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Game-Based Learning in Teaching Grammar for Non-Native Speakers: A Systematic Review

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ABSTRACT

The emergence of Industrial Revolution 4.0 targets challenging the norm and pushing boundaries. Hence, educational institutions are expected to embrace a few methods to adopt technology as part of their instructional strategies. The incorporation of technology can nurture students' motivation to learn English, particularly grammar. While game-based grammar learning provides motivation, enjoyment, and acquisition of grammar knowledge, trends in using game-based grammar learning have not been scrutinised in the context of a systematic review. Therefore, this paper reviewed articles on game-based grammar learning beginning in 2016 through 2021. The review summarises articles in the following categories: 1) research contextual dimension, 2) methodological dimension, 3) game dimension, and 4) outcomes dimension. By reviewing 25 articles, this systematic review could serve as a guide for designing language teaching and learning activities using a game-based approach. Based on the findings, the paper presents implications and suggestions for future research in terms of optimised delivery of knowledge using game-based grammar learning.

Keywords: ESL; games; game-based grammar learning; grammar; non-native speakers

INTRODUCTION

The fundamental aspect of languages is generally marked by their grammar. The significance of English grammar, for example, cannot be disregarded as it is a crucial linguistic structure in which students must be proficient (Savignon, 2017). In the context of ESL, it is important for learners to express themselves confidently without being scared and shy about making grammar mistakes. On the one hand, learners often find grammatical rules to be challenging (Baharudin & Yunus, 2018). Learners may become passive, confused, shy, afraid of making mistakes, and bored when they study English grammar. Also, learners may get negative results, and they might become demotivated to learn, making it difficult to communicate in English (Saraswati, 2015).

On the other hand, teaching ESL learners demands academics and instructors to be innovative, analytical, and creative in advocating new teaching methods (Krasniuk & Kryvych, 2016; Larsen-Freeman, 2015). A number of effective teaching techniques are used to stimulate

learners' interest in learning grammar. Using game-based grammar learning in classrooms is one of the recommended techniques. Game-based grammar learning is a pedagogical approach that applies gaming principles to teaching and learning, which is synonymous with gamification (Trybus, 2015).

This paper is significant in capturing the extent to which game-based grammar learning has been carried out by conducting a systematic literature review. Firstly, no systematic literature review about this topic has been conducted to the best of researchers' knowledge. Secondly, technological developments have continued to transform society, which demands technology-based teaching and learning methods to enhance learners' technology literacy. It encourages learning in an active and collaborative environment with the integration of technology-based activities. With reference to the Malaysian context, the focus on game-based grammar learning may be a testament on the part of learners to face the challenges of educational reformation. The reformation, a move towards the Industrial Revolution 4.0, focuses on 21st-century learning proposed to achieve the aim of the National Philosophy of Malaysian Education (NPME).

PAST STUDIES

According to Adeng and Shah (2012), an overreliance on rules and memorisation in grammar teaching may lead to a loss of interest and motivation among learners. Instead, researchers suggest that games may be the most appropriate approach for acquiring the grammar of a second language. Game-based grammar learning firstly provides the opportunity to meet learners' diverse needs because learners may be engaged and participate actively in grammar lessons (Chambers & Yunus, 2017). Secondly, engaging in grammar learning through a game-based approach may evoke a particular sense of excitement without emotional and social restrictions. By using the game-based approach, learners may be unaware of the learning processes that take place.

Many teachers have employed game-based techniques in grammar learning, reporting positive feedback from their experiences. Chambers and Yunus (2017), for instance, reported that students were unable to construct simple sentences before employing the Wheel of Grammar (WOG). WOG was then utilised to examine WOG's effectiveness in bolstering students' confidence in using subject-verb agreement in the context of sentence construction. Through a mixed-method design, it was reported that students' responses reflected an improvement in sentence construction. It was found that learners were able to apply basic subject-verb agreement, the right usage of tenses, and verbs-to-be. Researchers then concluded that learning becomes less stressful when a fun and creative way of teaching grammar is adopted.

In the same vein, Adeng and Shah (2012) conducted research on the use of games in teaching grammar and reported that grammar games promote fluency, simultaneously encouraging and entertaining learners. The research also opposes traditional language learning that focuses on grammar drills. Yaccob and Yunus (2019) stressed that the traditional teaching and learning process, chalk-and-talk, has become outdated in lessons. Game-based grammar lessons could enhance learners' comprehension of grammar rules beyond just memorisation (Musa et al., 2016). Zarzycka-Piskorz (2016) highlights that the Kahoot game application helped in enhancing students' irregular verb forms, question formation and passive voice. The researcher also concluded that despite the complexity of the material, students display enthusiasm and receptiveness towards acquiring knowledge by means of an online game. The results concur with Rozina et al. (2017), who conducted a study using a digital board game to teach grammar tenses

and aspects, highlighting that respondents performed better in post-test scores. The researchers assert that digital games are potentially useful as captivating resources for teaching and learning grammar.

Other studies also reported positive findings associated with game-based grammar learning. Michos (2017), for example, investigated game-based grammar learning to teach grammatical structures and lexical aspects. The researcher acknowledged that the use of gamification resulted in improved comprehension and simplified structures of both grammatical structures and lexical elements. Fazil and Said (2020) developed a mobile game application named 'TurTense', which was intended to aid in learning continuous tense. The researchers reported that the mobile gaming experience promoted learning in a non-threatening learning environment as it lowers students' anxiety levels. As a result, students were able to perform better in a more relaxing and comfortable setting.

The following systematic review contributes to a better understanding of patterns concerning game-based techniques in learning English grammar. An in-depth understanding of the extent to which technology-based grammar learning has been integrated is crucial to know how these technologies impact grammar learning. This research might better be understood as evidence of the potential effectiveness of adapting and embedding technology-based grammar learning into language classrooms.

CURRENT REVIEW

Game-based grammar learning has been used in a number of areas at many different levels of education and is perceived as an added value in teaching and learning. The aim of this research is to address the following research questions.

Research question 1: What are the types of game-based grammar learning used in English language grammar learning?

Research question 2: What is the impact of game-based grammar learning techniques on English language grammar learning?

Several systematic literature reviews have been carried out concerning the impact of game-based learning in the English language (Yieng & Aziz, 2022; Girgina, 2020; Vlachopoulos & Makri, 2017; Vnucko & Klimova, 2023; Seo & Seo, 2018). To our knowledge, there has been no attempt to synthesise research conducted in the area of English language grammar learning. As such, this review aims to systematically analyse the existing literature in the area of game-based grammar learning in the English language.

DATA COLLECTION

The research conducted in this systematic literature review (SLR) complied with the adapted version of the PRISMA coding scheme guidelines (Preferred Reporting Items for Systematic Reviews and Meta-Analyses). These guidelines were used to choose the articles for the review (Moher et al., 2009). PRISMA guidelines comprise a globally recognised and validated set of rules

for conducting systematic reviews (Shadiev & Yang, 2020). The research relied on the PRISMA guidelines to ensure the study's validity, transparency, and adaptability. This is evidenced by the use of PRISMA as the foundation for the research. The flowchart for the article selection is shown in Figure 1 below:

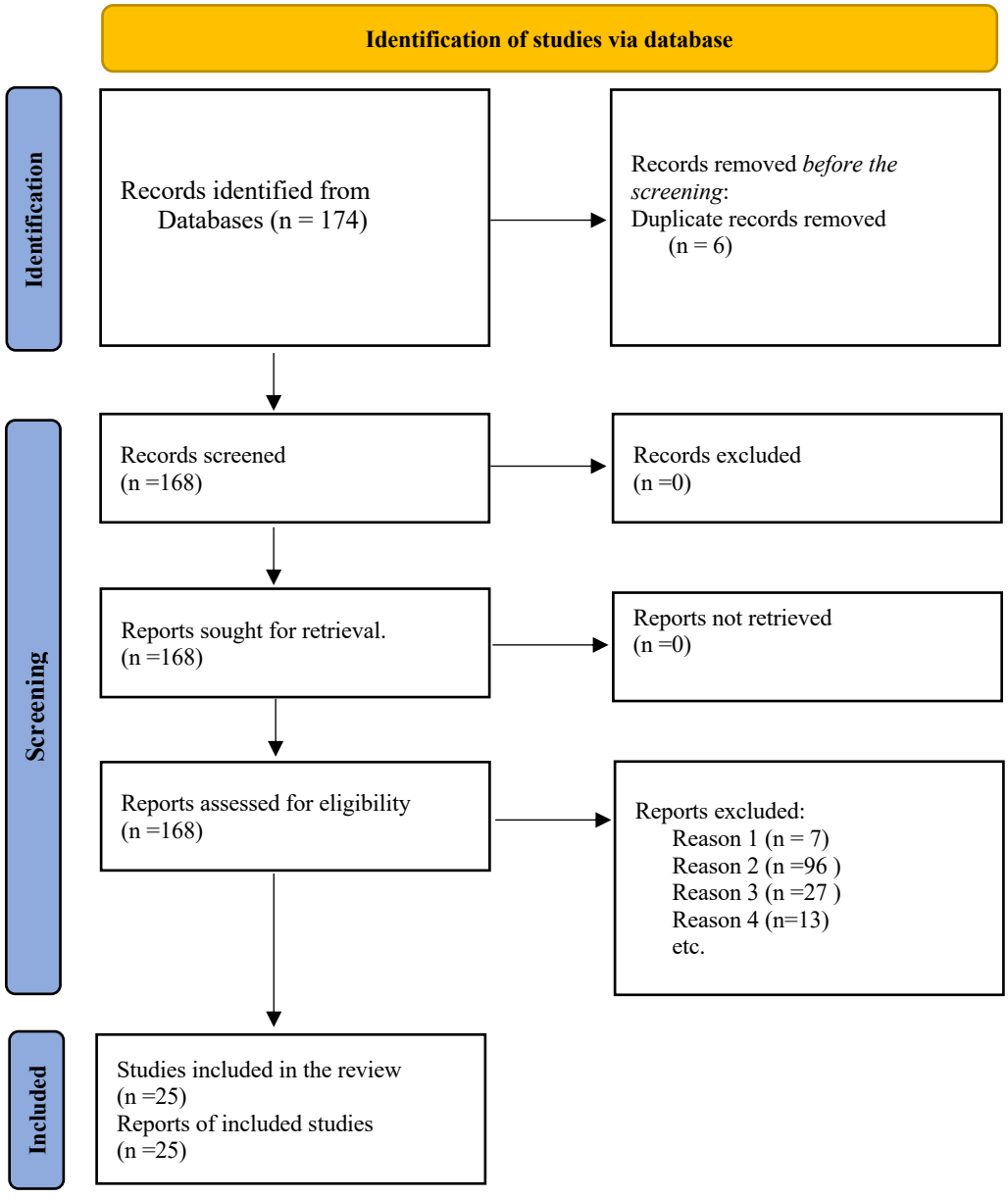

FIGURE 1. PRISMA in article selection

SEARCHED DATABASES

The search and selection of articles for this systematic literature review were completed in three phases: i) identification, ii) screening, and iii) selection/Include process. Firstly, the identification was completed by searching articles from the search engine Google Scholar. The search was based on Google Scholar because it provides: i) comprehensive coverage: Google Scholar indexes a wide range of academic sources, including journal articles, conference proceedings, and dissertations, making it a comprehensive search engine for academic literature and ii) easy usage: Google Scholar is a user-friendly search engine that allows the researchers to search for relevant literature quickly and efficiently. It also allows for easy filtering of search results by date, relevance, and citation count, and c) free and open access: Google Scholar is a free and open-access search engine, making it an ideal choice for researchers who do not have access to expensive subscription-based databases. A combination of keywords was used to generate results such as "game-based grammar learning", "gamification in grammar teaching", "games to improve grammar", "games and grammar", and "grammar games." Firstly, a total of 174 papers were identified. Six papers were removed due to issue duplication and paper similarity. Secondly, a screening process was conducted. One hundred sixty-eight papers were screened and retrieved (read: downloadable and savable papers). After that, the selected papers went through an eligibility process before they were classified through pre-formulated inclusion and exclusion criteria. To be included in the current review, the following inclusion and exclusion criteria were used:

TABLE 1. Inclusion and exclusion criteria

	Inclusion Criteria
1.	Articles published in the English language only.
2.	Studies were conducted in both local and international settings.
3.	Articles reported only on empirical evidence to achieve rich data.
4.	Articles focused on students' use of games.
5.	Articles must focus clearly on enhancing English grammar through game-based learning.
6.	The research was published within a period of six years, from 2016 to 2021.
	Exclusion Criteria
1.	Non-empirical studies or studies that merely describe the design of the games or context of a learning environment.
2.	Articles discuss the use of game-based learning in other subjects or skills. For example, Science, Mathematics, and language skills like Listening, Speaking, Reading, Writing, and Vocabulary.
3.	Articles that cannot be accessed as full text.
4.	Book chapters, dissertations, thesis; this review focused only on research articles.

During the eligibility process, 143 papers were excluded due to several reasons. Seven papers were excluded due to Reason 1 (non-empirical studies only described how the games were designed without implementation of the games in learning). Ninety-six papers were excluded for Reason 2 (articles discussed the use of game-based learning in other subjects or skills. For example, Science, Mathematics, and language skills like Listening, Speaking, Reading, Writing, and Vocabulary). Twenty-seven papers were rejected due to Reason 3 (the articles were not full texts), and 13 papers were excluded due to Reason 4 (they were not research articles but book chapters and dissertations). Finally, this process yielded 25 articles for review and report of findings. Appendix 1 lists the reviewed articles.

DATA ANALYSIS

CODING FRAMEWORK

This review adopted the coding framework proposed by Connolly et al. (2012). The framework emphasising the analysis of games and their effects using a multidimensional approach was valuable in structuring the diverse research in this field. The framework was developed for analysing games and their effects, which considers multiple dimensions, and was helpful in organising the diverse research on this topic. Studies on games used for learning involved most commonly reported knowledge acquisition as an outcome, whereas games designed for entertainment addressed a wider range of outcomes related to affect, behaviour change, perception, cognition, and physiology (Boyle et al., 2016). The eventual 25 papers meeting the inclusion criteria were analysed using the coding framework with multiple dimensions: 1) research contextual dimension, 2) methodological dimension, 3) game dimension, and 4) outcome dimension. This review contains detailed descriptions and rationales for the respective coding dimensions and categories. Table 2 displays the final coding scheme.

TABLE 2. Coding framework

Dimension	Category	Value	Reference
Research Contextual Dimension	Country	1	Indonesia
		2	India
		3	Iran
		4	Malaysia
		5	Taiwan
		6	Vietnam
		7	Egypt
		8	Poland
		9	Slovenia
		10	Morocco
	School Type	1	Tertiary
		2	Primary
		3	Secondary
	Subject (Grammar Component)	1	Relative Pronouns
		2	Simple Present Tense
		3	Singular, Plural Nouns
		4	Countable, Uncountable Nouns
		5	Adjectives, Conditional
		6	Simple Past Tense
		7	Past Continuous Tense
		8	Parts of Speech
		9	Present Progressive Tense
		10	Simple Future Tense
		11	Modals
		12	Passive Voice
		13	Irregular Verb
		14	Gerund
		15	Present Perfect
		16	Past Continuous Tense
		17	General
Methodological Dimension	Study Design	1	Descriptive
		2	Mix-Method
		3	Qualitative
		4	Quantitative

	Participants/ Sample	1	Students
		2	Students & Teachers
Game Dimension	Developer	1	Researchers
	Game Genre	1	Board Game
		2	Puzzle/ adventure
		3	Pre-authored courseware
		4	Role-plays
Outcomes Dimension	Learning	1	Cognitive
		2	Affective
		3	Cognitive + Affective
		4	Psychomotor
	Impact	1	Positive
		2	Negative

Firstly, the "research contextual dimension" deals with variables related to where a study was conducted and language skills (subjects). Three subcategories exist, encompassing country, school type, and subject (grammar component):

- Country: This study included many countries. This is because the researchers investigated game-based grammar learning, not only in the Malaysian context but also in other parts of the world. Therefore, the search yielded articles from ten countries, namely Indonesia, India, Iran, Malaysia, Taiwan, Vietnam, Egypt, Poland, Slovenia, and Morocco.

- School type: The educational system is different across countries. For the purpose of this study, categories comprised primary, secondary and tertiary to indicate education beyond secondary school.

- Subject (grammar component): This category refers to specific grammar components. The coding scheme by Connolly et al. (2012) comprises eight domain/curricular-specific areas involving the games. Because the current research focused on grammar components where gameplay or gamification was mainly integrated, the search yielded 18 grammar components that were taught by researchers using game-based grammar learning. These were relative pronouns, simple present tense, singular and plural nouns, countable and uncountable nouns, adjectives and conditionals, simple past tense, past continuous tense, parts of speech, present progressive tense, simple future tense, models, passive voice, irregular verb, gerund, present perfect, past continuous tense, and general grammar components.

Secondly, the "methodological dimension" includes the types of research design used in the papers. They included qualitative, quantitative, and mixed-method. In the initial process, papers were categorised individually as qualitative, quantitative, or mixed-method. On the one hand, qualitative research design refers to the use of qualitative data for analysis, such as interviews, observations, reflective journals, and expert validation. On the other hand, quantitative research design refers to the use of data such as pre-tests, post-tests, and questionnaires. The quantitative research design was further categorised into true experimental, quasi-experimental, and descriptive.

True experimental research refers to papers that include both experimental and control groups, employing random assignment of samples. Quasi-experimental in this study refers to the condition where authors included only the experimental group without the control group, a quantitative report on one group of pre-test and post-test phenomena. Descriptive study in this research refers to a particular phenomenon that is described in a quantitative manner. In general, descriptive studies used surveys with descriptive statistics. Finally, mixed-method design refers to a design that employs both qualitative and quantitative data analysis. This "methodological dimension" includes participants or samples from students, teachers, or both students and teachers.

Finally, the "game dimension" includes the games' nature, developers, and genres. The explanations are given below:

- Nature of the game: The papers were categorised according to specific game-related focus: i) game-based learning or ii) gamification. Game-based learning refers to active learning experiences where game-based learning is designed to ensure players' comprehension of the subject matter. In game-based learning, the game itself functions as the learning experience. However, gamification refers to the incorporation of game elements or mechanics into an experience, where the goal of gamification is to increase engagement or enjoyment. In gamification, the game components are added to the traditional instruction method.
- Developers: The papers were evaluated to determine how games were developed for educational purposes. Games available in the market are originally developed by professional game designers for commercial purposes.
- Game genre: There was some overlapping nature of these genres. Where possible, the researchers focused on the dominant genre of games. The following are the descriptions of the game genres used in this study:

    a) Board game: This refers to the movement of pieces on a board according to pre-set rules.
    b) Puzzle or adventure: This genre involves challenging tasks and quests.
    c) Pre-authored courseware: This refers to available online templates developed by another party or organisation, so teachers may use the developed courseware or templates for their classes. Pre-authored courseware is usually free and highly accessible for teachers and students. The content of this courseware is categorised based on age or ability groups, making it easier for teachers to customise learning for various levels. Some examples are *Kahoot, Gamilab, Quizlet, Socrative* and many more.
    d) Role-plays: This refers to the simulation of real-life situations in teaching and learning processes in classrooms. This activity is performed individually, in pairs, and in groups, involving more complex role-play situations.

"Outcomes dimension" deals with the overall outcome or effects of the games in the learning of grammar. Two subcategories were formed under this dimension, namely, learning and impact:

- Learning: Learning outcomes are goals for student learning set by instructors. Learning outcomes demonstrate what the instructors want the students to know, do, or value at the end of the course. For the purpose of this study, Bloom's three domains of learning serve as an excellent framework for analysing the learning outcomes. It comprises cognitive, affective, and psychomotor domains (Bloom et al., 1984).
- Impact: This category deals with the finding of the studies that were rated as positive, negative, or mixed as a result of game-based grammar learning (Seo & Seo, 2018).

RESULTS AND DISCUSSION

RESEARCH CONTEXTUAL DIMENSION

TABLE 3. Research contextual dimension (country)

Country	Frequency	Percentage (%)
Indonesia	8	32
India	1	4
Iran	1	4
Malaysia	9	36
Taiwan	1	4
Vietnam	1	4
Egypt	1	4
Poland	1	4
Slovenia	1	4
Morocco	1	4

Table 3 depicts the results of the "research context dimension." The final set of 25 articles was selected from various countries around the globe. The highest number of papers were produced in Malaysia (9), which constitutes 36%. This could be directly attributed to the education policy in Malaysia, which emphasises the usage of ICT in teaching and learning. Such a vast improvement in the educational system of Malaysia has taken place to achieve the goals of the Malaysian Educational Blueprint that covers expected educational perspectives between 2013 and 2025 (Ebrahimi & Jiar, 2018). The use of ICT in teaching and learning has increased in Malaysia due to the need to create new aspects of education that comply with 21st-century pedagogy. Therefore, more academics are willing to use technology-based lessons in classrooms, and the research in this area is increasing simultaneously.

Next, Indonesia produced 32% of articles. When the researchers went over the reasons for the increased number of publications in Indonesia, it was stated that learners of English as a Foreign Language (EFL) in Indonesia use maximum advantages from the rapidly growing access to the internet for their learning agenda. Digital applications and resources are now even more accessible with more affordable digital technology devices (Hidayat et al., 2022). Therefore, many Indonesian English teachers and learners are already familiar with using different forms of digital technologies for their English language teaching and learning, and it contributes to the higher number of researchers from the country.

TABLE 4. School type

School Type	Frequency	Percentage (%)
tertiary	7	28
primary	8	32
secondary	10	40

Table 4 lists the school type associated with the publications. The highest number of publications involved studies conducted in secondary schools, with ten articles out of 25 (40%). The primary school ranked second with eight articles (32%). The lowest number of articles published is on studies conducted at the tertiary level. This is evidence that there is a lack of research conducted on game-based grammar learning. Due to the nature of the games, which provide enjoyment and fun, many researchers tend to focus on the primary and secondary settings as the students are more engaged. However, even at the tertiary level, young adults and adult learners also show great enthusiasm towards learning through technology.

TABLE 5. Subject (grammar component)

Subject (grammar component)
relative pronouns
simple present tense
singular, plural nouns
countable, uncountable nouns
adjectives, conditional
simple past tense
past continuous tense
parts of speech
present progressive tense
simple future tense
modals
passive voice
irregular verb
gerund
present perfect
past continuous tense
general

Eighteen grammar components were the focus of the studies that the researchers reviewed, with some focusing solely on one grammar component. For example, the study by Fadhilawati (2021) focused on enhancing students' grammar achievement in learning, particularly relative pronouns. Idris et al. (2020) examined the effects of *Kahoot* in reinforcing simple present tense among primary students. However, not all the papers focused on only one grammar component. There were combinations of target grammar components taught to students via games. Vijayarajoo and Jani (2019), for example, used games to enhance parts of speech, while El-Magd and El-Magd (2017) used games to improve students' grammar achievement in adverbs, simple, past tense, and past continuous tense.

Therefore, although 25 articles were found for this systematic literature review, some articles do not necessarily focus on one grammar component. There were also studies reporting a combination of a few grammar components, which resulted in 18 grammar components at the end of this systematic literature review.

METHODOLOGICAL DIMENSION

TABLE 6. Methodological dimension (study design)

Study design	Frequency	Percentage (%)
descriptive	2	8.34
mix-method	5	20.84
qualitative	4	16.67
quantitative	13	54.17

Table 6 represents the result of the "methodological dimension." The review indicated that the majority (13 articles, 54.17%) of the studies employed quantitative design. This is because researchers employed pre-and post-tests, including experimental methods, to examine the efficacy of the educational games. Quantitative designs that were employed by the articles were pre and post-tests through experimental design and quasi-experimental pre and post-tests. Moving on, the next type of study design was a mixed method (20.84%), qualitative (16.67%), and lastly descriptive (8.34%).

Qualitative data generally appeared in the form of reflective journals, observations, and interviews with students and teachers. According to Table 6, only 24 articles out of 25 were reported here; one article did not include statistical data. The discussion focused on explaining the benefits of *Kahoot*, how teachers could use *Kahoot* in teaching irregular verbs, and how the students benefited from it. The article was merely on description without any proven results or data. Therefore, the paper was excluded from the study design section.

TABLE 7. Participants/samples

Participants/ sample	Frequency	Percentage (%)
students	20	80
students and teachers	5	20

As seen in Table 7, the participants and samples of the articles revealed the highest number of student involvement as participants (20 articles; 80%). Students are frequently accessed across social and behavioural sciences research. While some students were studied directly in educational-focused research, game-based grammar learning was one of them. Thus, since games are generally designed for learners, the dominance of students as participants can be seen. While student participation is valid in providing feedback and examining the effects of certain personalised educational games, teachers and students were only involved in only five articles (20%). Teachers also have their own perspectives, which sometimes differ from the students. So, examining both will give a broad understanding of the phenomena being studied.

GAME DIMENSION

TABLE 8. Game Dimension

	Category/genres	Frequency	Percentage (%)
Game and genre dimension	developers	25	100
	board game	5	20
	puzzle/ adventure	14	56
	pre-authored courseware	4	16
	role plays	2	8

Table 8 depicts the result of the "game dimension." All 25 articles in this review used the applications or software for educational purposes and not for commercial purposes. The most popular game genre was puzzle and adventure (14), with 56%. Some examples are Climbing Grammar, Mountain Game, Leaping Frog, Crossword Puzzle, and Quizzes. Next was Board Games (5) with 20%, and the most popular Board Game was Snake and Ladder. The third genre was pre-authored courseware (4), with 16%. Pre-authored courseware refers to applications or software that are available online, and teachers may customise it according to their lesson objectives. Pre-authored courseware offers free and paid plans designed by other parties or organisations for classroom use. Normally, these are global learning platform companies that provide applications and software to be used by everyone for teaching and learning purposes. In this review, pre-authored coursewares that were used by the articles were *Kahoot and Socrative*. Lastly, role plays were the least used genre, with two articles (8%).

OUTCOMES DIMENSION

TABLE 9. Outcomes Dimension

	Category	Frequency	Percentage (%)
Outcome dimension	learning		
	cognitive	2	8.34
	affective	5	20.84
	cognitive + effective	17	70.84
	psychomotor	0	0
	impact		
	positive	25	100
	negative	0	0

Table 9 represents the results of the "outcomes dimension." Any teaching and learning aimed at producing learning outcomes are based on the teaching and learning process. This review addresses the issue by reviewing the learning outcomes of 24 out of 25 articles. One article was excluded; the article did not provide statistical evidence but merely a description of the benefits of *Kahoot.*

For the purpose of this review, three learning domains were used: cognitive, affective, and psychomotor. The cognitive domain in this review is represented by 8.34%. The cognitive domain focuses on intellectual skills, measured by academic achievements, tests, and scores. The affective domain deals with attitudes, values, interests, appreciation of learners, motivation, and satisfaction. Five out of 25 papers (20.84%) focused on measuring the affective domain of grammar games. Meanwhile, the combination of cognitive and affective domains was dominant, represented by 17 out of 24 papers (70.84%) to perceive both cognitive and affective domains, not just as achievement through test scores is as important as investigating participants' feelings and perceptions when they use the games.

The affective domain serves the purpose of knowing and measuring the participant's feelings and experience towards game-based grammar learning. It is significant to note that the vast majority of articles focused on both learning outcomes. Finally, psychomotor deals with learners' ability to physically accomplish tasks and perform movement and skills. None of the studies examined psychomotor as they might be perceived as irrelevant in grammar learning. With

respect to the impact of game-based grammar learning, all 25 articles reported positive findings and comments. No article reported negative findings.

DISCUSSION

This research reviewed 25 articles on the use of game-based grammar learning in the English language. This review placed much attention to grammar teaching and learning due to the lack of a systematic literature review on grammar learning. In the conventional classroom, the instructors are used to grammar instruction using chalk-and-talk, a rote learning method. Thus, researchers aimed to improve language delivery based on the use of technology to support the acquisition of grammar. With respect to the use of game-based grammar learning, this review identified four types of game-related genres that were commonly applied in the articles. These game-related genres have been listed with examples of games or applications. The outcome of this review showed the positive impact of game-based grammar learning, as most of the learners performed better through games. Technology-based learning has been reported as effective in supporting the learning of grammar (Fithriani, 2018; Scholz, 2017; Camilleri & Camilleri, 2017; Khalil, 2018). Learners' interests and motivation improved by using technology as it provided learners with input, output, and feedback. Teachers favour the use of technology as they can rely on it to organise course content and communicate with several students simultaneously. Teachers have incorporated game-based grammar learning to create a more entertaining and engaging environment for learners.

CONCLUSION

To our knowledge, this study makes a significant contribution to research in the field of game-based grammar learning since no other systematic literature review has been conducted. The existing educational sector demands technology-based teaching methods. Technological developments continue to transform society, and these teaching methods may help to expose and encourage children to be more literate in technology. The researchers hope the findings of the study may be useful to guide other researchers or policymakers in the field of game-based grammar learning. In future studies, researchers might better focus on reviewing papers published in different databases to provide more extensive and detailed information.

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APPENDIX

SUMMARY OF RESEARCH ARTICLES REVIEWED

Reference	Country	Aim of the Study	Skill	Technology/ Genre	Method	Sample	Outcomes/Conclusion
Piskorz (2016)	Poland	To examine students' motivation through *Kahoot*.	Grammar	*Kahoot*	Survey from *Kahoot.* Descriptive analysis (%)	Students (Tertiary)	Positive Outcome.
Simbolon & Satria (2016)	Indonesia	To make Ludo Word Game (LWG) to improve students' mastery of grammar	Grammar	Ludo Words Game	Descriptive	Students & Teachers (Secondary)	Evaluation from Students, Teachers, Lecturers. Helped the students in learning grammar.
Taslim (2016)	Indonesia	To determine whether the use of Climbing Grammar Mountain Game (CGMG) gave significant improvement on simple Present Tense	Simple Present Tense	Climbing Grammar Mountain Game	Mix-method. Pre- Post-tests, Questionnaire, Interview	Students & Teachers (Secondary)	CGMG is effective in improving Simple Present Tense. Students' enthusiasm increased.
Singh & Harun (2016)	Malaysia	To examine students' experiences challenges in learning grammar through flipped classroom and gamification	Grammar	Flipped Classroom and Games	Qualitative – Reflective journal, interview, semester course evaluation	Students (Tertiary)	Positive feedback from the students. Students enjoyed the grammar class.
Musa, Ariffin & Hasan (2016)	Malaysia	To determine the usage of board games in improving the teaching and learning of grammar	Singular, Plural, Countable, Uncountable Nouns.	Noun-it-Right, Snake and Ladder Board Game	Quantitative. Pre-post tests	Students (Primary)	Positive feedbacks. Increase in students' score in post-test.
Wahyuningsih (2016)	Indonesia	To determine the influence of Clue game in the mastery of grammar.	Grammar	Clue game	Quantitative-Experimental	Students (Secondary)	Positive outcome. The experimental group performed better than the control group.

Cam & Tran (2017).	Vietnam	To examine whether games are helpful in grammar mastery	Adjectives, Conditional sentence (tense & verb)	Describing pictures (Adjectives) + Presentation (Conditional sentence)	Mixed-method	Students (Tertiary)	Games help create enjoyment, motivation and reduce stress in learning grammar.
El-Magd (2017)	Egypt	To improve primary students' grammar achievement	Adverb, Simple Past Tense, Past Continuous Tense	Playing cards, Leaping Frog, Crossword Puzzle, Snakes & Ladders	Quantitative – Experimental	Students & Teachers (Primary)	Positive outcome. The experimental group performed better than the control group.
Puspitasari & Kurniawan (2017)	Indonesia	To find out whether Quartet card games improve grammar in descriptive writing	To be, Adjective, Singular, Plural verbs, Pronoun	Quartet Card game	Quantitative, Quasi-experimental, one-group pre-post-tests.	Students (Secondary)	The card game helped the students become interested, enjoy, and better at learning grammar. The students could improve their grammar mastery in writing descriptive text.
Apsari (2018)	Indonesia	To describe the implementation of Snowball Throwing & investigate the benefits of learning grammar	Parts of speech, Simple Present Tense, Present Progressive Tense, Simple Past Tense, Past Progressive Tense, Future Tense, Modals, Passive Voice	Snowball Throwing	Qualitative-observation, interview	Students (Tertiary)	Positive feedbacks.
Yarahmadzehi & Parvin (2018).	Iran	To discover the effects of games on grammatical accuracy	Present Simple Tense, Simple Past	Clue, Animal Habits, How Often, Relay Detective, Piling	Quasi-experimental. Pre-post-tests.	Students (High school/ Secondary)	Game-based practices were found to have no significant effect. This may be due to some aspects of the

			Tense, Present Progressive Tense, Adjective	Up Events, Act it Out, Picture Sentences, Description			study/participation. However, the experimental group scored slightly higher.
Sindin ,Gisip & Stella (2018)	Malaysia	To determine the effects of Grammilliant Tarsia	Grammar	Grammilliant Tarsia	Qualitative - interview, observation and document reviews	Students (High school/ Secondary)	Positive feedbacks.
Azman & Yunus (2018).	Malaysia	To explore the benefits of *Kahoot* in Irregular Verbs	Irregular Verb	*Kahoot*	Description only	Students (Primary)	Description of the benefits of *Kahoot* only. No proven results.
Lille & Bratoz (2019)	Slovenia	To explore the effectiveness of using games.	Present Continuous Tense	Miming, Board games, Card games, Memory games.	Quantitative (Experimental). Pre-post-tests.	Students (Primary)	Positive feedbacks
Hajji & Kim (2019)	Morocco	To examine teachers' attitudes and effectiveness of using grammar games.	Pronouns, Gerund, Present Perfect, Simple Past Tense & Past Continuous Tense	Games- Noughts & Crosses, Double & Quits, Grammar Tennis, Your Words	Quantitative. Questionnaire, post-test	Teachers & Students (High school/ Secondary)	Teachers – have a positive attitude towards the use of games. Students- Showed improvement in the post-test.
Hashim, Rafiq & Yunus (2019)	Malaysia	To explore the effectiveness of online language games in improving ESL grammar	Grammar	Socrative, PPT Challenge Game, *Kahoot*	Quasi-experimental. Pre-post -tests	Students (Secondary)	Students- Showed improvement in the post-test.
Rafiq, Hashim, Yunus & Pazilah (2019)	Malaysia	To find out students' perception towards gamified-learning	Grammar	-	Quantitative (questionnaire)	Students (Secondary)	Students favour the use of games in learning grammar.
Vijayarajoo & Jani (2019)	Malaysia	To experiment with the use of the Monster's Way	Parts of Speech	Board game	Mix-method. Questionnaire, Interview	Students (Tertiary)	Students claimed they enhanced their knowledge of Parts of Speech through the

		'Monster Back to School-Parts of Speech Board Game'					interviews but no statistical evidence via tests.
Fazil & Said (2020).	Malaysia	To investigate the effects of a self-build mobile game application	Continuous Tenses	Turtense App	Mix-method. Pre-post-tests. Observation	Students (Primary)	Positive feedbacks.
Hafis, Putra & Sahrawi (2020)	Indonesia	To provide an alternative solution to grammar teaching based on game-based activities.	Simple Past Tense	Board game. Snake & Ladder	Mixed-method. Observation, Interview, Expert Validation, Questionnaire	Teacher & Students. (Primary)	Positive effects from game-based g grammar learning.
Idris, Said & Tan (2020)	Malaysia	To examine the effectiveness of *Kahoot* in reinforcing Simple Present Tense.	Simple Present Tense	*Kahoot*	Quantitative. Pre-post-tests.	Students (Primary)	Positive feedback from game-based g grammar learning.
Ayumi (2020)	Indonesia	To obtain data on how students' perceptions have been taught using communicative methods.	Grammar	Guessing the Word, Board & Dice game. Run & Guess.	Qualitative. Observation	Students (Junior high school / Secondary)	Grammar games are effective in acquiring grammar.
Lin, Hwang, Fu & Cao (2020)	Taiwan	To evaluate the effectiveness and game learning behaviour	Noun Clauses	Listening, MCQ, Fill-in-the-blanks, Construct Questions	Quantitative.	Students (Tertiary)	Both experimental and control groups achieved improvement. However, the affective domain was reported more in the experimental group.
Fadhilawati (2021)	Indonesia	To enhance students' grammar achievement in learning Relative Pronouns using Quizizz App	Relative Pronouns	Quizizz	Quantitative.	Students (Tertiary)	Positive feedbacks
Singaravelu (2021)	India	To find out the effects of video games on learning English grammar.	Grammar	Video Games	Quantitative. Pre-post-tests	Students (Primary)	Positive feedbacks