

ESL LEARNERS' ACCEPTANCE OF A DIGITAL EDUCATIONAL ESCAPE ROOM (DEER) FOR DISCOURSE COMPETENCE DEVELOPMENT

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Abstract. Discourse competence plays a crucial role in preparing English as Second Language (ESL) learners to produce coherent and cohesive communication. Nevertheless, the effective use of cohesive devices remains a challenge for many ESL learners, hindering their ability to produce coherent and meaningful discourse. To address this issue, the Case of the Lost Linkers Digital Educational Escape Room (DEER) was developed as a gamified learning tool to support the development of discourse competence. This study aimed to investigate ESL learners' acceptance of the DEER game using the Technology Acceptance Model (TAM). A quantitative survey design was employed involving 151 ESL learners from a Malaysian public university. Data were collected using a five-section questionnaire consisting of demographic information and four TAM constructs: perceived usefulness, perceived ease of use, attitude toward use, and behavioural intention to use. Descriptive analysis revealed high levels of acceptance across all constructs. Learners perceived the DEER game as useful, user-friendly, enjoyable, and effective for learning linkers and cohesive devices. They also expressed strong intentions to continue using and recommending the game. The findings suggest that DEER has considerable potential as an engaging and learner-centred tool for supporting discourse competence development in ESL contexts.

Keywords: *Digital Educational Escape Room (DEER), discourse competence, Technology Acceptance Model (TAM), ESL learners, gamification*

Introduction

In English as Second Language (ESL) learning, the ability to communicate effectively extends beyond grammatical accuracy and vocabulary acquisition. Learners are increasingly expected to organise ideas coherently and produce meaningful discourse in both spoken and written communication. However, many ESL learners continue to experience difficulties in constructing cohesive and coherent texts despite years of formal English instruction. These challenges are often associated with limited discourse competence, particularly in the appropriate use of cohesive devices that connect ideas logically within a text. According to Lavadia (2023), discourse competence refers to the ability to combine language structures meaningfully to achieve unity and coherence in communication. Similarly, Legak and Wahi (2020) emphasise that communicative competence involves not only grammatical knowledge but also the ability to organise language appropriately in discourse. The development of discourse competence is therefore essential in enabling ESL learners to participate effectively in academic and social contexts. A key component of discourse competence is cohesion, which ensures that ideas within a text are logically connected and meaningful to the reader. Cheng and Tsang (2022) define cohesion as the semantic relationship between elements in a text that creates continuity and unity of meaning. Cohesive devices such as conjunctions, reference words, and transitional markers play an important role in linking ideas across sentences and paragraphs. However, research indicates that ESL

learners often struggle to use these devices effectively, resulting in texts that are grammatically correct but weak in coherence and organisation (Matiso and Nomlala, 2025).

The persistence of such challenges is frequently associated with traditional grammar instruction, which tends to emphasise rule memorisation and isolated sentence-level practice rather than functional language use. This approach limits learners' opportunities to apply grammar in meaningful communicative contexts, thereby restricting the development of discourse competence (Lee et al., 2023). Consequently, there is a growing need for pedagogical approaches that integrate grammar with authentic language use and meaning-focused learning. From a functional perspective, language is understood as a resource for making meaning in social contexts rather than a set of prescriptive rules. Esteban (2024) argues that grammar should be taught as a meaning-making system where linguistic choices serve communicative purposes. This view supports the teaching of cohesive devices as functional tools that help learners construct coherent discourse. Herman et al. (2023) further suggest that explicit engagement with functional grammar can enhance learners' ability to organise ideas effectively in academic writing.

In recent years, digital game-based learning has emerged as an innovative approach to ESL instruction, offering interactive and engaging learning environments. One such approach is the Digital Educational Escape Room (DEER), which integrates problem-solving, and language tasks within a gamified digital setting. Educational escape rooms have been shown to promote active learning, learner engagement, and meaningful communication through task-based interaction (Ugo et al., 2025). Such environments may provide learners with opportunities to use language in authentic, contextualised situations, thereby supporting discourse development. Beyond pedagogical effectiveness, the success of digital learning tools also depends on learners' acceptance and willingness to use them. Prior research in educational technology suggests that when learners perceive a system as useful and easy to use, they are more likely to develop positive attitudes and intentions to continue using it (Llumiquinga, 2022).

Statement of problem

In many ESL contexts, learners are expected to demonstrate coherence, cohesion, and logical organisation across speaking, reading, writing, and listening tasks (Majlis Peperiksaan Malaysia [MPM], 2025; Zuwardi and Ganesan, 2025). These skills are essential in tertiary education and assessments such as the Malaysian University English Test (MUET). To construct coherent discourse, achieving communicative competence requires not only grammatical accuracy but also effective use of cohesive devices, including linkers and transitional expressions. However, traditional grammar instruction often focuses on isolated structures, rule memorisation, and sentence-level practice, offering limited opportunities for meaningful language use (Zulkepli et al., 2024; Zulkflee et al., 2023; Bhartia et al., 2023; AbuSa'aleek, 2022). As a result, learners may understand grammatical rules but continue to experience difficulties in organising ideas coherently and applying cohesive devices in authentic communication. This reflects a continued emphasis on linguistic accuracy rather than discourse-level competence in ESL pedagogy. Digital Educational Escape Rooms (DEERs) have recently emerged as an innovative pedagogical approach that promotes engagement, collaboration, and active learning. Existing studies report positive outcomes of DEERs in terms of motivation, engagement, and academic performance in both STEM and language

learning contexts (Gruber and Faßbender, 2025; Keller et al., 2025; Krouska et al., 2025). However, limited attention has been given to their potential in supporting discourse competence development through the use of linkers and cohesive devices. Furthermore, little is known about learners' acceptance of discourse-focused DEER tools, despite learner acceptance being a key factor influencing the successful implementation and sustainability of educational technologies (Tang, 2024; Makri et al., 2021). Even when a learning innovation demonstrates pedagogical potential, its effectiveness may be limited if learners perceive it as difficult to use or of little value. Therefore, understanding learners' perceptions is an important first step in evaluating the viability of a discourse-focused DEER. This study investigates ESL learners' acceptance of the Case of the Lost Linkers DEER through the Technology Acceptance Model (TAM), focusing on its perceived usefulness, perceived ease of use, attitude toward use, and behavioural intention to use in supporting discourse competence development.

Objective of the study and research questions

This study aims to investigate ESL learners' acceptance of the Case of the Lost Linkers Digital Educational Escape Room (DEER) game in supporting discourse competence development. Specifically, the study examines learners' perceptions based on the Technology Acceptance Model (TAM). The study seeks to answer the following research questions: How do learners perceive the usefulness of the DEER game? How do learners perceive the ease of use of the DEER game? What is learners' attitude toward using the DEER game? What are learners' behavioural intentions to use the DEER game in the future?

Literature review

Theoretical framework of the study

This study is grounded in the Technology Acceptance Model (TAM), developed by Fred Davis (1989). TAM explains users' acceptance of technology through four primary constructs: perceived usefulness (PU), perceived ease of use (PEOU), attitude toward use (ATU), and behavioural intention to use (BI). Perceived usefulness refers to the degree to which an individual believes that using a system enhances performance, while perceived ease of use refers to the degree to which using the system is free of effort. According to TAM, perceived usefulness, and perceived ease of use influence users' attitudes toward a system, which subsequently determine their behavioural intention to use it. In educational contexts, TAM has been widely applied to examine learners' acceptance of e-learning platforms, mobile learning applications, and gamified instructional tools. Since the Case of the Lost Linkers DEER game integrates digital technology and gamification into grammar instruction, TAM provides an appropriate theoretical lens to examine learners' perceptions of its usefulness and usability in supporting discourse competence development. By adopting TAM, this study systematically investigates the factors influencing learners' acceptance of a gamified grammar learning tool rather than merely evaluating enjoyment or satisfaction.

Past studies

Past studies on discourse competence and grammar instruction

Many studies have been conducted to investigate the relationship between discourse competence and grammar instruction, particularly in relation to how explicit and discourse-based grammar teaching influences learners' ability to produce coherent, cohesive, and contextually appropriate academic writing. Recent research has increasingly shifted from sentence-level grammar focus to discourse-oriented instruction, emphasising the integration of grammar with meaning-making in extended texts. The study by Oyama and Kang (2024) examined the relative effects of discourse-based grammar instruction and traditional sentence-level grammar instruction on the acquisition of the English present perfect in academic writing. This experimental mixed-methods study involved 37 multilingual graduate students enrolled in an ESL writing course at a university in the United States. The instruments used included pre-tests, post-tests, delayed post-tests, and retrospective verbal reports to assess learners' grammatical performance and awareness. The findings revealed that although both groups improved, the discourse-based instruction group demonstrated stronger performance in contextualised grammar use, particularly in academic writing tasks. The study concluded that grammar instruction should be embedded within discourse-level contexts to enhance learners' communicative competence and long-term retention of grammatical structures. Similarly, the study by Alawerdy and Alalwi (2022) investigated the impact of explicit instruction of conjunctions as cohesive devices on the writing performance of EFL learners. The study involved 43 EFL students at a Saudi university and employed an experimental and control group design with pre- and post-tests. The experimental group received explicit instruction on conjunctions while the control group received regular instruction without the intervention. The findings revealed that the explicit instruction of conjunctions significantly improved students' paragraph writing performance. The study concluded that grammar instruction focusing on discourse markers, can enhance writing cohesion and overall discourse competence among EFL learners.

In another study, Lee (2021) explored the relationship between writing strategies and cohesion in ESL learners' written narratives. Adopting a qualitative case study approach, the research compared the written narratives of an ESL learner and a native English speaker. Through text analysis and an examination of writing processes, the findings revealed that the ESL learner used fewer connectives and relied heavily on translation from the first language (L1) to English, resulting in a less cohesive narrative. In contrast, the native speaker employed a mental template to organise the narrative more effectively. The study highlighted the role of writing strategies and cohesive devices in producing coherent and well-organised written texts. The findings suggest that learners' ability to use cohesive devices appropriately is an important component of discourse competence and contributes to the overall quality of written communication. In summary, the studies reviewed consistently indicate that grammar instruction is most effective when integrated with discourse-level writing development, rather than being taught in isolation. While explicit instruction (Alawerdy and Alalwi, 2022) improves grammatical accuracy and cohesion, discourse-based approaches (Oyama and Kang, 2024) appear to better support meaningful language use in academic contexts. These findings suggest that discourse competence is closely tied to how grammar is taught and applied in authentic writing tasks. Therefore, it can be argued that integrating grammar instruction with discourse-oriented writing activities is essential for developing learners' academic writing competence, which aligns with the focus of the present study on enhancing discourse competence through grammar instruction.

Past studies on gamification and digital escape rooms in language learning

The integration of gamification and digital game-based learning (DGBL) into language education has attracted considerable scholarly attention. This is due to its potential to enhance learner engagement, motivation, and language development (Liu et al., 2026). By incorporating game elements such as challenges, rewards, narratives, and problem-solving tasks into instructional activities, educators have sought to create more interactive and meaningful language learning experiences (Grab, 2026). These advancements have facilitated the emergence of digital game-based learning environments designed to enhance language acquisition. Previous research on DGBL has shown that the approach is effective in language development and increases student motivation. For example, this method improves vocabulary learning and performance greatly by fostering high cognitive and emotional involvement (Tian and Umar, 2025; Zhang et al., 2023). Similarly, Chowdhury et al. (2024) observed significant benefits in vocabulary development as the approach provides low-anxiety and joy in classrooms. On the other hand, Moniza Ray and Ajit (2024) focused on the impact of playing a story-driven DGBL on ESL learners' listening skills. The findings showed that playing games mainly enhances listening skills and attentiveness significantly, which promotes natural language context and pushes players to use critical life skills. The pedagogical consensus continues to be quite positive. DGBL research has shown favourable impacts on vocabulary learning and student motivation, while researchers have continued to explore other immersive gaming forms.

Under the subset of DGBL, Digital Educational Escape Rooms (DEERs) place learners in narrative-driven, time-constrained virtual environments where they must solve a sequence of puzzles to achieve a specific learning goal. For instance, Mudure-Iacob (2024) reported DEERs in English for Specific Purposes classes engage students through external game mechanics such as storytelling, teamwork and competition to promote experiential learning. On the other hand, Kaplan and Coşgun (2025) found that DEERs were very helpful in building up concentration, clear goals, and social interaction; knowledge improvement was strongly correlated with feedback, challenge, and autonomy. In line with these findings, Nasri et al. (2024) found that DEERs are perceived as fun and helpful for reading skills by ESL tertiary students across gender and academic disciplines. Overall, the integration of DEERs in language learning is highly positive. These findings suggest that escape rooms provide meaningful opportunities for contextual language use. In addition, recent studies have highlighted the importance of learner acceptance in the sustainability of digital learning innovations. Krouska et al. (2025) as well as Tian and Umar (2025) reported that learners are more likely to adopt educational technologies if they perceive the technology to be useful, easy to use, and beneficial for their learning experiences. In gamified learning settings, positive perceptions of usability and usefulness are linked to favourable attitudes and stronger intentions to continue using digital learning tools (Schenker and Kraemer, 2022). These findings suggest that learner acceptance is a critical factor in the successful implementation of DEERs in language learning contexts.

Despite consistent positive outcomes on gamification, DGBL, and DEERs research, existing studies mostly focus on learners' emotion and motivation (Saban et al., 2024; Bellés-Calvera and Martínez-Hernández, 2022), vocabulary acquisition (Chowdhury et al., 2024), and general language proficiency (Schenker and Kraemer, 2022). These studies neglect discourse-level skills, specifically ESL learners' use of linkers and

transitional devices to establish coherence and cohesion. To bridge this gap, this study investigates ESL learners' acceptance of the Case of the Lost Linkers DEER, a discourse-focused learning tool that supports linkers and transitional devices. Moreover, the present study uses the Technology Acceptance Model (TAM) to assess learners' perceived usefulness, perceived ease of use, attitudes towards use, and behavioural intention. The study expands DGBL and DEERs research by examining learners' acceptance of a discourse-focused DEER designed to support discourse competence development.

Conceptual framework of the study

While the theoretical framework explains the Technology Acceptance Model (TAM) in general terms, the conceptual framework illustrates how TAM is applied in the present study. This study adapts TAM to examine learners' acceptance of the DEER game in supporting discourse competence development. Discourse competence refers to learners' ability to produce coherent and cohesive communication through appropriate use of linkers and cohesive devices. The DEER game embeds these devices within narrative-driven problem-solving tasks to promote contextualised grammar learning. With reference to *Figure 1*, perceived ease of use and perceived usefulness are treated as the independent variables. These two constructs influence learners' attitude toward use, which subsequently affects their behavioural intention to use the DEER game in future learning contexts. Although this study does not directly measure improvement in discourse competence, positive acceptance of the DEER pedagogy suggests its potential to support functional grammar acquisition through meaningful and context-driven learning experiences.

Figure 1

Materials and Methods

This study employed a quantitative cross-sectional survey design with descriptive analysis to examine learners' acceptance of the DEER game. A purposive sample of 151 participants responded to the survey. The instrument used is a 5 Likert-scale survey and is formed based on Technology Acceptance Model (TAM) (Davis, 1989) to reveal the variables in *Table 1*. The distributed questionnaire has five sections. Section A has items on demographic profiles. All items in Section B until Section E are constructed on the effectiveness of Case of Lost Linkers, which Section B: Perceived Usefulness (4 items), Section C: Perceived Ease of Use (4 items), Section D: Attitude toward Use (4 items) and Section E: Behavioural Intention to Use (3 items). *Table 1* shows the reliability of the survey. The analysis shows a Cronbach alpha of .880, .901, .899 and .891 respectively for Section B, C, D and E. Thus, this reveals a good reliability (.948) of the instrument chosen. Further analysis using SPSS is done to present findings to answer the research questions for this study.

Table 1. *Distribution of items in the survey.*

Section	Construct	No of items	Cronbach Alpha
B	Perceived Usefulness	4	.880
C	Perceived Ease of Use	4	.901
D	Attitude toward Use	4	.899

E	Behavioural Intention to Use	3	.891
	Total	15	.948

Results and Discussion

Figure 2 shows the gender and discipline distribution of the study's participants. Males comprised 43% of the participants, while males represented the majority (57%). Table 2 presents the findings for perceived usefulness of the Case of Lost Linkers escape room game. The highest mean score was recorded for PUQ3 (M = 4.69), which indicates that the students considered the game helpful in identifying linkers, sequencing ideas with linkers and correcting linker errors. In addition, PUQ1 and PUQ4 both obtained mean scores of 4.60, suggesting that the game enhanced students' understanding and ability to apply linkers during MUET practice. PUQ2 recorded a slightly lower but still high mean score of 4.55, showing that the game supported the learning of linkers across all MUET skills. Overall, these results demonstrate that the respondents viewed the game positively as a learning tool in strengthening students' mastery and practical use of linkers. Table 2 shows the descriptive statistics for learners perceived ease of use (PEOU) of the Digital Educational Escape Room (DEER) game. There are four items in this section those measure participants' perceptions of the game's ease of use. The highest mean score was reported for PEOUQ2 "the game's instructions are clear and easy to follow" (M = 4.44), suggesting that participants found the instructional guidance particularly clear. This was followed closely by PEOUQ4 "the game interface is convenient and accessible" (M = 4.42), indicating positive perceptions of the game's usability and interface design. Meanwhile, PEOUQ3 "the tasks in the game are easy to understand, and I can finish them without difficulty" and PEOUQ1 "The Case of the Lost Linkers escape room game is easy to navigate and user-friendly" recorded slightly lower mean scores of 4.36 and 4.34 respectively.

Table 2. Descriptive statistics.

Item	M
Perceived Usefulness (PU)	
PUQ1-The Case of the Lost Linkers escape room game improves my understanding of how linkers are used.	4.60
PUQ2-This game helps me learn how to use linkers for all MUET skills.	4.55
PUQ3-I find the game useful for identifying linkers, sequencing ideas with linkers and correcting linkers errors.	4.69
PUQ4-The game enhances my ability to apply linkers when practising MUET skills.	4.60
Perceived Ease of Use ((PEOU)	
PEOUQ1-The Case of the Lost Linkers escape room game is easy to navigate and user-friendly.	4.34
PEOUQ2-I find the game's instructions clear and easy to follow.	4.44
PEOUQ3-The tasks in the game are easy to understand, and I can finish them without difficulty.	4.36
PEOUQ4-The game interface is convenient and accessible.	4.42
Attitude towards Used (ATU)	
ATUQ1-I enjoy using the Case of Lost Linkers escape room game as a learning tool.	4.34
ATUQ2-Playing the Case of Lost Linkers escape room game makes learning linkers fun.	4.69
ATUQ3-I feel this game helps me learn linkers effectively.	4.64
ATUQ4-I find that using the game makes learning linkers more enjoyable and helps me understand them better.	4.65
Behavioural Intention to Use (BITU)	
BITUQ1-I would like to play the Case of the Lost Linkers again because it helps me improve my linkers.	4.58
BITUQ2-I would recommend this Case of the Lost Linkers escape room game to other students who are learning linkers.	4.66
BITUQ3-I intend to use the game in the future to practice linkers regularly.	4.53

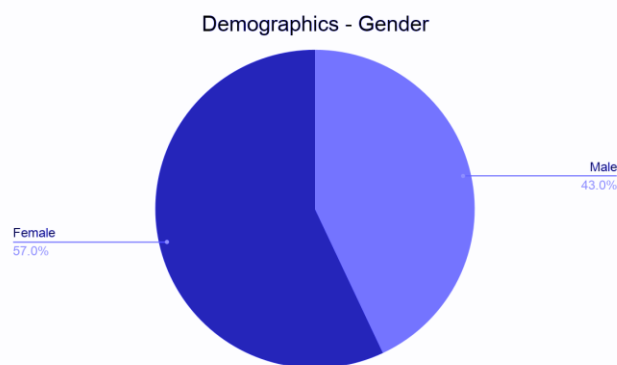


Figure 2. Percentage for demographic profile.

Table 2 depicts the findings of the Attitude towards Using the Game Question (ATUQ) show that the respondents had very positive perceptions towards the Case of Lost Linkers escape room game. ATUQ2, “Playing the Case of Lost Linkers escape room game makes learning linkers fun”, recorded the highest mean score ($M = 4.69$), indicating that most students strongly agreed that the game made learning enjoyable. Other items also show high mean scores, including ATUQ4 ($M = 4.65$), ATUQ3 ($M = 4.64$), and ATUQ1 ($M = 4.34$), suggesting that the students enjoyed using the game, found it effective for learning linkers, and believed that it improved their understanding. Overall, the findings highlight that the DEER game positively influenced students’ motivation, engagement, and comprehension of linkers. Table 2 presents the descriptive statistics for learners’ behavioural intention to use the DEER game in the future. There are three items in this section that measure participants’ behavioural intention to use the game. The highest mean score was recorded for BITUQ2 “I would recommend this Case of the Lost Linkers escape room game to other students who are learning linkers” ($M = 4.66$), suggesting that participants were highly willing to recommend the game to others. This was followed by BITUQ1 “I would like to play the Case of the Lost Linkers again because it helps me improve my linkers” ($M = 4.58$), indicating a strong intention to replay the game for learning purposes. Meanwhile, BITUQ3 “I intend to use the game in the future to practice linkers regularly” recorded the lowest mean score ($M = 4.53$).

Conclusion

This study aimed to investigate ESL learners’ acceptance of the Case of the Lost Linkers Digital Educational Escape Room (DEER) in supporting discourse competence development through the Technology Acceptance Model (TAM). The present study focuses on learners’ perceptions of the game’s usefulness, ease of use, attitude towards use, and behavioural intention to use the game in future learning contexts. The overall findings indicate a highly positive acceptance of the Case of the Lost Linkers DEER across all four Technology Acceptance Model (TAM) constructs. Learners perceived the game as useful (PUQ) in helping them understand, identify, and apply linkers in MUET-related language tasks, particularly in recognising and correcting the use of cohesive devices. A similar trend was observed by Kaplan and Coşgun (2025), who observed that DEER effectively enhances learners’ practical skills, knowledge application, and overall academic performance. Interestingly, out of the four constructs,

Perceived Ease of Use (PEOU) recorded the lowest mean score. Nonetheless, the mean score is still within the high interpretation range. This suggests that the system is generally user-friendly; however, minor usability challenges may still exist. This finding aligns with the report by Krouska et al. (2025), which states that a user-friendly interface is essential to the learning experience when using DEER. Moreover, in response to the third TAM construct, Attitude towards Use (ATUQ), learners reported positive attitudes towards DEER, describing the learning experience as enjoyable, engaging, and effective. This finding concurs with those of Schenker and Kraemer (2022), who reported that DEER is a fun, engaging, and motivating experience, making the learning environment less stressful. These favourable perceptions were also reflected in their strong behavioural intentions (BITUQ), which showed an inclination to continue using and recommending the game. The positive perceptions of the DEER also align with findings reported by Tian and Umar (2025), who observed that gamified learning environments enhance learners' engagement and willingness to continue using digital learning tools. Collectively, the findings suggest that DEER is a widely accepted gamified learning tool with considerable potential to support the development of discourse competence through meaningful and interactive language-learning experiences.

The findings of this study provide both theoretical and conceptual implications for the application of the Technology Acceptance Model (TAM) in ESL learning environments. The findings revealed positive perceptions across all four TAM constructs: Perceived Usefulness, Perceived Ease of Use, Attitude toward Use, and Behavioural Intention to Use. The findings therefore reinforce Davis's (1989) theoretical proposition that users are more inclined to accept and adopt a technology when it is perceived as beneficial and easy to operate. Conceptually, the study extends the application of TAM beyond conventional e-learning platforms to a discourse-focused Digital Educational Escape Room (DEER). The findings also reinforce the study's conceptual framework by demonstrating that positive perceptions of usability and usefulness are associated with favourable attitudes and stronger intentions to continue using gamified language-learning tools. Besides, the present study contributes to the literature on Digital Educational Escape Rooms, particularly in relation to linkers and discourse-oriented language development. The results suggest that DEER-based learning environments are a promising pedagogical approach for introducing and practising linkers and transitional devices in a contextualised way. The findings suggest that teachers incorporate gamified learning activities in grammar teaching to develop learner engagement and meaningful use of the language. Furthermore, the positive acceptance of the DEER game suggests that technology-enhanced learning tools may support more sustainable and learner-centred approaches to ESL instruction. The study provides useful information about learners' acceptance of the DEER game, but it mainly focuses on perceptions rather than actual language performance. Future research should explore the use of pre-tests and post-tests to examine whether participation in DEER activities leads to measurable improvements in discourse competence, particularly in the use of linkers, cohesion, and coherence in speaking and writing tasks. Additionally, future research may also look into qualitative approaches using interviews, reflective journals, or classroom observations as methods to gather a more profound insight into learners' experiences and interactions in using the DEER approach. Finally, further research may examine the application of discourse-focused DEERs across various

proficiency levels, educational contexts, and language skills to further assess their pedagogical efficacy.

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Conflict of interest

The authors confirm that there is no conflict of interest involve with any parties in this research study.

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