



The Development of the Eco-Tense Game Book: A Non-Digital Game-Based Grammar Learning Media for Economics Students in South Papua

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Abstract

Mastery of English tense forms remains a persistent linguistic challenge for students in Papua, largely due to limited access to contextualized English learning resources, restricted digital connectivity, and unequal ownership of digital devices, particularly among indigenous Papuan students. To address these constraints, this study developed the Eco-Tense Game Book, a non-digital, game-based instructional medium designed for economics students. The development followed Plomp's Research and Development (R&D) model, encompassing five stages: needs analysis, design, development, evaluation and revision, and implementation. Data were collected through semi-structured interviews and evaluation instruments administered to experts, practitioner, and students. The results showed that expert validation produced a high validity score of 91.5%, practitioner evaluation demonstrated good instructional feasibility with a score of 82.5%, and student evaluation revealed strong usability and learner acceptance, reflected in an overall score of 90.5%. The findings indicate that expert validation confirmed the academic appropriateness of the Eco-Tense Game Book, practitioner evaluation demonstrated its feasibility for classroom use, and student evaluation revealed that the media was easy for learners to use. The findings are based on validation and user perception data rather than experimental measurement of learning outcomes. A limitation of this study is the absence of a pre-test and post-test design to evaluate learning effectiveness. This study contributes to the development of non-digital game-based learning in English for Specific Purposes (ESP) by providing an alternative instructional resource for low-resource and low-connectivity educational settings.

Keywords: Educational Media Development, Economics Students, Eco-Tense Game Book, English For Specific Purposes (ESP), Grammar Instruction.

1. Introduction

Tense usage in English remains one of the most challenging aspects in learning English as a Foreign Language (EFL) in Indonesia due to the differences in structure and conception of time. A clear understanding of tense enables students to express relationships between time and meaning accurately, as tense encodes the temporal location of events in relation to meaning (Smith, 2007). In economics, where discussions often involve trends, projections, and past performance, accurate tense usage is essential for professional communication. Previous studies consistently indicate that Indonesian EFL learners experience persistent difficulties in mastering tense usage, primarily due to limited contextualized practice and challenges in applying grammatical rules in authentic communication. These findings suggest a common reliance on form-focused instruction that does not adequately support meaningful language use (Damis et al., 2024; Mustakim et al., 2025). This issue is also experienced by economics students, who face similar

difficulties as general EFL learners while also encountering additional challenges related to understanding specialized academic texts and discipline-specific concepts in English (Adys et al., 2025). In addition, students often make grammatical mistakes and do not feel confident when they speak, especially in subject-specific classes such as English for Economics (Benchennane & Stambouli, 2021).

While these challenges are experienced by EFL learners more broadly, they become more complex in South Papua due to the region's linguistic diversity, geographical barriers, and limited technological infrastructure. Universities face challenges such as considerable distances between their campuses, unstable internet connectivity, and a scarcity of digital learning materials (Agustus et al., 2025; Muslimin & Indrawati, 2024; Prasetyo et al., 2021). Given these constraints, integrating digital technologies commonly found in modern language classrooms becomes difficult. As a result, educators in Papua need to adopt practical, cost-effective, and culturally sensitive pedagogical strategies capable of effectively teaching grammar and engaging students in the absence of advanced technological or online support.

In this case, Game-Based Learning (GBL) offers a relevant pedagogical alternative for grammar instruction in low-resource educational contexts. Prior research generally highlights the potential of game-based learning (GBL) to enhance student engagement and motivation; however, these findings are largely derived from digitally mediated environments, leaving a limited understanding of how similar outcomes may be achieved through non-digital approaches (Jaramillo-Mediavilla et al., 2024; Zakaria & Zakaria, 2025). In ESP contexts such as economics, GBL enables students to practice language structures in real-world workplace scenarios, which enhances their workplace communication skills and deepens their understanding of grammar (Dahalan et al., 2023; Harwood & Omar, 2024). However, despite these advantages, most applications of GBL are heavily dependent on digital technology. This technological orientation presents an important limitation, as digital GBL often assumes stable internet access, sufficient digital literacy, and availability of personal devices—conditions that are not consistently available in remote regions such as South Papua. Consequently, the effectiveness of digital GBL may not be fully transferable to marginalized educational settings where infrastructural constraints directly influence learning participation and accessibility. As a result, there is still limited research and practice focused on developing non-digital, discipline-oriented grammar learning resources that can function effectively in low-connectivity and resource-poor environments.

This gap is theoretically significant, as effective grammar learning requires active engagement, interaction, and contextualized practice, as emphasized in constructivist and experiential learning theories. These principles are often assumed to be supported by digital technologies; however, in low-resource contexts, such assumptions are not always applicable. The absence of non-digital instructional alternatives, therefore, limits the practical implementation of these learning theories in ESP grammar instruction. This highlights the need for theoretically grounded, non-digital game-based learning resources that can function effectively in low-connectivity environments.

From a theoretical perspective, effective grammar learning involves active participation, contextualized interaction, and experiential engagement. Constructivist theory emphasizes knowledge construction through interaction (Vygotsky, 1978), while experiential learning highlights learning through experience and reflection (Kolb, 1984). Game-based learning (GBL) operationalizes these principles through engagement and

contextualized practice, making it a relevant approach for grammar instruction (Plass et al., 2015).

To address these limitations, the present study adopts a non-digital GBL framework through the development of the Eco-Tense Game Book. Drawing on constructivist, experiential, and communicative learning principles, the Eco-Tense Game Book was designed as a non-digital interactive learning medium consisting of individual and collaborative classroom games for learning English tenses within economic contexts. The activities were developed progressively, beginning with vocabulary-focused games, followed by activities involving grammatical word changes, expressions, and contextual sentence construction related to classroom communication and economic themes. Individual and group-based gameplay was incorporated to encourage active participation and classroom interaction, while contextual economic situations were integrated to provide meaningful grammar-learning experiences. In addition, communication-oriented activities were embedded throughout the games to promote the functional use of English tenses in authentic classroom interaction. These principles were implemented through activities such as Bingo Game, Spy, Timeline Scrabble, Treasure Game, Game Wheel, What Ifs, Grid Game, and Board Game, all of which integrate grammar learning with economic contexts relevant to students' academic discipline.

The Eco-Tense Game Book is a non-digital grammar-learning tool that combines the playful characteristics of games with the structured format of a workbook. Rather than functioning as a conventional grammar book, it serves as an interactive learning medium that provides grammar explanations, reflection activities, and extended gameplay within a single resource. Through both individual and collaborative classroom activities, learners engage with English tenses through participation and contextual communication rather than rote memorization.

The game book was selected for both pedagogical and practical considerations. Pedagogically, the format supports active participation and contextualized grammar learning through classroom activities. Practically, the physical format makes the product accessible in South Papua, where electricity and internet access may be limited or unreliable. The Eco-Tense Game Book does not require digital devices, making it an affordable, flexible, and adaptable resource for grammar instruction in low-resource educational settings. Furthermore, its portable format enables teachers to modify existing activities or develop additional games according to classroom conditions and students' proficiency levels.

Hence, the objective of this article is to describe the design, development, and evaluation of the Eco-Tense Game Book as an innovative, sustainable, and contextual method for grammar learning addressed to economics students in the South Papua region. This study contributes to the literature by developing a non-digital game-based learning (GBL) approach for English for Specific Purposes (ESP) grammar instruction, specifically adapted to low-resource and low-connectivity educational contexts.

2. Method

This study employed a development research design adapted from Plomp (2013), which consists of five systematic stages: (1) initial investigation, (2) design, (3) realization, (4) evaluation, and (5) revision. This method was chosen because it provides a structured way to create and test educational products and ensure that the final prototype is reliable, valid, and useful. The study was conducted over five months from July to November 2025.

1. Initial Investigation

In this phase, the learning needs of ESP economics students in South Papua were identified through five working days of interviews with 35 students and an analysis of the ESP economics curriculum within one week. This phase ensured that the Eco-Tense Game Book addressed the real issues of limited internet access, lack of motivation, and context-specific grammar issues. This stage served as the foundation for the subsequent two cycles of development.

2. Design

Based on the findings in the investigation, the first draft of the Eco-Tense Game Book was designed over approximately nine weeks, which included selecting tenses of English important to economics, incorporating economic concepts into grammar games, compiling the Eco-Glossary, and designing the rules, game boards, and worksheets, as well as the book layout with a view toward contextual relevance and accessibility in low-technology environments. This design was prepared for implementation in the first cycle of the development process.

3. Realization

The design was then realized into a printed prototype. The prototype included the game pieces, example sentences, game directions, and game scenarios. Students participated in one-on-one trials to detect any usability problems lasting six classroom sessions. The prototype then underwent a first and second round of validation by two experts and one practitioner over 10 working days. The experts were chosen based on their proficiency in teaching English, especially in the areas of instructional media development and grammar instruction. Meanwhile, the practitioner was chosen based on their teaching experience in English for Specific Purposes (ESP) and their familiarity with classroom practices related to the target learners. This stage constituted Cycle 1 and Cycle 2 of the implementation and refinement process.

4. Evaluation

Evaluation was conducted by collecting evaluations from experts and practitioner as well as student responses through validation sheets, questionnaires, and interviews within approximately two weeks. Experts and practitioner evaluated the content accuracy, language quality, media presentation, and the educational value. Students evaluated the clarity, interest, and educational value. This step enhanced the internal validity of the product. This step was conducted across the two iterative cycles of realization and evaluation.

5. Revision

According to the results of the evaluation, two rounds of revisions were made to make the text clearer, more grammatically correct, and concise within two weeks. These revisions were conducted in line with the two iterative cycles of realization and evaluation. The final prototype reflected all of the suggestions made by the experts and the students and was found to be a valid and useful grammar learning experience without the aid of a computer. This revision process completed Cycle 2 of the development process.

This study involved undergraduate economics students enrolled in an English for Specific Purposes (ESP) course during the 2025/2026 academic year. Using purposive sampling, 35 students were selected from a class with the highest proportion of Orang Asli Papua (OAP) students, while still reflecting diverse levels of English proficiency relevant to the target context. Participants' English proficiency levels (high, medium, and low) were based on the lecturer's existing course grades. No additional test was administered because the classification used the available assessment scores. This sample size is

considered sufficient for development research focusing on practicality and usability rather than statistical generalization. However, the relatively small and context-specific sample may limit the external validity of the findings; therefore, future studies should involve larger and more heterogeneous samples.

Three instruments were used to collect the required data. The first was validation sheets, which were used by two experts and a practitioner to validate the content, linguistics, design, and practicality of the game book. The validators were purposively selected based on their academic qualifications in English education and a minimum of five years of teaching experience. Their expertise lies in English language teaching, particularly in grammar instruction, English for Specific Purposes (ESP), and instructional media development. The second was the student questionnaires, to measure the usability, clarity, engagement, and practicality of the game book. The internal consistency of the student response questionnaire was assessed using Cronbach's alpha. The obtained coefficient of 0.80 indicates good reliability, suggesting that the items consistently measure students' perceptions of the developed product. The third was interviews with some of the students to gain deeper qualitative insights about their user experience and any suggestions for improvement. The validation sheets and questionnaires were adapted from (Evayani, 2021) and developed based on established criteria of instructional material evaluation and media design. The triangulation of these instruments provided greater reliability and depth for the gathered data.

The data were analyzed quantitatively and qualitatively. Quantitative analysis was conducted to calculate the mean score and percentage score of expert validation, practitioner assessment, and student questionnaire using a four-point Likert scale (Sugiyono, 2015). The level of validity and practicality was interpreted using the criteria proposed by Arikunto (2008).

Table 1. Rating scale

Category	Score
Very Good	4
Good	3
Fair	2
Poor	1

(Source: Sugiyono, 2015)

Table 2. Level of Validity

Score	Category
$75 < P \leq 100$	Highly Valid
$50 < P \leq 75$	Valid
$25 < P \leq 50$	Partially Valid
$P \leq 25$	Not Valid

(Source: Arikunto, 2008)

Qualitative data from semi-structured interviews were analysed thematically to identify key patterns related to students' learning experiences. The analysis followed a systematic coding procedure. First, all interview transcripts were read repeatedly to achieve data familiarization. Second, meaningful statements were identified and assigned initial codes based on their relevance to students' experiences. Third, similar codes were compared and grouped into broader categories based on shared meanings. Finally, these categories were refined and developed into themes that represented the main findings. The data were grouped into four main themes: (1) visual design and readability, (2)

learning support features, (3) usability and accessibility, and (4) motivation and engagement.

Data triangulation was employed to enhance the credibility of the findings by integrating multiple data sources, including expert validation sheets, practitioner evaluations, student questionnaires, and semi-structured interviews. The triangulation process involved systematically comparing quantitative and qualitative data to identify convergent and complementary patterns. While quantitative results provided overall trends, qualitative interview data offered deeper insights into students' experiences, thereby strengthening the validity and interpretation of the findings.

3. Results

3.1. Findings

This section reports the findings of the development and evaluation of the printed game book in terms of its validity, practicality, and ease of use. The results are drawn from expert and practitioner validation, student evaluations, and qualitative feedback obtained during the implementation stage. Quantitative findings are presented in tables as mean scores and percentages, while selected student verbatim responses are included to provide further insight into learners' experiences.

3.1.1 Validation of the Game Book by Experts

Table 4 provides a brief overview of the experts' evaluation. The expert validation results show that the Eco-Tense Game Book obtained a high validity score (M = 3.66; 91.5%), indicating that the material is generally considered appropriate in terms of content, language, and design. The material aspect received the highest score (95%), which may suggest that the integration of English tenses within economic contexts is relevant for ESP learners. This finding indicates alignment with discipline-specific learning needs, although further empirical investigation would be required to examine its impact on learning outcomes. The score for language use (92.5%) suggests that the instructions and explanations are generally clear and understandable, which may support students in following the material. The design aspect (87.5%), while still within the highly valid category, indicates that some elements of visual presentation could be further refined.

Table 4. Experts Validation Results

Aspect	Mean	Percentage
Material	3.8	95 %
Language use	3.7	92.5 %
Design	3.5	87.5%
Overall Score	3.66	91.5 %

3.1.2. Practicality Evaluation by Practitioner

Table 5 shows that the practitioner generally perceived the Eco-Tense Game Book as practical for classroom use (M = 3.5; 87.5%). Higher scores in instructional clarity and organization, particularly for "simple and complete instructions" (95%) and "well-organized" (92.5%), suggest the material can be implemented with relative ease. This may facilitate classroom management, especially in game-based learning contexts where clear procedures are important. The "interactive" aspect received the lowest score (75%), which may reflect that interaction relies more on teacher guidance and peer collaboration than on features embedded in the material itself, a common characteristic of non-digital resources. Other aspects, including alignment with objectives, presentation format, and reusability (all

87.5%), indicate that the material is generally suitable and can be reused in instructional settings. The range of scores (3.0–3.8) suggests some variation across aspects, particularly between interactivity and clarity, indicating that while the material is largely well-developed, certain elements may still require further improvement.

Table 5. Validation Results of the Practicality of the Game Book by Practitioner

Criteria	Mean	Percentage
Clearly focused on objectives	3.5	87.5%
Interactive	3	75%
Presentation format is motivating	3.5	87.5%
Well-organized	3.7	92.5 %
Simple and complete instructions	3.8	95 %
Reusable	3.5	87.5%
Overall Score	3.5	87.5%

3.1.3 Student Validation Results on Ease of Use

Thirty-five students tested the printed game book as part of their class work to evaluate its usability. According to Table 6, it received positive evaluations from students. Learning grammar through the book was easy, the tasks made sense, the book was self-paced, and the vocabulary was easy for students to pick up. The average score for each of these areas was 3.6 (90%), meaning that most students found the book easy to use, with an average score of 3.7 (92.5%). This shows that the students did not struggle to find out what to do, and they felt well supported. Layout and design also helped; both "easy to navigate" and "tasks for group learning" received an average score of 3.5 (87.5%). Students agreed that it was well organized and suitable for both solo and group work. Overall, students gave the printed game book an average score of 3.61 out of 4, or 90.25%. This high score indicates that the book is not only practical and well accepted in the classroom.

Table 6. Student Validation Results of the Ease of Use of the Game Book (n=35)

Criteria	Mean	Percentage
Easy to use for learning grammar	3.6	90%
Instructions are clear and easy to follow	3.7	92.5%
Layout and design support easy navigation	3.5	87.5%
Activities are easy to understand and complete	3.6	90%
Examples and explanations are easy to follow	3.7	92.5%
The book can be used independently	3.6	90%
The book can be used in group learning	3.5	87.5%
Vocabulary is easy to understand	3.6	90%
Overall ease of use	3.7	92.5%
Student Mean Score	3.61	90.25%

3.1.4 Student Qualitative Feedback

Qualitative feedback from students was analyzed thematically to identify recurring patterns in their responses. The data were grouped into four main themes: (1) visual design and readability, (2) learning support features, (3) usability and accessibility, and (4) motivation and engagement. This thematic categorization strengthens the interpretation of qualitative data by organizing individual responses into meaningful patterns.

1. Visual Design and Readability

Students highlighted issues related to text size and visual presentation in the initial version of the game book. Several responses indicated that a small font size reduced readability, while the limited use of images made the material less visually engaging. These findings suggest that visual clarity plays a crucial role in supporting learners' interaction with printed instructional materials. This is reflected in the following responses:

P1: *"Ibu, ini sudah bagus sekali, tapi kalau boleh tambah gambar lagi, Kak. Biar kita baca itu lebih, lebih enak liat-liatnya."* ["Ma'am, this is already very good, but if possible, please add more pictures. It would make it more enjoyable to read and nicer to look at."]

P2: *"Tulisan ini ada yang kecil, Ibu. Kita baca itu harus dekat sekali. Kalau bisa bikin besar sedikit supaya kita baca gampang."* ["Some of the text is small, Ma'am. We have to read it very closely. If possible, please make it a bit larger so it's easier for us to read."]

2. Learning Support Features

Another prominent theme relates to the need for additional learning support tools. Students suggested including independent practice exercises, a glossary, and a summary of tense formulas. This indicates that learners require scaffolding features to facilitate self-directed learning and reinforce their understanding of grammar concepts. The following excerpts illustrate these needs:

P3: *"Ini mantap, Ibu, cuma mungkin tambah latihan mandiri di belakang tiap bagian ka. Supaya kita bisa tes diri sendiri, kita sudah paham atau belum."* ["This is excellent, Ma'am, but maybe you could add independent practice exercises at the end of each section, so we can test ourselves to see whether we really understand or not."]

P4: *"Ibu, kalau ada kamus kecil di belakang buku, saya tidak punya kamus, kalau ada itu bagus sekali. Biar kita bisa cari arti cepat, jadi kamus bantu sekali."* ["Ma'am, if there were a small glossary at the back of the book, that would be very good. I don't have a dictionary, so having one in the book would really help us quickly find word meanings."]

P5: *"Kalau bisa, Ibu, bikin juga ringkasan rumusnya, tenses. Jadi kita tidak pusing cari-cari lagi. Kita tinggal lihat satu halaman, langsung dapat rumusnya dan contohnya."* ["If possible, Ma'am, please also include a summary of the tense formulas. That way, we won't get confused looking for them. We could just look at one page and immediately get the formulas and examples."]

3. Usability and Accessibility

Students' responses also emphasized the importance of usability and accessibility. The game book was perceived as flexible for both individual and group learning, indicating that it accommodates different learning preferences and classroom conditions. Additionally, the inclusion of a glossary was considered particularly useful in contexts where students have limited access to external learning resources. After revision, students reported usability improvements, as reflected in the following responses:

P1: *"Tulisannya sudah mudah dibaca..."* ["The text is now easy to read."]

P2: *'Gambar-gambar juga lebih bagus dibaca bukunya, dan game-gamenya.'* ["The pictures also make the book more interesting to read, and the games are more engaging."]

P3: *"Latihan mandiri itu sangat membantu tes saya."* ["The independent practice activities are very helpful in testing my understanding."]

P4: *"Kamus di belakang buku suka sekali kalau tidak paham karena kami tidak ada kamus."* ["The dictionary at the back of the book is very helpful when we do not understand, as we do not have our own dictionaries."]

P5: *"Rumus tensesnya di belakang itu membantu kami kalau bingung artinya".* ["The tense formulas at the back of the book help us when we are confused about the meaning."]

4. Motivation and Engagement

The game-based format emerged as a strong motivational factor. Students expressed increased interest and enjoyment in learning grammar through interactive activities, suggesting that the material promotes engagement and reduces the perceived difficulty of grammar learning. This is evident in the following responses:

P6: "Sangat membantu saya belajar tenses dan bahasa Inggris ekonomi." ["It is very helpful for learning tenses and Economic English."]

P7: "Suka sekali belajar game-game begini. Saya tertarik." ["I really enjoy learning through this type of game; it makes me interested."]

P8: "Game sendiri dan kelompok suka semuanya, tertarik belajar kalau begini". ["I like both the individual and group games; learning this way makes me interested."]

P9: "Sangat membantu latihan bahasa Inggris ekonomi, sangat membantu". ["It is very helpful for practicing Economic English."]

A comparison of pre- and post-revision feedback shows a clear improvement in user experience. Initial responses focused on limitations such as small text, lack of visuals, and absence of supporting features. After revision, students' responses shifted toward positive affirmations, indicating that the improvements successfully addressed usability, readability, and learning support issues. This progression highlights the value of iterative design in educational material development, demonstrating how continuous refinement based on user feedback contributes to improved learning experiences.

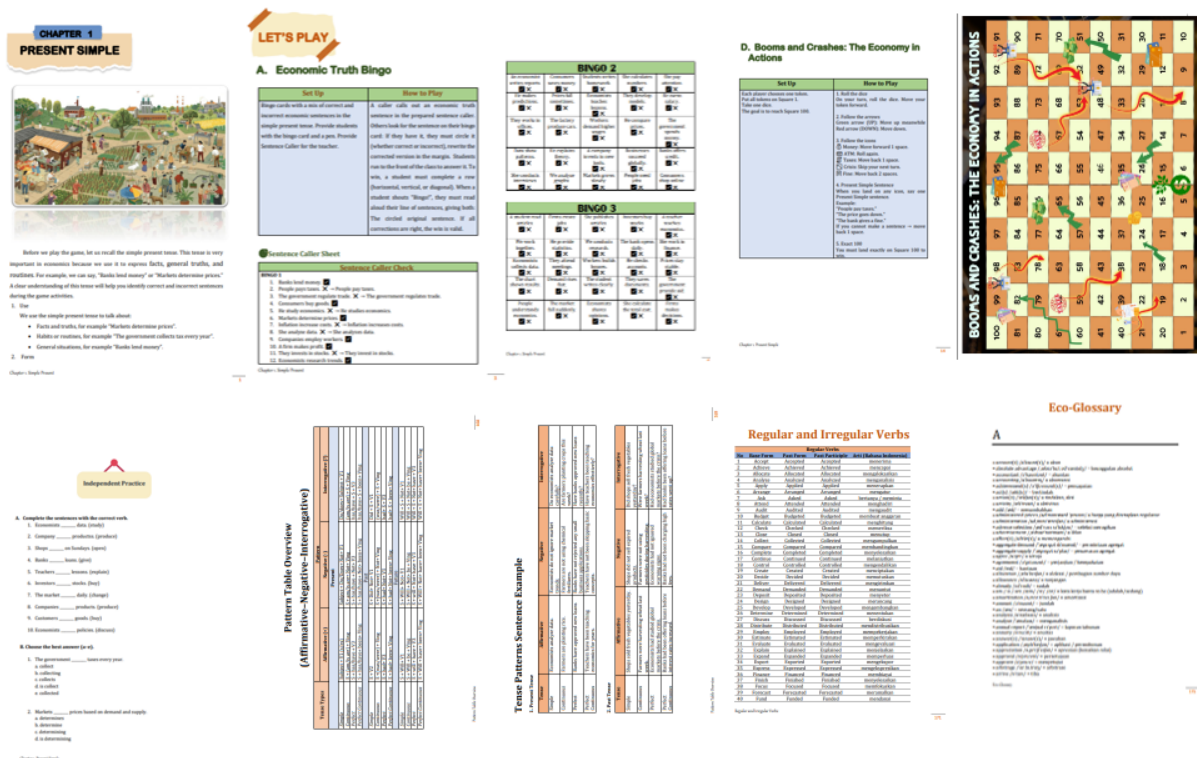


Figure 1 Visual Representations of the Eco-Tense Game Book

Figure 1 presents selected sample pages from one chapter of the *Eco-Tense Game Book* to provide an overview of its layout, instructional design, and game-based learning activities. Each chapter follows a consistent structure. It begins with an explanation of the target tense, including its form, function, and examples in economic contexts. This is followed by four game-based activities for each chapter, each accompanied by clear setup

instructions and gameplay procedures to facilitate independent or classroom use. At the end of every chapter, individual exercises are provided to assess students' understanding and mastery of the tense being studied.

All chapters are organized according to this same pedagogical sequence to ensure consistency and ease of use. In addition, the appendices include a comprehensive overview of all English tense patterns, example sentences, lists of regular and irregular verbs, and an economic glossary to support learners' comprehension of discipline-specific vocabulary. The pages displayed in Figure 1 serve only as representative examples of the book's content and organization. These visuals serve as a preview, while the full version of the game book is accessible for detailed examination (available at: <https://e-publisher.my.id/index.php/ptakm/article/view/185>).

The design of the Eco-Tense Game Book provides structured exposure to target tense forms and repeated practice through game-based activities in each chapter, with each chapter focusing on a single target tense, serving as the overall pedagogical foundation of the book.

3.2. Discussion

The present study aimed to develop and validate the Eco-Tense Game Book as a non-digital, game-based grammar learning medium for economics students in South Papua. The discussion examines the validity, practicality, and pedagogical efficacy of the developed product by amalgamating quantitative validation outcomes with qualitative student feedback, while contextualizing the results within the extensive literature on grammar instruction, English for Specific Purposes (ESP), and game-based learning (GBL).

3.2.1 Validity and Instructional Significance

The high expert validation scores suggest that the Eco-Tense Game Book successfully integrates grammar instruction with economics-related content while maintaining linguistic clarity and acceptable visual design. The strongest rating was obtained in the material aspect, indicating that experts considered the contextualization of tense learning within economics topics relevant to the target learners.

This finding is particularly significant because grammar instruction is frequently presented through isolated examples that have limited connection to students' academic disciplines. By embedding tense practice within economics-related situations, the material attempts to make grammar learning more meaningful and professionally relevant. However, the validation results should not be interpreted as evidence that students learned grammar more effectively. Instead, they indicate that the material is considered academically appropriate and aligned with its intended instructional objectives.

From a pedagogical perspective, this aligns with Communicative Language Teaching, which emphasizes meaningful language use in context (Richards, 2006). However, previous studies suggest that contextualization alone may not ensure grammatical accuracy without sufficient practice and feedback (DeKeyser, 2007). Therefore, the expert validation findings should be interpreted as evidence of content appropriateness and instructional alignment rather than evidence of improved grammar achievement. Determining effectiveness would require direct measurement of student learning outcomes through experimental or longitudinal investigation.

3.2.2 Practicality and Learning Mediation

The practicality findings extend beyond feasibility and may be interpreted in relation to how learning is mediated in the classroom. High ratings in instructional clarity suggest

that the material may reduce extraneous cognitive load, allowing learners to focus more on language use (Sweller, 2011).

The comparatively lower rating in interactivity indicates that interaction is largely mediated through teacher facilitation and peer collaboration rather than embedded system feedback. This differs from many digital game-based learning environments, which emphasize immediate feedback as a central mechanism for learning (Plass et al., 2015).

However, this does not necessarily imply reduced pedagogical value. From a constructivist perspective, learning is inherently social and dialogic (Bruner, 1996; Vygotsky, 1978). Therefore, the findings suggest that non-digital materials may support socially mediated interaction, which may be particularly relevant in collaborative classroom settings.

3.2.3 Student Experience and Iterative Design

Student perceptions provide insight into how the material functions in practice, particularly in relation to usability and learning support. The shift from initial concerns regarding readability, limited visual elements, and the absence of supporting resources to more positive responses after revision suggests that these aspects play an important role in students' learning experience. Students appeared to benefit from the improvements made to the material, particularly the inclusion of additional support features and clearer presentation. These findings are consistent with previous research indicating that grammar learning challenges often stem from insufficient contextualization and a lack of accessible support (Apolonio, 2021; Nassaji & Fotos, 2011).

Similarly, students responded positively to the addition of glossaries, summaries, and independent practice activities, suggesting that such features may help learners navigate grammar content more effectively. The inclusion of these support tools may also encourage learners to monitor and reinforce their own understanding during the learning process, which has been associated with metacognitive development (Oxford, 2011; Zimmerman, 2022).

The improvements reported by students after revision are also reflected in the design features presented in Figure 1. The figure illustrates how grammar explanations, contextualized economic examples, game-based activities, and individual practice exercises are organized within a consistent instructional sequence. The inclusion of supporting resources such as glossaries and tense summaries further demonstrates how student feedback was incorporated into the final version of the material. These design features help explain the positive ratings for usability and ease of use, suggesting that the iterative revision process contributed not only to the visual quality of the book but also to its pedagogical functionality.

However, because the present findings are based on students' perceptions, further research is needed to determine whether these features contribute to measurable learning outcomes.

3.2.4 Game-Based Learning and Motivational Dynamics

Students consistently reported that the game-based format made grammar learning more enjoyable and engaging. The combination of game activities and economics-related content appeared to reduce the perception that grammar learning is difficult or repetitive. This finding is consistent with previous studies suggesting that game-based learning can enhance learner motivation through challenge, interaction, and meaningful learning tasks (Jaramillo-Mediavilla et al., 2024; Plass et al., 2015; Wicaksana et al., 2025). However,

these findings should be interpreted cautiously. The evidence for increased motivation is based exclusively on students' self-reported perceptions collected during implementation. While positive responses indicate that students enjoyed the activities and perceived them as engaging, they do not necessarily demonstrate sustained motivation, long-term engagement, or improved grammar learning outcomes. Students may report enjoyment immediately after participating in game-based activities without necessarily achieving substantial gains in grammatical competence.

At the same time, the relationship between motivation and learning outcomes remains complex. While increased engagement may support participation, it does not necessarily guarantee deeper learning without appropriate instructional scaffolding (Hu et al., 2025). The integration of economic contexts further enhances the relevance of grammar learning, which is a key principle in ESP (Basturkmen, 2025). This suggests that motivation may be supported not only by game elements but also by contextual relevance. Consequently, the motivational findings should be viewed as promising indicators of learner acceptance rather than definitive evidence of instructional effectiveness.

3.2.5 Contextual Constraints, Limitations, and Implications

The findings should be interpreted within the specific context of South Papua, where infrastructural limitations such as unstable internet access and limited availability of digital learning materials influence instructional practices (Agustus et al., 2025; Muslimin & Indrawati, 2024; Prasetio et al., 2021). In such contexts, non-digital instructional materials may offer a practical and accessible alternative.

However, several limitations should be acknowledged. First, the study involved a relatively small sample ($n = 35$), which may limit the transferability of the findings. Second, the study focused on validity, practicality, and usability rather than direct measures of grammar achievement. Consequently, the findings cannot determine whether the positive evaluations translated into measurable improvements in tense mastery.

Despite these limitations, the findings offer several practical implications. For curriculum design, integrating grammar into discipline-specific contexts may enhance relevance and learner engagement (Adys et al., 2025; Benchennane & Stambouli, 2021). For teacher training, the findings highlight the importance of equipping teachers with strategies to facilitate non-digital game-based learning (Simbolon, 2025). At the policy level, the study suggests that low-cost instructional materials may serve as practical alternatives in under-resourced educational settings, where access to adequate learning resources remains limited (Villacis et al., 2025).

Overall, the findings suggest that non-digital game-based materials may play a complementary role in grammar instruction, particularly in contexts where access to technology is limited. More importantly, the present study demonstrates that game-based learning does not necessarily require digital platforms to promote learner engagement and perceived usability. In the context of South Papua, where technological and infrastructural constraints continue to affect educational practice, the Eco-Tense Game Book illustrates how a low-cost, printed game-based resource can serve as a feasible alternative for supporting ESP-oriented grammar instruction.

4. Conclusion

This study aimed to develop and validate the Eco-Tense Game Book as a non-digital, game-based grammar learning resource for economics students in South Papua. The findings indicate that the developed product is valid, practical, and well-received by

users, based on expert validation (91.5%), practitioner evaluation (87.5%), and positive student responses (90.25%). These results demonstrate that the Eco-Tense Game Book meets established standards of instructional design and usability, and can be feasibly implemented in classroom settings.

However, it is important to clarify the scope of this study. The evaluation focused on validity and practicality, including content appropriateness, clarity, usability, and learner acceptance. The study did not measure learning outcomes or effectiveness in improving students' grammar proficiency, as no experimental design (e.g., pre-test and post-test) was employed. Therefore, claims regarding instructional effectiveness should be interpreted cautiously and remain beyond the validated scope of this research.

Despite this limitation, the study offers a theoretical contribution by demonstrating how principles of constructivist and experiential learning can be operationalized through non-digital game-based learning in ESP grammar instruction, particularly within low-resource and low-connectivity contexts. This extends existing literature, which has predominantly focused on digital game-based approaches.

Future research is recommended to strengthen and extend these findings. First, experimental studies are needed to examine the impact of the Eco-Tense Game Book on students' grammar achievement. Second, studies involving larger and more diverse samples would improve the generalizability of the results. Third, comparative research exploring digital versus non-digital game-based learning could provide deeper insights into their relative effectiveness across different educational contexts.

The Eco-Tense Game Book can be regarded as a validated and practical instructional resource that is positively received by learners, with considerable potential to support grammar learning in contexts with limited access to digital technology.

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References

- Adys, H. P., Adys, H. P., & Usman, M. (2025). Enhancing ESP reading comprehension through context clues and digital strategies. *Edu Cendikia: Jurnal Ilmiah Kependidikan*, 5(2). <https://doi.org/10.47709/educendikia.v5i02.6916>
- Agustus, F. S., Andoko, D., Muniasari, Savitri, M., Maharani, Nurisnaeny, C., Setiawati, P., Batara, M., & Heny. (2025). Strengthening the Papua steering committee strategy: Reducing instability for accelerated development in Papua, Indonesia. *Social Sciences & Humanities Open*, 11. <https://doi.org/10.1016/j.ssaho.2025.101413>
- Apolonio, J. A. (2021). *Needs analysis, challenges, and teaching strategies in English grammar learning* [Doctoral dissertation, Lyceum of the Philippines University]. <https://files.eric.ed.gov/fulltext/ED613630.pdf>
- Arikunto, S. (2008). *Dasar-dasar evaluasi pendidikan (Edisi revisi)*. Bumi Aksara.
- Basturkmen, H. (2025). *Core concepts in English for Specific Purposes*. Cambridge University Press.
- Benchennane, D., & Stambouli, M. (2021). Challenges in English for Specific Purposes: Economics students with speaking deficiencies. *Global Journal of Foreign Language Teaching*, 11(1). <https://doi.org/10.18844/gjflt.v11i1.5215>

- Bruner, J. (1996). *The culture of education*. Harvard University Press.
- Dahalan, F., Alias, N., & Shaharom, M. S. N. (2023). Gamification and Game Based Learning for vocational education and training: A systematic literature review. *Education and Information Technologies*. <https://doi.org/10.1007/s10639-022-11548-w>
- Damis, W. H., Jabu, B., & Salija, K. (2024). Difficulties in learning English tenses encountered by senior high school students. *Phinisi Journal of Art, Humanities, & Social Studies*, 4(2).
- DeKeyser, R. M. (2007). Introduction: Situating the concept of practice. In *Practice in a second language: Perspectives from applied linguistics and cognitive psychology* (pp. 1–18). Cambridge University Press. <https://doi.org/10.1017/CBO9780511667275.002>
- Evayani, D. A. M. C. D. (2021). *Pengembangan media Game Mission Book untuk meningkatkan motivasi belajar siswa kelas V di SD Gugus II Kecamatan Susut Kabupaten Bangli tahun pelajaran 2020/2021* [Universitas Pendidikan Ganesha]. <https://repo.undiksha.ac.id/8794/9/1611031381-LAMPIRAN.pdf>
- Harwood, M., & Omar, A. R. (2024). Overview of gamified and game-based vocabulary learning in ESP. *9th International Conference Vallis*. <https://doi.org/10.62598/9thICVA.008>
- Hu, K., Tang, D., & He, H. (2025). The mediating role of learning engagement in the relationship between master's students' learning motivation and scientific research and innovation capability. *Frontiers in Education*, 10. <https://doi.org/10.3389/feduc.2025.1604792>
- Jaramillo-Mediavilla, L., Basantes-Andrade, A., Cabezas-González, M., & Casillas-Martín, S. (2024). Impact of gamification on motivation and academic performance: A systematic review. *Education Sciences*, 14(6), 639. <https://doi.org/10.3390/educsci14060639>
- Kolb, D. A. (1984). *Experiential learning: Experience as the source of learning and development*. Prentice-Hall.
- Muslimin, M., & Indrawati, R. (2024). Digitalization and education equity in remote areas: Challenges and strategic solutions. *Journal of Education Humaniora and Social Sciences (JEHSS)*, 7(2). <https://doi.org/10.34007/jehss.v7i2.2356>
- Mustakim, M., Musfirah, N., & Jabri, U. (2025). Challenges in grammar learning among EFL students: A case study of an Indonesian University. *Seltics Journal: Scope of English Language Teaching, Literature and Linguistics Journal*, 8(1). <https://doi.org/10.46918/seltics.v8i1.2598>
- Nassaji, H., & Fotos, S. (2011). *Teaching grammar in second language classrooms: Integrating form-focused instruction in communicative context*. Routledge.
- Oxford, R. L. (2011). *Teaching and researching: Language learning strategies*. Routledge.
- Plass, J. L., Homer, B. D., & Kinzer, C. K. (2015). Foundations of Game-Based Learning. *Educational Psychologist*, 50(4). <https://doi.org/10.1080/00461520.2015.1122533>
- Plomp, T. (2013). *Educational design research: An introduction*. In T. Plomp & N. Nieveen (Eds.), *Educational design research*. Netherlands Institute for Curriculum Development (SLO).
- Prasetio, A., Anggadwita, G., & Pasaribu, R. D. (2021). Digital learning challenge in Indonesia. In *Advances in educational technologies and instructional design* (pp. 56–71). IGI Global. <https://doi.org/10.4018/978-1-7998-4972-8.ch004>
- Richards, J. C. (2006). *Communicative language teaching today*. Cambridge University Press.

- Simbolon, T. N. (2025). Exploring non-digital gamification in English education: Insights from a middle school study. *Journal of English Language and Education*, 10(1). <https://doi.org/10.31004/jele.v10i1.669>
- Smith, C. S. (2007). Tense and temporal interpretation. *Lingua*, 117(2). <https://doi.org/10.1016/j.lingua.2004.10.005>
- Sugiyono. (2015). *Metode penelitian pendidikan: Pendekatan kuantitatif, kualitatif, dan R & D*. Alfabeta.
- Sweller, J. (2011). Cognitive load theory. In *Psychology of learning and motivation* (pp. 37–76). Elsevier Academic Press. <https://doi.org/10.1016/B978-0-12-387691-1.00002-8>
- Villacis, M. A. B., Gualpa, S. C. G., Sandoval, D. J. D. la V., & García, M. R. A. (2025). Use of low-cost educational technologies to enhance English language learning. *Revista Ciencia Innovadora*, 3(3). <https://doi.org/10.64422/rci.v3n3.2025.67>
- Vygotsky, L. S. (1978). *Mind in society: The development of higher psychological processes*. Harvard University Press.
- Wicaksana, M. F., Sari, N. K., & Alfiana, N. (2025). Assessing the impact of Game-Based Learning through TikTok on English as a Foreign Language (EFL) vocabulary acquisition: An innovative approach to achieving SDG 4. *International Conference on Games-Based Learning (ICGBL 2025)*, 38–52.
- Zakaria, A., & Zakaria, N. Y. K. (2025). The impact of digital game-based learning tools on motivation, engagement, and performance in language education: A systematic literature review. *International Journal of Academic Research in Progressive Education and Development*, 14(1). <https://doi.org/10.6007/ijarped/v14-i1/24954>
- Zimmerman, B. J. (2022). Becoming a self-regulated learner: An overview. *Theory Into Practice*, 41(2). https://doi.org/10.1207/s15430421tip4102_2