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# The Effectiveness of Self-Study in Improving the Grammar Competence of Students of the Department of Food Science and Agricultural Product Technology: A Classroom-Based Investigation

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## ABSTRACT

This study investigates the effectiveness of self-study as a supplementary strategy for improving grammar competence among first-year students in the Department of Food Science and Agricultural Product Technology at a public university in West Sumatra, Indonesia. Conducted within a General English course limited to six class meetings, the study addressed the challenge of grammar instruction in a heterogeneous classroom. A self-study module, comprising curated online resources and structured assignments, was implemented to support grammar learning outside classroom hours. Findings indicate a marked improvement in grammar scores, particularly among students with lower initial proficiency levels. Self-assessment and perception surveys also showed a high level of engagement and acceptance of the self-study approach. These results suggest that structured self-study can be an effective method to complement formal instruction in time-constrained, diverse educational settings.

### Contribution to Sustainable Development Goals (SDGs):

SDG 4: Quality Education

## 1. INTRODUCTION

### 1.1. Research Background

In recent years, the need for **flexible, learner-centered approaches** to grammar instruction has become increasingly evident, particularly in English as a Foreign Language (EFL) contexts involving students from non-English-speaking backgrounds. Grammar competence—including the understanding of parts of speech, sentence structure, and sentence types—is fundamental to academic literacy, especially for accessing scientific texts and producing structured academic writing in higher education. As noted by Ref. [1] grammar teaching must be **adaptive and integrative**, combining form-focused instruction with meaning-oriented activities to promote both accuracy and fluency in written academic discourse [1]. Likewise, Ref. [2] argues that the role of grammar instruction

in EFL settings has shifted toward more interactionist and learner-centred paradigms, where explicit input and self-regulated learning become essential. In the Indonesian context, Widodo emphasizes that EFL classrooms are often **linguistically heterogeneous**, requiring curriculum models that align policy with actual classroom conditions and learner needs [3]. This aligns with the framework of differentiated instruction by Ref. [4], which calls for **flexible pedagogy** tailored to learners' readiness, interests, and profiles, particularly in large, mixed-ability classrooms..

Ref. [5,6] found that first-year students from vocational (SMK), Islamic (MAN), and general high schools (SMA) demonstrated significant disparities in grammar mastery, vocabulary range, and reading comprehension. These differences complicate the attainment of uniform learning outcomes in General English courses, particularly when instruction time is limited and learning materials are standardized.



This proficiency gap becomes even more pronounced in large EFL classrooms where English is treated as a supplementary skill rather than an academic priority. Ref. [7,8]. Instructors often struggle to accommodate varying proficiency levels across the four core language skills—listening, speaking, reading, and writing, leaving grammar instruction even further marginalised. As a result, many students fail to build a sufficient linguistic foundation for engaging with academic texts in their respective disciplines.

This study was conducted within a General English I course at a public university in West Sumatra, Indonesia. The course was designed for students in the Department of Food Science and Agricultural Product Technology and allocated only 2 credit hours, delivered over six weekly meetings. Given the time constraints and the heterogeneous backgrounds of the students—who came from various high school streams (SMA, SMK, MAN), rural regions, and with differing levels of prior English exposure—providing adequate grammar instruction posed a significant challenge.

As emphasised in the literature, heterogeneous classrooms require differentiated instruction [4] and adaptive pedagogical strategies. However, when classroom time is extremely limited, alternative approaches—such as guided self-study using curated online resources—can serve as viable solutions. Structured self-directed learning has been shown to promote learner autonomy and improve language outcomes even outside the traditional classroom environment [9].

## 1.2. Research Objective

This study aims to investigate the implementation of a structured self-study model in supporting students' grammar acquisition. The intervention involved weekly online grammar tasks, reflective self-study reports, and targeted in-class clarification sessions. Specifically, the study seeks to address the following research questions: To what extent does the self-study method improve students' understanding of parts of speech and sentence construction? How does student performance differ between learners with differing initial proficiency levels? What patterns of improvement emerge, and what pedagogical insights can be drawn from the observed outcomes?

## 2. MATERIALS AND METHODS

### 2.1 Research Design and Context

This study adopts a classroom-based action research design with a descriptive quantitative approach. It was conducted in a General English I class for first-year students in the Department of Food Science and Agricultural Product Technology. The course, which forms part of the university's general education curriculum, carried 2 credit hours and was delivered in six weekly meetings. Given the limited contact hours, a blended instructional model was implemented, combining in-class instruction with a structured self-study component.

### 2.2 Participants

Participants included 28 students from Class A. These students represented diverse educational backgrounds—SMA (general), SMK (vocational), and MAN (Islamic)—and came primarily from rural or non-urban areas. As a result, they exhibited highly varied initial levels of English grammar proficiency.

### 2.3 Instructional Model: Structured Self-Study

To address this diversity, a structured self-study program was introduced alongside in-class teaching. The model was guided by two instructional handbooks: *Guidance for the English Class* and *Guidance for Self-Study Activities*. The self-study component utilized online grammar resources from EnglishClub.com and the British Council's learning tools.

Each weekly self-study cycle included:

- A **pre-quiz and post-quiz** for the topic of the week (e.g., verbs, nouns, adjectives, sentence types);
- A **written explanation** of the topic based on the student's own understanding;
- **Applied grammar exercises** using texts related to their academic field (e.g., food science), such as identifying verbs, nouns, or sentence patterns;
- A **weekly report submission** using a standardized template, documenting quiz scores, self-reflections, and unresolved grammar questions.

The grammar instruction during the first half of the course focused on (1) The nine **parts of speech**, and (2) Basic **sentence structure and types**.

### 2.4 In-Class Implementation

Weekly in-class sessions were held to:

- Review submitted learning reports;
- Discuss unresolved grammar issues reported by students; Conduct collaborative grammar quizzes to reinforce concepts;
- Provide individualized feedback and encourage re-engagement with difficult topics.

The course was co-taught by two instructors: one with a background in English language education, and the other with training in English for Specific Purposes (ESP) within a scientific field. This interdisciplinary collaboration ensured linguistic accuracy while maintaining relevance to students' academic disciplines.

### 2.5 Instruments

The following instruments were used to collect data:

- **Pre-test and post-test quizzes** (15 items each), adapted from British Council grammar materials;
- **Weekly self-study reports**, based on the self-study guidance document;
- **Instructor reflection notes** capturing classroom interaction and trends in student difficulties;
- **Aggregated test scores** for evaluating general learning progress.

## 2.6 Data Analysis

Descriptive analysis was used to compare pre-test and post-test performance. Student scores were categorized into three ranges: 1–5 (low), 6–10 (medium), and 11–15 (high). Individual-level statistical testing was not conducted due to the absence of matched longitudinal student data. However, inferential observations were made based on class-level score distributions to identify trends and improvement patterns.

## 3. RESULT AND DISCUSSION

### 3.1. Pre-Test Grammar Proficiency by Level

To further understand the diversity of initial grammar competence among students, pre-test scores were categorized by estimated proficiency levels: **Elementary** and **Pre-intermediate**, based on their correct answers out of 15 items. As shown in **Table 1**, although the overall grammar proficiency was heterogeneous, certain patterns emerged:

**Table 1.** Grammar Pre-Test Distribution by Proficiency Level (Class A, N = 28)

Correct Answers	Elementary (%)	Pre-intermediate (%)
1–5	3.6	3.6
6–10	28.0	53.6
11–15	67.9	42.0

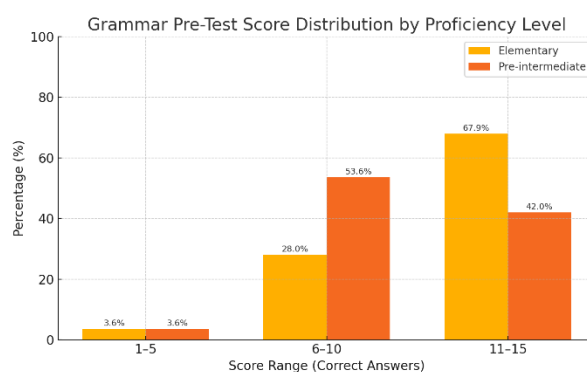
### 3.2. Additional Analysis: Grammar Pre-Test by Proficiency Level

To provide a more detailed picture of students' initial grammar proficiency, the pre-test results were further analyzed by dividing the students into two broad categories of language level estimation: *Elementary* and *Pre-intermediate*. This categorization was based on the number of correct answers out of 15 grammar questions, with the following bands:

- 1–5 correct answers:** indicating very low (A1-level) grammatical competence;
- 6–10 correct answers:** indicating partial knowledge or developing competence;
- 11–15 correct answers:** indicating adequate to strong grammar competence.

As shown in Figure 1, both groups displayed varied performance, with notable contrasts in score distribution.

The chart compares the percentages of students within each score range (1–5, 6–10, and 11–15 correct answers) for both the *Elementary* and *Pre-intermediate* groups.



**Figure 1.** Grammar pre-test score distribution by proficiency level (Class A, N = 28).

To gain deeper insight into how students with varying English proficiency levels responded to the grammar-focused self-study intervention, a comparative analysis of pre-test and post-test scores was conducted. The assessment specifically measured two fundamental aspects of grammar competence—**parts of speech** and **sentence construction**—and categorized student performance into three score ranges: **low (1–5 correct answers)**, **medium (6–10)**, and **high (11–15)**.

This analysis revealed important trends that not only reflect the diversity of grammar mastery within designated proficiency groups but also carry implications for instructional design. As detailed in Table 1, the results uncovered unexpected strengths among elementary-level students, score dispersion among pre-intermediate learners, and a small but notable presence of low performers in both groups. These findings challenge the assumption that general English proficiency levels accurately reflect specific grammar abilities and provide further justification for incorporating differentiated, self-paced learning strategies—such as the structured self-study model implemented in this study.

#### High performers dominate in the elementary group:

A substantial proportion (67.9%) of students categorized as elementary scored between 11–15, suggesting that many of these students had higher grammar competence than expected for their level.

#### Greater score dispersion among pre-intermediate students:

In the pre-intermediate group, only 42.0% achieved scores in the highest band, while the majority (53.6%) fell into the medium range (6–10 correct answers).

#### Low performers were few but present in both groups:

Both groups showed a small but equal proportion (3.6%) of students in the lowest band (1–5 correct answers).

#### Pedagogical implication – mismatch between general level and grammar proficiency:

The findings emphasize that students' general English proficiency labels may not directly correspond to their grammar mastery.

**Justification for self-study strategy:** The variation in performance supports the use of differentiated and self-paced learning tools, such as the structured self-study model applied in this study.

The results are based on a comparative analysis of grammar pre-test and post-test scores, which assessed two main components: parts of speech and sentence construction. Student performance was grouped into three score ranges: 1–5 (low), 6–10 (medium), and 11–15 (high). **Table 2** summarizes the grammar score distributions before and after the self-study intervention.

**Table 2. Pre-test and Post-test Results (N = 28)**

Score Range	Pre-test (%)	Post-test (%)
1–5	0.0	0.0
6–10	58.0	21.4
11–15	42.0	78.6

The data indicate a marked shift from medium to high performance categories, with the proportion of students scoring in the 11–15 range nearly doubling after the intervention. No students scored in the lowest band in either test, suggesting that all participants had at least a basic grasp of the tested content.

The findings of this study demonstrate a clear improvement in students' grammar performance following the implementation of a structured self-study program. Specifically, the proportion of students scoring in the highest range (11–15) increased from 42% in the pre-test to 78.6% in the post-test, while those in the mid-range (6–10) decreased from 58% to 21.4%. These results suggest that even within a short instructional period, guided self-study—supported by reflective activities and in-class clarifications—can meaningfully enhance students' understanding of fundamental grammar concepts, particularly parts of speech and sentence construction.

These quantitative findings are further supported by students' self-assessment and perceptions regarding the learning model. As shown in Table 3, the majority of students rated their self-study participation positively, with 92.9% selecting "Very Well," "Well," or "Quite Well." Only 7.1% reported doing "Poorly," and no student selected "Not Well." This self-assessment suggests that the program successfully engaged most learners and fostered consistent participation. According to Ref. [11], self-evaluation activities—especially when structured and accompanied by feedback—can enhance learner engagement and metacognitive awareness, which are essential in grammar acquisition.

**Table 3. Student Self-Assessment on Self-Study Implementation (N = 28)**

Rating	Percentage (%)
Very Well	7.1
Well	42.9
Quite Well	42.9
Poorly	7.1
Not Well	0.0

In addition to evaluating their own performance, students were asked to reflect on whether the self-study model had helped improve their grammar competence. According to **Table 4**, 85.7% agreed with this statement, while only 3.6% disagreed, and no student strongly disagreed. Although no student selected "Strongly Agree," the overall response indicates a broad acceptance of the strategy and general satisfaction with its outcome.

**Table 4. Student Perception on the Effectiveness of Self-Study for Improving Grammar (N = 28)**

Agreement Level	Percentage (%)
Strongly Agree	0.0
Agree	85.7
Somewhat Disagree	10.7
Disagree	3.6
Strongly Disagree	0.0

In addition to evaluating their own performance, students were asked to reflect on whether the self-study model had helped improve their grammar competence. According to Table 4, 85.7% agreed with this statement, while only 3.6% disagreed, and no student strongly disagreed. Although no student selected "Strongly Agree", the overall response indicates a broad acceptance of the strategy and general satisfaction with its outcome.

These results resonate with a growing body of research highlighting the potential of self-directed and technology-assisted grammar learning in EFL contexts. For instance, Zhou et al. [12] introduced the Independent Grammar Study Scheme (IGSS) within an online platform and observed significant improvement in grammar proficiency among Chinese university students, especially when learning was scaffolded with structured exercises and accessible digital tools [12] [

Similar to our model, the IGSS provided pre- and post-topic quizzes, explanatory materials, and weekly learner engagement tracking. The parallel improvement observed in our study reinforces the notion that grammar learning can occur effectively outside traditional classroom instruction when learners are provided with sufficient scaffolding.

Furthermore, the role of **reflective learning** was critical in this study. Students were asked to submit weekly reports summarizing their scores, reflections, and challenges. This strategy mirrors the findings from Ref. [11] who emphasized the pedagogical value of self-evaluation in enhancing grammar learning outcomes, particularly when supported by teacher feedback and personal goal-setting. Their study, which involved a quasi-experimental design with university students in China, showed that learners who practiced structured self-evaluation outperformed those in the control group. The students' self-assessment data in our study offer parallel insights: the act of regularly reflecting on their learning progress may have contributed not only to performance gains but also to increased awareness of individual learning habits and responsibility.

Ref. [13] Similarly reported that in the Indonesian university context, self-directed learning combined with perceived relevance and teacher scaffolding increased learner motivation and task engagement. Our implementation, which included grammar tasks linked to students' academic field (food science), and regular in-class feedback, was designed with these elements in mind. As indicated by students' positive perceptions of effectiveness, such an approach appears to support both skill development and learner autonomy.

The interdisciplinary teaching arrangement also supported this outcome. With one instructor specialized in English language pedagogy and another trained in English for Specific Purposes (ESP), students received grammar instruction that was both linguistically sound and contextually relevant. This aligns with studies suggesting that subject-integrated grammar instruction enhances motivation and comprehension, particularly in science-based EFL settings [14].

Despite these positive outcomes, it is important to acknowledge the **limitations** of the study. First, the absence of individual-level tracking restricts more nuanced statistical analysis. Secondly, the small sample size and single-class implementation limit generalizability. However, the upward trend

in grammar scores, supported by students' self-reflections and in line with recent research, provides preliminary validation of the model's effectiveness in comparable EFL contexts with heterogeneous student populations and limited instructional time.

To further contextualize the findings of this classroom-based study within broader research on self-directed grammar instruction, Table 5 summarizes key comparative studies that informed and reinforced the present intervention. These studies highlight the effectiveness of structured self-study, reflective practices, and contextual relevance in enhancing grammar competence among EFL learners in diverse educational settings.

**Table 5.** Summary of Comparative Findings

Study	Context	Strategy	Findings	Relevance to This Study
Zhou et al. [12]	Chinese EFL learners	Independent Grammar Study Scheme (IGSS)	Significant improvement in grammar accuracy with structured self-study	Validates the potential of self-study outside class
Luo et al. [11]	University EFL, China	Self-evaluation, teacher feedback, L2 grit	Higher grammar gains with self-reflection activities	Supports the use of reflective weekly reports
Subekti [13]	Indonesian EAP learners	SDL with instructor scaffolding	Increased motivation and engagement	Justifies in-class clarification and content relevance

The results of this study not only demonstrate the effectiveness of structured self-study in improving grammar competence but also offer several pedagogical insights. These implications are particularly relevant for EFL instructors working within time-constrained, mixed-proficiency classrooms, and are outlined below to guide future instructional planning and curriculum development.

1. **Blended Models Are Feasible and Effective:** Even with minimal in-class time, structured self-study complemented by targeted in-class support can lead to meaningful grammar improvement.
2. **Reflection Enhances Learning Depth:** Encouraging learners to reflect on their own progress and questions fosters greater metacognitive awareness and active engagement.
3. **Contextual Relevance Boosts Motivation:** Grammar instruction that uses content relevant to students' fields (e.g., food science) may improve the perceived value and applicability of language learning.
4. **Differentiation Through Self-Study:** Structured self-study allows students to work at their own pace, which is crucial in heterogeneous classrooms with varied proficiency levels.

#### 4. CONCLUSION

This classroom-based study examined the effectiveness of a structured self-study model for improving grammar competence among undergraduate students in the Department of Food Science and Agricultural Product Technology. The findings revealed a significant improvement in students' grammar performance after

the implementation of the program. The number of students achieving high scores increased notably, and the majority of participants reported positive experiences with the self-study process.

Students' self-assessment and perception data supported the objective test results. Over 92% of learners rated their self-study engagement as positive, and 85.7% agreed that the approach contributed to their grammar improvement. These findings reflect high learner engagement and a generally favorable attitude toward the self-study model, even in the absence of intensive teacher-led instruction. When situated within the broader literature, the study contributes further evidence to the growing body of work that supports autonomous grammar learning through reflective practices and accessible learning materials.

1. **Recommendations** for future practice and research include the following:
2. **Integration into curriculum:** The self-study model, especially when paired with reflective logs and periodic in-class support, should be considered as a complementary strategy in grammar instruction across non-English departments. It encourages learner autonomy without compromising outcomes.
3. **Expansion to other linguistic areas:** While this study focused on basic grammar (parts of speech and sentence construction), future implementations could include other dimensions of language competence such as cohesion, sentence variety, and genre-specific grammar.
4. **Use of digital platforms:** Future studies could incorporate digital self-study systems that allow for automatic scoring, individualized feedback, and real-time progress monitoring to enhance efficiency and engagement.

5. **Longitudinal research:** Further investigations with a longer timeline and multiple checkpoints would provide insights into the retention of grammar knowledge and the sustainability of autonomous learning habits.
6. **Cross-program application:** Similar models could be tested across different faculties or departments to determine their adaptability and impact across various academic fields and student profiles.

Overall, this study underscores the pedagogical potential of structured self-study for grammar learning in EFL settings and contributes to the shift from teacher-centred to learner-centred grammar instruction, particularly in content-specific academic contexts.

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