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Exploring the Role of Language Reactor in English Language Learning: A Metaphor Analysis of Student Perceptions

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ABSTRACT

This study explores the integration of Language Reactor, a digital tool that enhances English language learning through dual-language subtitles, interactive dictionaries, and sentence-mining features, among undergraduate students in an English language and literature department. With the growing popularity of streaming platforms like Netflix for language study, Language Reactor provides learners with valuable opportunities to improve comprehension and vocabulary acquisition. This research employs metaphor analysis to examine students' perceptions of the program's effectiveness in enhancing language skills. Participants described their experiences with Language Reactor through metaphors, revealing key themes such as learning facilitation, guidance/support, knowledge enhancement, and accessibility/usability. The findings indicate that students view Language Reactor as a practical, supportive, and engaging tool that aids in their language acquisition, particularly in vocabulary retention, comprehension, and interaction with authentic English content. These insights highlight the potential for digital media and AI-driven language tools to foster self-directed learning in higher education. Additionally, the metaphorical analysis provides a nuanced understanding of students' attitudes towards the integration of technology in language education, suggesting strategies for educators to guide the effective use of such tools in language classrooms.

Keywords: Metaphors, Language reactor, MAXQDA, Self-directed learning, Netflix

INTRODUCTION

The emergence of leading global streaming services offers a wide variety of television series, documentaries, and feature films across a range of genres and languages. It has significantly impacted the entertainment industry by pioneering the subscription-based streaming model, allowing users to access content on-demand via internet-connected devices. Their influence extends beyond content distribution, as they also produce original content, contributing to the reshaping of media consumption patterns and the global entertainment landscape. For language education, streaming services such as Netflix provide language learners ample opportunities to develop their comprehension. The platform not only provides a vast array of licensed content but also invests heavily in producing original series and films, contributing to shifts in both global media production and consumption practices and becoming an integral part of teenagers, especially the ones who are studying languages. Through its algorithm-driven recommendations,

Netflix tailors content to individual user preferences, thereby enhancing viewer engagement and setting new standards in the digital entertainment industry.

A powerful toolbox that makes language learning more effective, interesting and enjoyable with the addition of features such as a pop-up dictionary, responsive video playback controls and others, Language Reactor (formerly known as Language Learning with Netflix) is an extension added to Google Chrome on desktops and laptops running Windows and MacOS to help with the discovery, understanding and learning from native materials of the movies and series watched on the Netflix website. Since the Language Reactor facilitates reading and sentence mining of the dual subtitles (L1 and L2) both at the bottom and on the sidebar, the synthesis of incidental, intentional learning through mining sentences with extensive exposure is achieved, which is recommended by Schmitt (2008).

Vocabulary learning programs need to include both an explicit, intentional learning component and a component based on maximising exposure and incidental learning (Schmitt, 2008, p.329). Effective vocabulary learning strategies entail a synthesis of explicit, intentional learning with extensive exposure to linguistic input (Schmitt, 2008). The strategy of benefiting from the use of the Netflix streaming platform for language study Language Reactor is a tool that has allowed a much more strategic use of the Netflix streaming platform to increase the strategic depth due to the multiple functions it offers to study a language. Thus, this article presents the results of a study applied to students of the Bachelor of Languages in order to analyse how these digital media work together as a novel technological resource for self-directed learning of the English language.

A much more strategic use of Netflix is made possible by combining this streaming platform with the Language Reactor due to the multiple functions of this toolbox. How "these digital media work together as a novel technological resource for self-directed learning of the English language" is analysed in the article by Córdova et al. (2023, p.7), which presented the results of a study applied to undergraduates enrolled in the Bachelor of Languages.

While global streaming service offers a vast array of content that can be valuable for educational purposes, particularly in studying literature through film, it is not without challenges. English language learners (ELLs), in particular, may struggle to grasp the underlying themes and messages of movies or series, especially when they are presented without subtitles. The absence of linguistic support can hinder comprehension, making it difficult for these students to engage with the material effectively. To mitigate this issue, the Language Reactor, a free extension for Chrome, was implemented to facilitate language difficulties, enabling simultaneous display of dual language subtitles (one above the other) and the sidebar consisting of the script lines that can be hovered over with the cursor to access multi-word units (chunks) and its translation as well as the pop-up dictionary for individual words plus links to external dictionaries. Through this program, students can better understand and analyse complex narratives, thus enhancing their learning experience and facilitating a deeper engagement with the material.

Technology Integration in Education and Language

The integration of technology in education, particularly in language learning (Çatalbaş & Solmaz, 2024; Zhao & Lai, 2023), has significantly transformed traditional teaching methods, offering innovative tools that cater to diverse learning needs. Recent advancements in digital platforms and applications, such as Language Reactor, have enabled more interactive and personalised learning experiences. These tools, by leveraging features like dual subtitles, foster an immersive learning environment where students can simultaneously engage with multiple linguistic inputs. This approach aligns with Paivio's bilingual dual coding theory (Paivio, 2014), suggesting that combining visual and verbal elements can enhance language retention and acquisition.

In language education, technology-driven methods such as glossed captions, interactive multimedia, and adaptive learning platforms allow learners to practice listening, speaking, reading, and writing skills in context. The widespread availability of mobile apps, language software, and online resources has democratised access to language learning, making it more flexible and accessible. However, the effectiveness of these technologies depends on their thoughtful integration into the curriculum (Liang, 2021), where teacher guidance and pedagogical strategies remain crucial. Ultimately, the balance between technology and traditional teaching methods ensures a more holistic and engaging learning experience for students at various proficiency levels.

Language Acquisition through Video and TV Series

The use of video content, particularly TV series, has gained considerable attention as an effective tool for language acquisition. As an engaging and widely accessible medium, TV series offer authentic linguistic input, presenting learners with real-life dialogue, natural intonation, and culturally contextualised communication. These elements contribute to the enhancement of language comprehension and production skills, making TV series a valuable resource in second language (L2) learning.

One of the key advantages of using TV series for language acquisition is the exposure to natural language in context. Learners are able to observe how linguistic structures are used in everyday situations, which facilitates the internalisation of vocabulary, syntax, and pragmatic features of the target language. Additionally, the repetitive nature of episodic TV series provides learners with the opportunity to encounter recurring language patterns, aiding in the reinforcement of language learning.

The integration of audiovisual stimuli also aligns with dual coding theory (Paivio, 2014), which posits that combining visual and verbal inputs enhances cognitive processing and retention. Through simultaneous exposure to both auditory and visual language cues, learners can more effectively link spoken words with corresponding visual actions, supporting comprehension and vocabulary acquisition. Moreover, the use of subtitles—whether in the target language (L2) or the learners' first language (L1)—can further scaffold language learning, providing additional linguistic support. In sum, video and TV series offer a dynamic, multimodal approach to language learning that complements traditional pedagogical methods, promoting language acquisition in an immersive and contextually rich environment. Starting with a concise and informative description of Language Reactor, Cordova et al continue with a list of alternative apps summarising their qualities. To illustrate, eJOY, another Chrome add-on, has a collection of features nearly identical to Language Reactor, but besides Netflix and YouTube, “it is compatible with Amazon Prime Video, Coursera, Udemy, and TED. A similar service, Mate Translate, shows you a dual-caption layout on Netflix’s desktop site on a bunch of browsers, including Safari and Mozilla Firefox, and lets you access your saved words or lines from your iPhone. A second alternative, Dualsub, is another extension offering “dual-language captioning and currently supports 23 services, including HBO Max, Hulu, and Disney+, at varying levels of support. Rakuten Viki, a streaming platform exclusively for Asian TV shows and movies, has these language-learning features built into its interface (Vargas, 2023).

Cognitive Load and Language Learning through Video Content

Cognitive load theory (Sweller, 1988) offers valuable insights into the complexities of language learning through video content. According to this theory, the human cognitive system has a limited capacity for processing new information, and learning occurs most effectively when cognitive demands are carefully managed. In the context of language learning, video content presents both opportunities and challenges in terms of cognitive load, as it requires learners to simultaneously process multiple streams of information,

including auditory input (speech), visual stimuli (images and actions), and written text (subtitles or captions).

Video content can impose different types of cognitive load: intrinsic, extraneous, and germane. Intrinsic load refers to the inherent complexity of the language itself, which varies depending on the learner's proficiency and the difficulty of the content. Extraneous load involves non-essential elements that distract from learning, such as overly complex visuals or irrelevant background information. Germane load, on the other hand, relates to cognitive processes that directly contribute to learning, such as integrating new language structures with prior knowledge. To optimise language learning through video, educators must strike a balance between providing sufficient linguistic input and avoiding cognitive overload. For instance, the use of dual subtitles (in both L1 and L2) can reduce extraneous cognitive load by offering immediate translation, but if overused, it may hinder the development of L2 comprehension skills by splitting the learner's attention. Similarly, well-designed video content that aligns with the learner's current proficiency level and incorporates appropriate scaffolding can enhance germane cognitive load, promoting deeper language acquisition. Thus, managing cognitive load effectively is crucial for maximising the educational potential of video content in language learning, ensuring that learners can process and retain linguistic information without being overwhelmed.

The Use of Dual Subtitles in Language Learning

The advent of dual subtitles has garnered significant attention in recent pedagogical research, facilitated by the development of computer-assisted technologies such as the user-friendly Chrome browser extension Language Reactor (https://www.languagereactor.com/). This tool provides advanced captioning options, allowing users to display dual subtitles—also known as bilingual subtitles—where both the L1 and L2 subtitles are simultaneously presented at the bottom of the screen. A growing body of literature (e.g., Fievez et al., 2021; Hsieh, 2020) has begun to explore the educational benefits of glossed captions and dual subtitles in language learning contexts.

The theoretical underpinning for the potential efficacy of dual subtitles may be derived from Paivio's (2014) bilingual dual coding theory, which posits that visual imagery, combined with two distinct sets of verbal inputs (L2 audio and L1 subtitles), can have cumulative positive effects on L2 acquisition. This theory offers a rationale for the advantages of using L1 subtitles in language learning. However, the effectiveness of dual subtitles, which involve the integration of visual input with three distinct verbal components (L2 audio, L1 subtitles, and L2 captions), requires further empirical investigation to understand its impact on L2 learning outcomes fully. Therefore, the current study was initiated. Incorporating extensive viewing into the language teaching curriculum is also recommended as an effective pedagogical strategy (Suárez & Gesa, 2022).

A Multimodal Learning Perspective on English Language and Literature Major Students

Muñoz et al. (2022) acknowledge that students majoring in languages tend to exhibit higher proficiency in their L2 and are often more motivated to engage in language learning; this finding was also studied in our study. The limited and mixed evidence available suggests that immediate repetition of audiovisual content may be particularly beneficial for EFL (English as a Foreign Language) learners with lower proficiency levels (Akyıldız, 2019). At the same time, repeated viewing with a one-week interval might yield better outcomes for more advanced L2 learners. However, given the differences in audiovisual input (e.g., on-screen texts) and the language pairs used in the present study (Chinese-English) compared to those in Muñoz et al.'s study (Spanish-English), further research is required to validate these findings and ensure their generalizability across different contexts, so the current was performed to validate the English-Turkish

Language translation strategies. Focusing on whether TED-Talk through LRT enriches learners' English vocabulary for the university level, Nasrullah and Aini (2024, p. 487) "explored how TED talks can increase student involvement and interest in vocabulary learning, while LRT's interactive features facilitate active participation and knowledge retention so as to produce innovative and interactive vocabulary learning." As a result, with LRT's interactive features integrated into the platform, synchronisation of the spoken with the written through dual subtitle function generates synergistic vocabulary learning. The learners' interest, motivation and retention of language are boosted, and educators may construct classrooms as dynamic, student-centred settings with immersive and dynamic learning of the language experienced with real content and interactivity introduced into the process (Nasrullah & Aini, 2024 pp.488-489). The findings of Fakhrurriana and Nasrullah's (2023, p. 537) study demonstrated that the Language Researcher Toolbox (LRT) "became a new concept of vocabulary teaching to increase students' interest in vocabulary learning." In their conclusion, Fakhrurriana and Nasrullah (2023, p. 542) state that by utilising LRT, "the teacher can overcome the problem of vocabulary teaching, particularly in students' boredom. The teaching steps are easy to implement and provide an interesting way of vocabulary learning."

While metaphor analysis provides valuable insights into learners' perceptions of AI-supported language learning tools such as Language Reactor, there remains a gap in understanding the extent to which these perceptions align with actual learning outcomes and practical tool effectiveness. Metaphorical representations often reflect subjective and emotional experiences, which can correspond to the functional performance of the tools in real learning settings. The research aims to bridge this gap by integrating perception-based qualitative approaches with empirical evaluations of learning performance and usability, thereby offering a more comprehensive understanding of the relationship between user perceptions and the actual pedagogical value of AI-assisted language learning tools.

The research question of the study;

1. How do language learners conceptualise their experiences with AI-supported language learning tools through metaphors?

METHODOLOGY

Participants, Instruments, and Data collection

The study was conducted with 24 undergraduate students majoring in English language and literature enrolled in an advanced English course during the 2023/2024 academic year. The participants voluntarily agreed to take part in the study, motivated by a keen interest in the research findings and its potential to improve their English language proficiency. Their ages ranged from 19 to 21 years old.

In an effort to enhance the participants' understanding and learning of English, they were introduced to the Language Reactor tool, which allows for the interactive use of subtitles and translations while watching video content. The tool was employed as an auxiliary language-learning aid to improve their vocabulary, sentence structures, and overall comprehension. Following this experience, participants were asked to employ metaphors to describe their reflections on the effectiveness of using the Language Reactor tool for their language acquisition. According to Ortany (1993), metaphors serve not only a communicative purpose but also an explanatory one, which highlights their utility in research like this. The metaphors were designed to encapsulate students' thoughts and attitudes toward the tool's functions, providing a clearer lens through which to understand their experiences. To further support this metaphorical exploration, students were asked to elaborate on the reasoning behind their metaphor selections, offering a more profound interpretation of their views. This process aligns with the notion that metaphors, as explained by Lakoff

and Johnson (2003), are not just linguistic tools but cognitive frameworks that shape our understanding of abstract concepts.

For analysis, the metaphorical data provided by the students were processed through metaphor analysis, a method that facilitates the interpretation of how participants' thoughts, beliefs, and attitudes are communicated through figurative language. This process allowed for a nuanced exploration of how students perceive and interact with AI-based educational tools, such as Language Reactor, in their language-learning journey. This analysis also echoes findings from previous research that highlight the role of metaphor in deepening conceptual understanding (Hacıfazlıoğlu et al., 2011).

The insights gained from the metaphors provided a valuable window into participants' cognitive frameworks and beliefs about the role of technology in language education. As a research tool, the use of metaphors helped to articulate students' authentic perceptions and attitudes towards the integration of AI into their learning experience.

Analysis

The data collected from the participants were analysed using the qualitative data analysis software MAXQDA. MAXQDA allowed for the efficient organisation, categorisation, and interpretation of the data, facilitating the identification of recurring patterns and themes. By utilising the software, we were able to manage large amounts of data, including verbal responses and metaphors provided by the students, systematically.

The metaphor analysis approach, as outlined by Cameron and Low (1999), was employed to explore the conceptual metaphors that students used to describe their experiences with the language learning process through audiovisual materials. MAXQDA's coding capabilities made it easier to track the linguistic metaphors and expand them into conceptual categories, ensuring that the analysis was both rigorous and consistent. Each student's interpretation of their metaphor was meticulously analysed, recognising that individuals may attribute diverse meanings to identical metaphors. This approach facilitated a more nuanced comprehension of their perspectives.

Thematic content analysis, as described by Harwood and Garry (2003), was also conducted within MAXQDA, which allowed for the systematic coding and classification of the data. The software's ability to visualise coding frequencies and theme co-occurrence helped us to uncover connections between different themes, ensuring a comprehensive analysis of the participants' responses. Through this process, the data was reduced to manageable categories, facilitating deeper interpretation and yielding insights that would have been difficult to discern manually. By utilising MAXQDA, we ensured the accuracy and efficiency of the content analysis, which ultimately enhanced the reliability of our findings. Additionally, reliability and validity measures were taken to ensure the rigour of the study. The reliability of the coding process was enhanced by involving two researchers in cross-checking the codes and discussing discrepancies.

Furthermore, data triangulation was applied by collecting both verbal and written metaphor explanations from students. Member checking was conducted with selected participants to confirm the accuracy of the interpretations. Thick descriptions of the participants' metaphors and their interpretations were provided to strengthen the validity and enable readers to evaluate the transferability of the findings.

Findings

The analysis revealed four major themes emerging from the metaphorical descriptions provided by the participants: Learning Facilitation, Guidance/Support, Knowledge Enhancement, and Accessibility/Usability. These themes reflect the participants' perceptions of how the Language Reactor

tool assists in their language-learning process. Each theme comprises several codes that represent various aspects of the learning experience. Below (Table 1) is a detailed explanation of each theme and its associated codes and metaphors.

Table 1. Themes and codes with sample metaphors and raw answers

Themes	**Codes**	**Frequencies (n)**	**Samples of Metaphors**	**Samples of Raw Answers**
Learning Facilitation	Step-by-step learning	2	a step	helps us to learn the language better, and we could learn the language by climbing the words and sentences one by one
	Learning through discovery	5	a matryoshka doll	we learn something new every time we use it.
			Reacturage	helps us discover more about the English language
			like a reactor of English	a reactor of English, "Language Reactor contains a lot of words and resources
	Ease of access to information	8	a calculator	Language Reactor reaches out everywhere and makes everything easier
			a bus	carries what information I want
			an enormous tree with dozens of branches	can be connected to YouTube and Netflix, giving access to a vast amount of content with dual-language subtitles
				and a dictionary
			an instant language-giving machine	it works really fast and is user-friendly
			Everyone's friend	always available when needed to help learn something, just like a good friend
			a better oil for our language car	helps me learn new words easily in a fun and catchy way
Guidance/Support	Guiding tools	9	a guiding light	lights the path that leads one to improve oneself.
			a compass	, "When we do not know where to look at the exact answer, Language Reactor shows us the answer we are looking for
			Campass in River	helps to use the language fluently and shows us the way correctly.

			lantern	improves your foreign language in whichever area you are lacking, just like a lantern illuminating a dark space
			a pair of glasses	shows all the language and meanings we need when we wear it
Knowledge Enhancement	Gaining knowledge and insight	2	seeing through an owl's eyes	made me feel more knowledgeable about English.
Accessibility/ Usability	User collaboration	4	'Fast and Furious'	how Dwayne Johnson and Paul in 'Fast and Furious' drive together, working together seamlessly
	Multimedia integration	3	Languactorflix,	, Languactorflix, Language Reactor works with Netflix
	Speed and error correction	7	thought-flow of view	due to the application's slow speed
			an eraser	I can check and correct my spelling and grammar mistakes.
	support	3	being a pair of eyes for blind people	helps blind people understand sentences by hearing

Learning Facilitation

This theme encapsulates how the Language Reactor tool aids in facilitating the learning process for students. The participants expressed their views through metaphors that highlight the incremental, exploratory, and accessible nature of learning. In Step-by-step (n=2) learning code, metaphors such as "a step" (indicating progressive learning, where language is acquired by climbing through words and sentences one by one) and "a matryoshka doll" (symbolising that learning through the tool involves discovering new layers each time) emphasise a structured, gradual approach to language acquisition. The participants recognised that the tool provides a scaffolder learning process. In Learning through discovery (n=5) code, metaphors like "Reacturage" and "a reactor of English" convey the idea that Language Reactor opens up new avenues for exploration. Participants acknowledged the vast resources available within the tool, describing it as a source of extensive knowledge and discovery in language learning. In ease of access to information (n=8) code, participants referred to the tool as "a calculator" (suggesting it simplifies tasks and provides instant results), "a bus" (indicating it carries the desired information), and "an enormous tree with dozens of branches" (highlighting the multitude of content it offers, from films to channels). The ease of integrating multimedia resources, such as YouTube and Netflix, enhances the language-learning experience by providing a dictionary and dual-language subtitles.

Guidance/Support

Participants frequently described the tool in terms of its ability to guide them through their language-learning journey. The metaphors reflected the perceived supportive role of Language Reactor in helping them find their way through language challenges. In guiding tools (n=9) code, metaphors like "a guiding light" and "a compass" indicate that the tool serves as a navigational aid, helping students to locate the

correct answers or directions when they are unsure. Additionally, the metaphor "Campass in River" suggests that Language Reactor helps to maintain fluency and accuracy in language use, guiding students towards the correct usage. Finally, "a lantern" and "a pair of glasses" highlight how the tool illuminates or clarifies areas of difficulty, allowing students to see and understand language concepts more clearly.

Knowledge Enhancement

This theme reflects how Language Reactor enriches the participants' knowledge and understanding of the English language. The metaphors were chosen to emphasise the deepening of insight and the acquisition of knowledge through its use. In gaining knowledge and insight (n=2) code, metaphors such as "seeing through an owl's eyes" convey a sense of wisdom and enhanced understanding. Participants felt that using the tool made them more knowledgeable and confident in their grasp of the language. Additionally, the metaphor "oil for our language car" highlights the tool's ability to make language learning smoother and more efficient, with an added sense of enjoyment in the process.

Accessibility/Usability

This theme covers the practical aspects of using Language Reactor, emphasising how participants perceived the tool's accessibility, user-friendliness, and utility. In user collaboration (n=4) code, one metaphor referred to Language Reactor as "Fast and Furious" characters working together, signifying seamless collaboration between users and the tool, helping to drive the learning process forward. In the multimedia integration (n=3) code, the metaphor "Languactorflix" underscores the integration of Netflix with Language Reactor, which the participants found valuable for language acquisition through media. In the speed and error correction (n=7) code, some participants expressed concerns about the speed of the application, with metaphors such as "thought-flow of view" indicating that the tool sometimes operates slowly. On the other hand, the metaphor "an eraser" emphasises the tool's capacity to help users correct their mistakes and refine their language skills. In support (n=3) code, finally, metaphors such as "being a pair of eyes for blind people" reflect the tool's ability to make language accessible, particularly through auditory support, which allows users to understand sentences by hearing. Figure 1 represents the theme and code relationship below.

Kod Sistemi	acc...	sup...	spe...	mul...	user...	kno...	gain...	gui...	gui...	lear...	ease...	lear...	step...
accessibility/usability													
support													
speed and error correction													
multimedia integration													
user collaboration													
knowledge enhancement													
gaining knowledge and insight													
guidance/support													
guiding tools													
learning facilitation													
ease of access to information													
learning through discovery													
step-by-step learning													
TOPLAM	35	11	22	6	15	5	11	24	24	32	24	18	5

Figure 1. The code relation browser table between themes and codes

Figure 1 and the analysis of the relationships and co-occurrences between different themes and codes directly support the research question, which seeks to explore how language learners conceptualise their experiences with AI-supported language learning tools through metaphors. The visual representation in

Figure 1 illustrates that participants primarily conceptualise their experiences with the tool in terms of learning facilitation, guidance/support, accessibility/usability, and knowledge enhancement. The frequent co-occurrence of Learning Facilitation and Ease of Access to Information, as well as Guiding Tools and Accessibility/Usability, reveals that learners often perceive the tool as a comprehensive and supportive learning companion, which enables smooth access to resources and provides continuous guidance during their learning journey. These conceptualisations, reflected through participants' metaphors, highlight how they experience and make sense of the AI tool's role in their language learning process.

Thus, Figure 1, created through MAXQDA, aligns with the research question by demonstrating how learners' metaphorical representations are interconnected and how these metaphors reflect their underlying perceptions of the tool's multifaceted support in language learning.

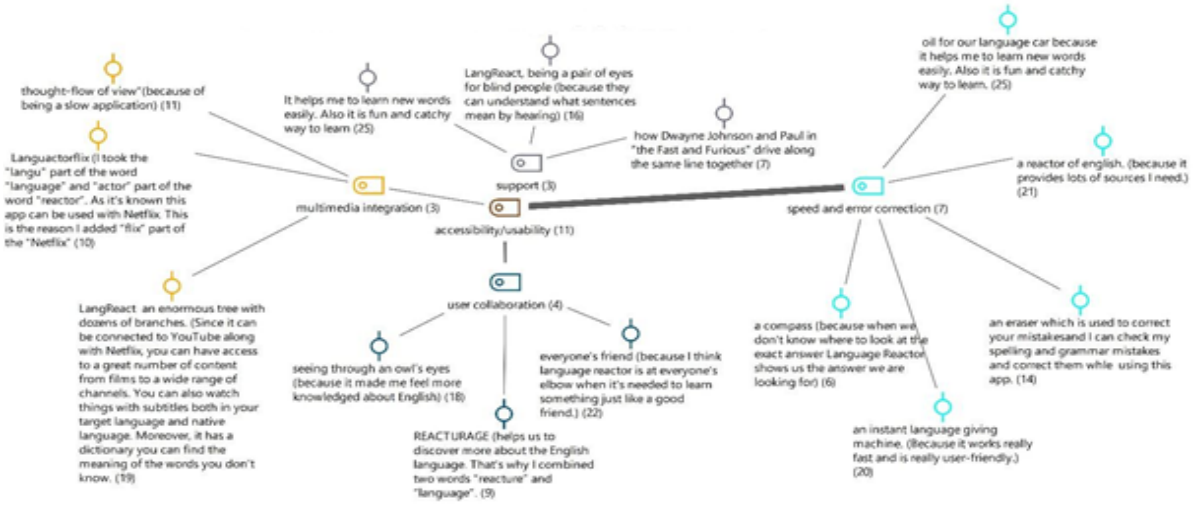

Figure 2. Access & Usability Codes Model and Sample Metaphors

Figure 2 highlights the frequency distribution of various codes related to the accessibility and usability of the Language Reactor tool. The most frequent codes, such as Speed and Error Correction (n= 7) and Multimedia Integration (n= 3), suggest that learners highly value the tool's efficiency in assisting with error correction and its ability to integrate multimedia resources. These features are central to the participants' positive experiences, as they make language learning more dynamic and responsive. User Collaboration (n=4) emerges as a moderately frequent code, indicating that students appreciate the tool as a supportive partner in their learning process. On the other hand, less frequent codes like Support and Application Speed (n=3) suggest that while these aspects are relevant, they are not as critical for the majority of users. Overall, the model emphasises that learners prioritise quick assistance and access to diverse content, while supportive features and performance issues are mentioned but not as prominently.

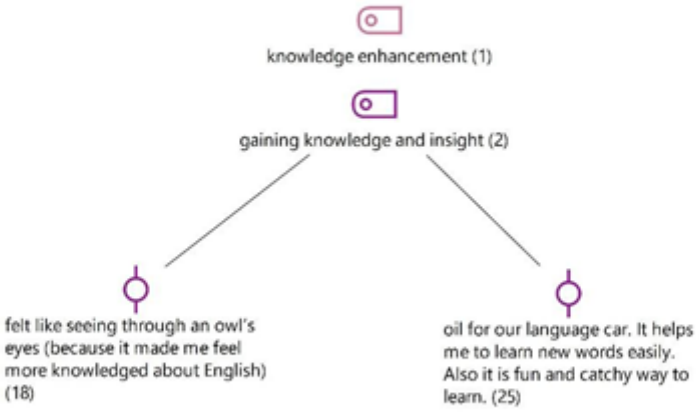

Figure 3. Knowledge Enhancement Codes Model and Samples of Metaphors

As figure 3 illustrates, the most prominent codes, such as Gaining Knowledge and Insight (n=2), indicate that learners value how the tool deepens their understanding of the language and provides meaningful insights. The model highlights that the tool's role in enhancing knowledge is both practical and enjoyable, as learners report gaining new language skills while finding the process engaging. Overall, this model suggests that Language Reactor is seen as an effective tool for enriching users' language knowledge and fostering a deeper connection to the material.

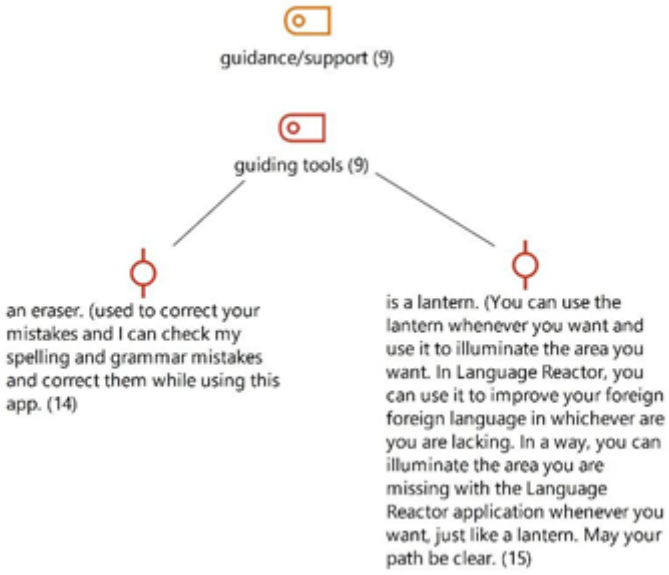

Figure 4. Guidance & Support Codes Model and Samples of Metaphors

As figure 4 shows, the primary code, Guiding Tools (n=9), shows how learners rely on the tool to correct mistakes and illuminate areas of difficulty. The model demonstrates that users appreciate the corrective feedback provided by the tool, as represented by metaphors of tools like an eraser. Additionally, the tool is viewed as a guiding light, offering clarity and direction in areas where learners need the most help. This highlights the tool's role not just in correcting errors but also in providing continuous support to guide learners through challenging aspects of language acquisition.

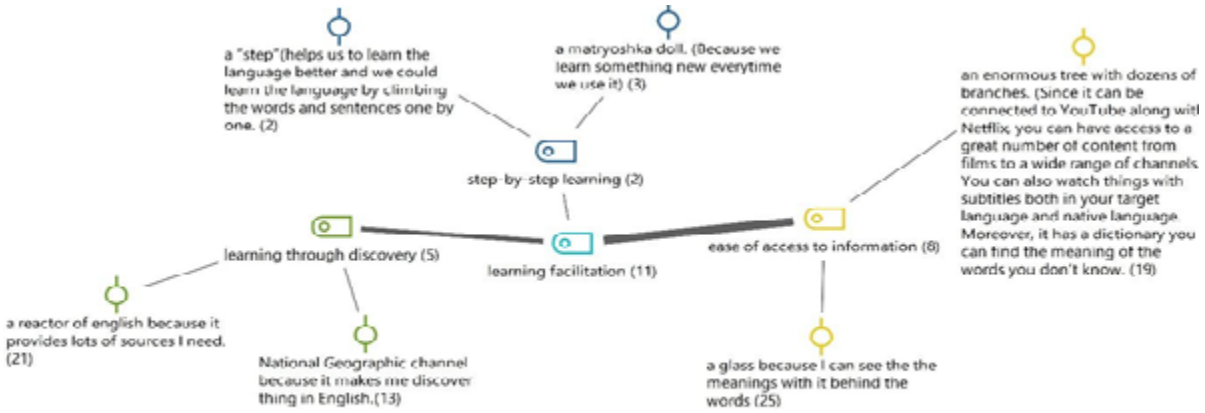

Figure 5. Learning Facilitation Codes Model and Samples of Metaphors

As in figure 5, the model is divided into key areas, including Step-by-Step Learning (n=2), where learners appreciate the gradual, progressive nature of learning with the tool and Learning through Discovery (n=5), which highlights the exploratory opportunities the tool offers. Additionally, the model emphasises Ease of Access to Information (n=8), showing how learners value the platform's ability to connect them with a wide range of multimedia content, such as YouTube and Netflix, making the learning experience more dynamic and efficient. Overall, the model illustrates that the Language Reactor aids learners by providing a scaffolder, resource-rich environment for language learning.

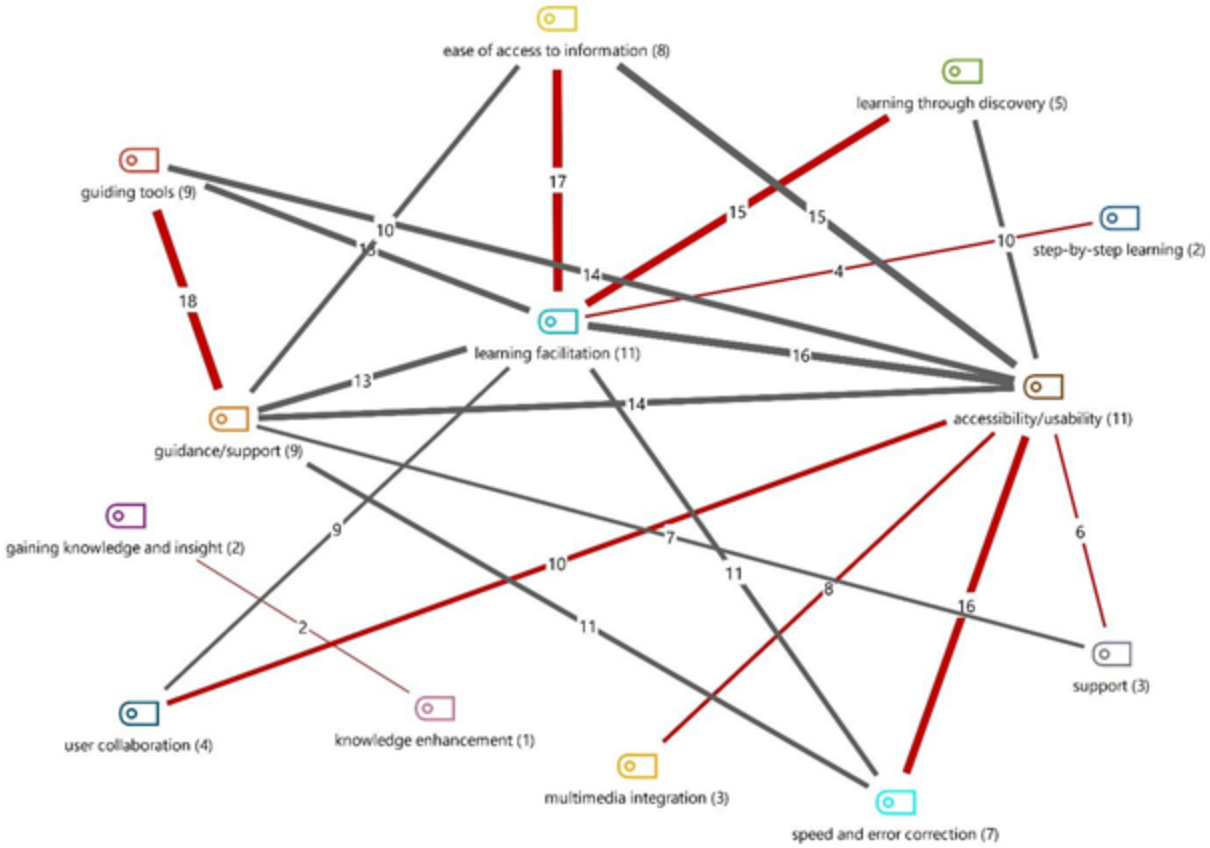

Figure 6. The theme and code relation model (code co-occurrence model and code proximity)

The theme and code relation model illustrates the intricate connections between various themes and codes in figure 6. At the centre of the model is learning facilitation (n=11), which is strongly linked to themes like the ease of access to information (n=8), learning through discovery, guidance/support (n=9), and accessibility/usability (n=11), which suggests that participants view effective learning as dependent on easy access to information, opportunities for exploration, and consistent guidance. Additionally, guiding tools (n=9) under the theme of guidance/support are intricately connected to both learning facilitation (n=11) and accessibility/usability (n=11), indicating that learners rely heavily on the tool's ability to provide guidance and make resources accessible.

The code step-by-step learning (n=2) is another key concept tied directly to learning facilitation, highlighting the importance of incremental progress in the language learning experience. It also connects to learning through discovery (n=5), showing that structured learning and exploratory learning are interrelated. The code speed and error correction (n=7) under accessibility/usability (n=11) is strongly associated with both learning facilitation (n=11) and guidance/support (n=9), signifying that the tool's ability to help learners correct mistakes quickly is highly valued. Finally, user collaboration (n=4) links knowledge enhancement (n=1) with learning facilitation, emphasising the collaborative aspect of the tool, where learners feel supported in gaining new knowledge through interaction with the platform. This model underscores the importance of interconnected themes, with learning facilitation being the central element supported by guidance, accessibility, and structured learning.

DISCUSSION

The findings of this study align with and extend the existing body of research on the integration of digital media and AI-powered tools in language learning. Specifically, the results underscore the potential of the Language Reactor tool to facilitate self-directed language acquisition through the combined use of streaming services and interactive language support features. These insights contribute to the broader discourse on the role of technology in education, particularly in the context of language learning (Catalbas & Solmaz, 2024; Zhao & Lai, 2023).

First, the study's outcomes resonate with the work of Paivio (2014) and his bilingual dual coding theory, which emphasises the importance of integrating visual and verbal inputs in enhancing cognitive processing and language retention. Participants' descriptions of the Language Reactor tool as a platform that offers dual subtitles and simultaneous access to visual and linguistic cues align closely with this theory. The tool's dual-subtitle functionality, frequently highlighted in participants' metaphors, allowed them to link auditory and textual inputs, thereby fostering deeper comprehension and vocabulary acquisition. This finding supports prior research that advocates for the pedagogical benefits of captioned and glossed video content in language education (Fievez et al., 2021; Hsieh, 2020). Moreover, the participants' appreciation of the tool's capacity to offer extensive exposure to authentic language input reflects the principles proposed by Schmitt (2008), who emphasised the synthesis of explicit and incidental learning. The ability to access multimedia content on streaming platforms like Netflix, integrated with Language Reactor's features, facilitated a balanced approach to intentional vocabulary learning and contextual exposure. This finding is consistent with the assertion that repeated exposure to authentic audiovisual input enhances linguistic competence (Suarez & Gesa, 2022).

However, the study also highlights potential cognitive load concerns, as described by Sweller (1988). Some participants noted challenges related to the tool's speed and the simultaneous processing of multiple sources of information, such as L1 and L2 subtitles, audio input, and visual content, which aligns with the notion that dual-input systems, while beneficial, may sometimes impose extraneous cognitive load, hindering the learner's processing capacity. This complexity underscores the need for careful calibration of technological interventions to match learners' proficiency levels and reduce cognitive strain, as suggested by Liang (2021).

Additionally, the participants' experiences reveal that the tool's user-friendly interface and guiding features played a pivotal role in facilitating their navigation through language challenges. Metaphors describing the tool as a “compass” or “guiding light” suggest that learners value the supportive role of technology in scaffolding their self-directed learning process, corroborates previous research emphasising the importance of adaptive and interactive learning platforms in promoting learner autonomy and motivation (Munoz et al., 2022; Nasrullah & Aini, 2024). Furthermore, the study contributes to the growing body of literature on the multimodal nature of language learning (Muñoz et al., 2022). The combination of visual, auditory, and textual inputs provided by Language Reactor aligns with contemporary perspectives that emphasise the value of multimodal resources in facilitating comprehensive language development. Learners' descriptions reflect an appreciation for the immersive experience offered by streaming platforms coupled with real-time language support, highlighting the synergy between content consumption and language learning.

Overall, the findings suggest that tools like Language Reactor, when thoughtfully integrated into language learning practices, can serve as valuable assets in creating a more engaging, personalised, and efficient learning environment. Nevertheless, educators must remain cognizant of the potential for cognitive overload and the need for continued guidance to ensure that technology enhances rather than hinders the learning process. Future research could further investigate the long-term impacts of AI-powered language learning tools on learners' proficiency and explore strategies to optimise their implementation across diverse educational settings.

Pedagogical Implications

The integration of AI-supported tools such as Language Reactor into language learning processes should be guided by a flexible and context-sensitive pedagogical approach. This study highlights that learners' experiences and perceptions of such tools vary depending on their proficiency, autonomy, and personal learning preferences. Consequently, educators should avoid a one-size-fits-all approach and instead adopt differentiated strategies that align with individual learners' needs. Drawing on the PAH (Pedagogy-Andragogy-Heutagogy) continuum (Blaschke & Hase, 2019), this study suggests that technology integration can be optimised by adjusting the balance between teacher-directed instruction, learner-directed exploration, and self-determined learning. For less experienced learners, a more structured pedagogical approach emphasising guidance and support may be appropriate. As learners develop greater proficiency and autonomy, instructors can gradually transition towards andragogical and heutagogical practices that promote self-directed and self-determined learning.
The cyclical nature of the PAH continuum offers a practical framework for ensuring that AI-supported tools enhance rather than overwhelm learners. Educators should monitor students' progress and adjust the level of scaffolding as needed to prevent cognitive overload, especially when introducing complex tools like Language Reactor that require simultaneous processing of auditory, textual, and visual inputs.

Additionally, teacher training programs should incorporate modules on the effective integration of AI-powered learning technologies, equipping educators with the skills to design flexible and learner-centred instructional plans. By fostering a dynamic learning environment where technology serves as both a facilitator and an adaptive support mechanism, instructors can harness the full potential of AI-supported tools to meet diverse learner needs.

CONCLUSION

This study highlights the significant role that the Language Reactor program plays in enhancing English language learning for undergraduate students, particularly those majoring in English language and literature. The use of streaming platforms such as Netflix, combined with AI-driven tools like Language Reactor, provides learners with authentic language exposure and interactive features that support comprehension, vocabulary acquisition, and engagement. Through metaphor analysis, students expressed their positive perceptions of the tool, indicating its usefulness in facilitating language learning, offering guidance, and making linguistic content more accessible. The findings suggest that Language Reactor serves not only as a resource for vocabulary retention and comprehension but also as an innovative tool that encourages self-directed and immersive learning experiences.

RECOMMENDATIONS

Integration into Curriculum

Based on the positive student feedback, it is recommended that Language Reactor be incorporated into language learning curricula, particularly in courses focusing on vocabulary building, comprehension, and listening skills, which will help bridge the gap between traditional classroom methods and modern, technology-driven approaches.

Teacher Guidance

While Language Reactor offers a self-directed learning experience, teacher guidance remains essential. Educators should be trained on how to effectively integrate this tool into their lessons, providing students with strategies for optimising its use for various language skills.

Expanding Beyond Streaming

Although the tool primarily works with Netflix, integrating other platforms like YouTube or TED Talks, which offer educational content, can diversify students' exposure to different genres and types of linguistic input, which further enhances their language learning experience.

Further Research

Additional research is recommended to explore the long-term impact of Language Reactor on language acquisition and retention. Future studies could also investigate its effectiveness across different language proficiency levels and in various educational contexts, ensuring its adaptability to broader learning environments.

These recommendations highlight the potential of Language Reactor as a transformative tool for modern language education, providing students with dynamic, interactive, and personalised learning opportunities.

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