We analyzed and interpreted one sample of one popular type of mixed-methods, namely an explanatory study conducted by Mayanondha and Sontornwipast (2020). They investigated the effects of the interactive web-based TOEIC tutoring course on students' English grammar proficiency and figured out students' opinions on the interactive web-based TOEIC tutoring course. This study uses a one-group design by conducting a pretest and posttest. The sample used includes students who have an age interval of 19-35 years. The background of the participants varied from full-time employees to full-time students and unemployed. This course uses asynchronous and synchronous integration and the use of technology that serves to promote interaction in online learning. The data is made in tabular form, and their progress is seen after several tests. They conclude that web-based interactive OEIC improves students' English grammar. The results of the questionnaire data show that the use of TOEIC in interactive web-based courses has a positive impact on students' grammar. The result of interaction between tutors and students has a positive impression on online learning. It makes students feel good and enjoy learning, which increases students' learning motivation. Besides, online learning impacts flexibility because students can learn anywhere and anytime. Interactions between students and teachers can strengthen their relationship in learning motivation.

CONCLUSION

The study of research methods in teaching grammar utilizing educational technology can reveal more methods used in learning over the last ten years. However, the authors can only explain eight methods used in research on the development of grammatical skills. Explanation of the eighth methods, such as quasi-experimental, pre-experimental, true-experimental, survey study, case study, descriptive study, phenomenology, and explanatory study, are expected to be

useful for readers or those researching the methods used in the development of teaching grammar in this digital era.

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