



# The Implementation of Grammar Application for Computer Students: Integrating Digital Learning Kit in English for Specific Purposes

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**Abstract**— Grammatical competence is a skill that is generally taught integrally into the teaching of active English competence in the scope of English for Specific Purposes (ESP) in the Informatics Management Study Program. Thus, students do not get maximum exposure to grammatical teaching even though grammar is a basic competency that plays an important role in determining the quality of speech and writing produced. Students need to be equipped with digital learning tool, i.e., grammar learning application to support their autonomous learning process. This research focuses on the implementation of a mobile-based grammar application for computer students that is used as a self-directed learning tool. The implementation phase was carried out using an experimental research method which was applied to English courses at Informatics Management with 84 participants. Quantitative data were obtained from the results of the pre-test and post-test in grammar before and after the integration of the grammar application. The results of the pre-test and post-test assessments were analyzed using the One-Sample Kolmogorov-Smirnov Test to test the normality and paired sample t-test to analyze the effect of using the application on improving student achievement. In addition, qualitative data was gathered using google form. The results of the questionnaire were analyzed to determine students' perceptions of the autonomous grammar learning process. The analysis of both quantitative and qualitative data reveals that students gained a deep grammar learning experiences and could enhance their grammar competence.

**Keywords**—grammar competence; technology-enhanced language learning; grammar mobile application; English for specific purposes

## I. INTRODUCTION

Passive English learning, such as grammar, is integrated into other competency learning for vocational students who study English with an emphasis on practical skills and more dominant active competencies, so that they do not receive a specific quantity of exposure. This also happens in the process of learning English courses for students with a computer science background in the Informatics Management D3 Study Program in which English courses are only taken in semesters I and II with a portion of exposure to grammatical learning integrated into the topic discussion chapter in the field of technology. information. However, there are studies

that state that grammar is related to the structure of language and contributes to producing good sentences, so mastering grammar knowledge in language skills such as reading, speaking, listening, and writing is required in teaching ESP [1]. Grammar should be seen as an element that will serve as the “glue” between the other language skills learned and will give meaning to the language concepts taught in all types of ESP classes. Thus, teachers need to emphasize to students that grammar will not cause them difficulties but will help them in mastering other language skills [2].

Based on the important function of grammar in language acquisition and the lack of exposure to intensive learning in the ESP class, there is an urgency where vocational students need to get increased exposure to grammar learning through a self-directed and autonomous learning process. A study by [3] emphasizes that students are digital natives who incorporate technology into almost every aspect of their lives, so they need to be provided with self-learning kits that not only contain comprehensive content but can also be accessed in the form of a digital platform in order to progress to the independent learning stage.

The integration of digital technology into the grammar learning process is in line with the elaboration of research findings [4] which state that grammar learning, which often appears as a major component in needs analysis, can be transferred to the digital domain for various reasons related to adjustment, an extension of exposure, reflection, and autonomy. learning. Combining grammar and technology can make grammar instruction easier, more interesting, effective, and fun. In addition, the use of technology to teach grammar can improve the instructional and learning process, not reduce it. Therefore, this study aims to provide an analysis of the implementation of independent learning tools to users, especially vocational students with a background in computer science in the form of a mobile-based application of essential grammar for computer students so that students can learn grammar with easy and fun access.

In particular, there have been several findings in the field of teaching grammar using technology, as done by [5]. The research raised the topic of teaching grammar by exploiting the visual aspects of communication using digital training activities based on blogs, videos, Storybird, and

Padlet for beginner and intermediate competency levels. Another study has also developed an android-based application called Basic English Grammar for learning grammar in the basic level General English class with a Research and Development approach from Gall & Borg [6]. An experimental study by [7] was conducted to investigate the effectiveness of a mobile application (e-Book) which was developed by the researcher named ABP English Grammar App and the findings showed that the application was effective in improving the students' grammatical skills. Although broadly speaking, the focus of content and design methods are the same, this research differs from these studies in terms of the scope of learning content used in the grammar application implemented in the study. This study aims to investigate the effectiveness of the grammar learning application within the scope of ESP with a focus on computer science and information technology.

## II. METHODOLOGY

The implementation phase of the mobile grammar application was carried out for 84 students of the Informatics Management Study Program based on a pre-experimental design method. Quantitative data were obtained from the pre-test and post-test in grammar by students before and after the integration of a self-directed learning tool, i.e., grammar application in the learning process. The one-sample Kolmogorov-Smirnov Test was used to determine normality, and the paired sample t-test was used to determine the effect of using the app on improving student achievement. To differentiate between the two, statistics from paired samples were used to investigate the average score on the pre and post-test. Using paired sample correlations, the correlation coefficient (R) was calculated to determine the relationship degree of the implementation. The paired-sample t-test was employed to investigate whether there was a distinctive disparity in students' grammar test scores before and after using the grammar application. Moreover, the responses gathered via a questionnaire, i.e., Google Form were analyzed descriptively to describe students' views on learning grammar.

## III. FINDINGS AND DISCUSSIONS

The following elaborations are the findings and discussions in this research consisting of students' perception and statistical analysis on their tests.

### • *Students' Perception of Learning Grammar*

This research provides independent learning tools to users, especially vocational students with a background in computer science in the form of a mobile-based application of essential grammar for computer students so that students can learn grammar with easy and fun access. The grammar learning application which is the product of this research, not only describes grammatical concepts but also provides

examples of the use of these concepts in sentences used in the scope of computer science or information technology as well as practice questions that are packaged in the form of gamification. Thus, this self-directed learning tool is expected to play a role in helping improve students' understanding of grammatical concepts that are specifically used within the scope of ESP and use them coherently and cohesively in the process of producing good and correct speech and writing.

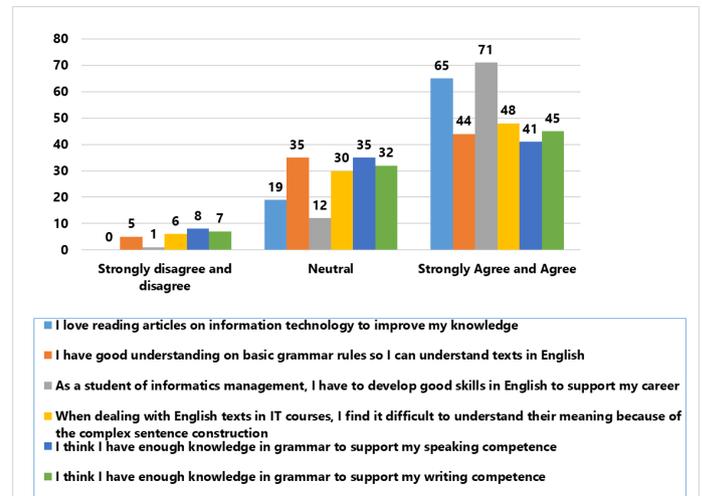


Figure 1. Perception of Learning English

Responses in Fig. 1 emphasize students' perceptions on the aspect of personal view on learning English, particularly grammar as computer students. As presented in the figure, the majority of students, or more than 50% of respondents agreed and strongly agreed with the statements given in the questionnaire. Most of the respondents (65 students of 77%) agreed and strongly agreed that they read articles on information technology to improve their knowledge. Regarding students' comprehension of basic grammar rules to understand texts in English, responses fall into two almost similar percentages. There were 35 students or 42% who chose the neutral scale, while 44 students or 52% agreed and strongly agreed with the statement.

Regardless of the awareness on their incompetence in understanding the meaning of English texts in IT because of the complex sentence construction (57% of respondents), a high percentage of respondents (85%) 71 students provided positive remarks regarding the importance of learning English as a student of informatics management to support their career. Regarding the awareness of having enough knowledge of grammar to support English active competence in speaking and writing, students showed an equal preference on agree and strongly agree scales, i.e., 49% and 54% respectively for positive preferences (scales 4 and 5).

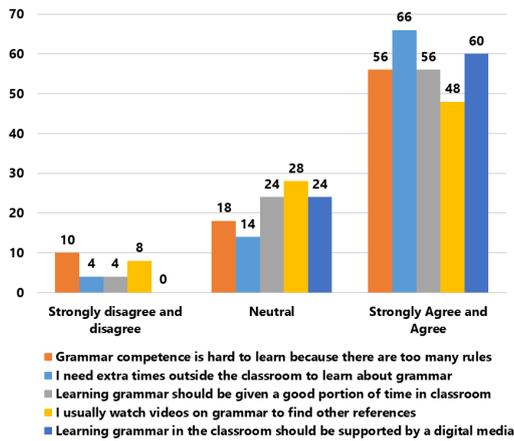


Figure 2. Perception of Grammar Mastery and Independent Study

Responses in Fig. 2 emphasized students’ perspectives on grammar mastery and independent learning. Among four different statements regarding self-study on grammar, the majority of the population chose scales 4 and 5 (agree and strongly agree). This showed that the students have acknowledged the importance of independent learning outside the classroom setting to improve their competence in grammar. On the first statement concerning the need to have extra time outside the classroom to learn about grammar, 66 students or 79% of the respondents expressed their agreement.

A large number of students (56 or 67%) acknowledged that learning grammar should be given a good portion of time in the classroom. Regarding the habit to watch videos on grammar to find other references, 48 students or 57% of respondents fall into the same category (agree and strongly agree). Referring to the aspect of grammar mastery, more than half of respondents (60 students or 71%) mentioned that learning grammar in the classroom should be supported by digital media. This is probably linked to the fact that students (79%) viewed grammar competence as hard to learn because there are too many rules.

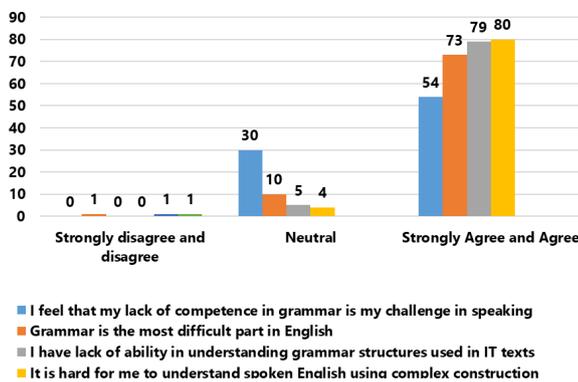


Figure 3. Perception of Challenges in Learning Grammar

Fig. 3 displays the results of students’ responses on their perspectives on grammar skills. The data shows that the majority of students (above 64% of total respondents) recognized that their lack of competence in grammar posts challenges their ability to speak English. Furthermore, students fall into the same percentage (scale 4 and 5), i.e., 80 students or 95% to two other statements highlighting that they have a lack of ability in understanding grammar structures used in IT texts and they have difficulty understanding spoken English using complex construction. Overall, 73 students 87% acknowledged that grammar is the most difficult part of English. This finding coincides with preceding research focusing on students’ perspectives in studying grammar in English for Specific Purposes context. According to a study in [8], there are difficulties in learning ESP because of the characteristics of ESP and learners’ low grammatical competence. However, understanding grammar is crucial to developing grammar proficiency, particularly for ESP context. Thus, the process of learning grammar needs to be supported by digital media including the mobile application. The interface of the grammar application developed by the authors can be seen in the following figures.

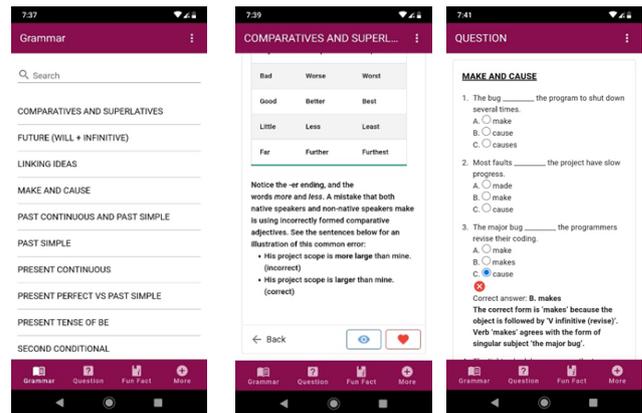


Figure 4. Grammar Application Page View

Fig. 4 shows the display of the grammar page view. On the home page, users can find a list of grammar resources and a variety of practice questions in the question section. In addition, the front page also displays fun fact features, trends, and trivia questions and answers. Users can close the application by clicking the more button and selecting close in the right corner. Users can also press the love button at the bottom right.

• Analysis of Students’ Grammar Competence

The widespread use of mobile and wireless devices in education has prompted gradual shifts in teachers’ approaches. Mobile phones are regarded as potentially essential learning tools due to their pervasiveness.

The data in this study was taken from the results of pre-test and post-test from 84 students majoring in Informatics Management. Before analyzing data using paired sample t-test, the one-sample Kolmogorov-Smirnov test was used to test whether a sample comes from a specific distribution. This procedure aimed to determine whether a sample comes from a population normally distributed.

		Test result
N		168
Normal Parameters <sup>a,b</sup>	Mean	66,1548
	Std. Deviation	13,13768
	Most Extreme Differences	
	Absolute	,073
	Positive	,073
	Negative	-,050
Kolmogorov-Smirnov Z		,948
Asymp. Sig. (2-tailed)		,330
a. Test distribution is Normal.		
b. Calculated from data.		

Figure 5. One-Sample Kolmogorov-Smirnov Test

The figure shown above demonstrates that the significance value of Asymp. Sig (2-tailed) of 0.33 is greater than 0.05. It can be concluded that the data is normally distributed. As the normality test showed the data was normally distributed, then the difference test was carried out using the t-test, particularly paired sample t-test.

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Pre_Test	62,2619	84	13,47118	1,46983
	Post_Test	70,0476	84	11,62455	1,26834

Figure 6. Paired Sample Statistics

The results of data processing as the outcome of paired sample statistics using SPSS statistics show that the students' average pre-test score was 62,2619 and the students' average grammar score (post-test) was 70,0476. This statistical analysis leads to the conclusion that there is a difference between the pre-test group and the post-test group's average test results. Then to prove whether the difference is significant or not, then a test is held in the form of paired-sample correlations. This analysis was carried out to determine the degree of relationships between before and after incorporating Essential Grammar for Computer Students into the educational process.

Pair	Pre_Test & Post_Test	N	Correlation	Sig.
1		84	,683	,000

Figure 7. Paired Samples Correlations

According to the findings, the correlation coefficient (R) of data in this class was 0.683. Based on the

Interpretation of the Correlation Coefficient by Guilford (1956), the result was in the range of 0,401-0,700 meaning that the correlation is relatively strong or high. The probability value indicates that it is still less than 0.05. This suggests that there was a meaningful correlation after students used the app to finish their assignments.

Furthermore, according to the comparison of  $t_{count}$  and  $t_{table}$ , if  $t_{count} < t_{table}$  or  $-t_{count} > -t_{table}$  then  $H_0$  (there is no positive impact of the grammar application on students' achievement) is approved, whereas if  $t_{count} > t_{table}$  or  $-t_{count} < -t_{table}$  then  $H_0$  is rejected. The level of significance is calculated using a 95% level of confidence or a 5% margin of error ( $= 0.05$ ). Where the 95% confidence level and sig. ( $\alpha$ ) = 0.05, then the value of df (degree of freedom) or degree of freedom =  $(nk) = 84 - 1 = 83$ . With a two-tailed test, each side is of  $\alpha / 2 = 0.05 / 2 = 0.025$  to determine the value of  $t_{table}$ . This can be seen in Figure 5.

Pair 1	Pre_Test - Post_Test	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
		-7,78571	10,13650	1,10598	-9,98547	-5,58596	-7,040	83	,000

Figure 8. Paired Samples Test

According to the analysis at a 95% confidence level (a significant level of  $0.001 < 0.05$ ),  $t_{count}$  is -7,040. The result of the data set shows that  $-t_{count} < -t_{table}$  ( $-6,073 < -9,98547$ ). This suggests that  $H_0$  is rejected and  $H_1$  is accepted (the integration of the grammar app contributes a positive impact on students' achievement in grammar competence).

Decision-making basis:

1. If the value of sig. (2-tailed)  $< 0.05$  then there is a significant difference between learning outcomes in pre-test and post-test
  2. If the value of sig. (2-tailed)  $> 0.05$  then there is no significant difference between learning outcomes in pre-test and post-test,  $0.05 = \text{sig alpha level } 5\%$
- Because of the value of sig. (2-tailed) of  $0.000 < 0.05$ , it can be concluded that there is a significant difference between learning outcomes in the pre-test and post-test.

Following use of the application, students displayed greater proficiency. This outcome is consistent with research conducted by [9] which discovered that the utilization of learning tools can assist learners share information more effectively. Additionally, learning tools are made to help students comprehend the material more simply and meticulously [10].

The results of this study demonstrated that students who integrated grammar applications in studying English grammar had improved their language proficiency. This result supports previous research that computer-assisted language learning environments, in general, can have a positive impact on learners' proficiency in English as a second language. The implementation of technology increases the motivation of

language learners, increases their likelihood of learning a foreign language [3], and decreases learner apprehension in the language teaching environment [4].

Several findings from previous research indicate that technology-based language learning can improve the performance of students learning English as a foreign language. It is critical to incorporate technology into the language learning process, but we must also consider the consequences [11]. This technology can be implemented by considering and evaluating its suitability, as well as the impact of the technology used. Specific learning objectives must be supported by technology. Despite mentioning the impact of technology, this study supports the idea of using technology appropriately to enhance the learning process.

Students benefit from incorporating technology into language learning because it allows them to relate their learning to real-life situations rather than just learning in isolation [12]. Infographics related to learning English as a Second Language (ESL) are another technology-based tool used in recent research to improve your 21st-century learning skills. According to one study [13], incorporating infographics as teaching tools in ESL lessons can boost the motivation of digital native students. Using mobile technology to learn English as a second language can improve the teaching and learning process. Students can learn whenever and wherever they want due to the device's portability [14]. Mobile devices, which are widely used among students, can also be used in the world of education and become a motivational tool for students.

Previous research [15], in conjunction with field research examining the effectiveness of widely available technology-based grammar instruction, discovered that Johnny Grammar Word Challenge improved students' grammar skills, particularly past grammar skills. Its goal is to examine the effectiveness of tense. The Johnny Grammar Word Challenge improved students' grammatical skills and had positive emotional, psychomotor, and cognitive effects, according to the findings. Another study conducted by [16] looked at the effects of incorporating the Learn English Grammar application into the grammar learning process as well as students' perceptions of its benefits. According to the findings of this study, students who use this application can improve their grammatical knowledge when compared to those who study in traditional classes. A study in [17] investigated the use of Quizlet application as an independent grammar learning medium. According to the surveys that the researcher distributed, the majority of students found Quizlet useful. This is due to the interactive interface, which allows students to become more involved in their learning. Students enjoy learning because of the interactive interface, and they no longer regard grammar as a tedious subject. The finding of those previous studies confirmed or are in line with the finding in this present study as students showed improvement in their competence with the aid of grammar application.

#### IV. CONCLUSION

The analysis describes that students acknowledged the importance of having sufficient time to learn grammar both in the classroom meeting session and to extend their study independently. Students also mentioned that mastering grammar is difficult and it posed challenges to their competence in producing not only written but also spoken forms of English. In order to address the issue, a self-learning kit in the form of an application for learning grammar has been incorporated into the process of learning English in order to look into how it affects students' mastery of grammar. According to the findings of the statistical analysis, the study's self-learning kit, Essential Grammar for Computer Students, is a useful tool for teaching students and enhancing their proficiency. The  $t_{\text{count}}$  is -7,040 according to the analysis performed using the SPSS 25 statistical program at a 95% confidence level (a significant level of 0.001 0.05). The result of the data set shows that  $-t_{\text{count}} < -t_{\text{table}}$  ( $-6,073 < -9,98547$ ).

Accordingly, it can be inferred that H0 is rejected and H1 is accepted (the use of the grammar app has a beneficial impact on students' acquisition of grammar proficiency). The implication is that students require learning media to help them progress in mastering both active and productive skills in English for Specific Purposes. Practitioners can conduct additional research to develop other interactive and integrated media to enhance students' learning experiences outside of the classroom setting. As a result, students can reflect on their learning and use learning media as one of the strategies to improve their autonomy as learners.

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