



OPEN ACCESS

EDITED BY

Wei Xu,
City University of Macau, Macao SAR, China

REVIEWED BY

Dennis Arias-Chávez,
Continental University, Peru
Hui Luan,
National Taiwan Normal University, Taiwan

*CORRESPONDENCE

Yi Yan

✉ yyan@cup.edu.cn

Wei Sun

✉ swcup1998@163.com

[†]These authors share first authorship

RECEIVED 10 May 2024

ACCEPTED 15 July 2024

PUBLISHED 30 July 2024

CITATION

Yan Y, Sun W and Zhao X, (2024)
Metaphorical conceptualizations of
generative artificial intelligence use by
Chinese university EFL learners.
Front. Educ. 9:1430494.
doi: 10.3389/educ.2024.1430494

COPYRIGHT

© 2024 Yan, Sun and Zhao. This is an open-access article distributed under the terms of the [Creative Commons Attribution License \(CC BY\)](https://creativecommons.org/licenses/by/4.0/). The use, distribution or reproduction in other forums is permitted, provided the original author(s) and the copyright owner(s) are credited and that the original publication in this journal is cited, in accordance with accepted academic practice. No use, distribution or reproduction is permitted which does not comply with these terms.

Metaphorical conceptualizations of generative artificial intelligence use by Chinese university EFL learners

Yi Yan*[†], Wei Sun*[†] and Xiufeng Zhao

School of Foreign Languages at China University of Petroleum, Beijing, China

The unveiling of ChatGPT 4o by OpenAI, a multimodal large language model powered by Generative Artificial Intelligence (GenAI), has injected interest and incited debate throughout the echelon of education institutions regarding its prospective benefits and drawbacks. Nonetheless, investigations into the learners' perceptions of GenAI use in learning English as a Foreign Language (EFL) remain markedly insufficient. The study adopts an explorative stance and aims to explore the attitudes and perceptions of Chinese EFL learners toward GenAI use in language learning through the application of metaphor analysis. Data were collected from 281 EFL students of varying majors in four key universities across China by completing a sentence using metaphors to elicit their attitudes and perceptions toward GenAI use in language learning. Through qualitative analysis of metaphorical constructs, including HUMANS, TOOL/MACHINE, BRAIN, RESOURCES, FOOD/DRINK, and MEDICINE metaphors, the study unveils a spectrum of attitudes toward GenAI. While some language learners perceived GenAI as supportive, helpful, and intelligent, others expressed concerns about over-reliance and potential loss of critical thinking skills. The findings underscore the importance of considering learners' diverse attitudes and beliefs toward GenAI use and application in language learning pedagogy. The implications of these findings for the future integration of GenAI in language education are discussed, complemented by recommendations for further research and pedagogical practice.

KEYWORDS

GenAI, students' perceptions, metaphor analysis, Chinese EFL learners, students' attitudes, language learning

1 Introduction

“The development of full artificial intelligence could spell the end of the human race.... It would take off on its own, and re-design itself at an ever-increasing rate. Humans, who are limited by slow biological evolution, could not compete, and would be superseded (Hawking, 2014).” A somewhat dystopic outlook offered by the late astrophysicist, yet with sheathed fundamental truths, presents the emerging obstacles, and opportunities that shall test the resolve of stakeholders within second language acquisition (SLA) for the next decade or beyond.

In May 2024, OpenAI unveiled ChatGPT 4o, the multimodal large language model powered by generative artificial intelligence (GenAI), a series of similar products were introduced by tech rivals, notably Google's Gemini and Anthropic's Claude. These

technological innovations not only garnered interest across diverse disciplines and multiple tiers in academic institutions (Su and Yang, 2023), but also assumed, by many within academia, to have opened a Pandora's box for its uncertain impact on educators and learners (Luo et al., 2024). Optimists emphasized its capabilities to enhance education through its accessibility to personalized and responsive support of problem-solving and critical thinking (Baidoo-Anu and Ansah, 2023) and leverage students with improved research and writing skills (Kasneci et al., 2023). Moreover, advocating the technology for its empowerment of learners from low-income or middle-income regions who are deprived of access to education resources, and provided with greater inclusivity (Wang et al., 2023). Pessimistically, the negative impact of the technology is underscored by invalid information, biased viewpoints, academic integrity, education resource disparity, and the decimation of disciplines (Barrot, 2023; Rudolph et al., 2023; van Dis et al., 2023).

Despite the technology's recency, it is difficult to imagine a language learning landscape in the future in which GenAI is nulled, hence, further evaluations of GenAI could provide greater insight into the revision of current and new avenues of its application in English as a foreign language (EFL) setting. Studies in the broad education context have investigated the attitude and perception of AI quantitatively and qualitatively across various tiers of education (Chai et al., 2021; Mertala et al., 2022; Anderson, 2023; Lim, 2023). Yet, investigations into the perceptions, attitude, and conception of GenAI post-launch of ChatGPT4, within the EFL setting, and targeting a higher education demographic remains under-explored. The extent to which the systems or technologies of GenAI is perceived by students in the language educational setting remains inconclusive (Li et al., 2022). Thus, a metaphor analysis of GenAI from the student's perspective in EFL setting will address the present limitations by providing additional flexibility, adaptation, or imagination.

2 Literature review

2.1 Students' perception of GenAI use in EFL education

Traditionally, AI in language education was primarily employed in the role of an "intelligent tutor," and subsequently as for "assessment and evaluation" as well as "adaptive systems and personalization" (Liang et al., 2023). The emergence of GenAI-powered large language models has demonstrated heightened effectiveness and enhanced specialization for tasks relating to the aforementioned contexts. Studies associated with GenAI in SLA predominately focus on applications relating to foreign language writing quality (Hwang et al., 2023), automated feedback (Yang et al., 2023), plagiarism identification (Casal and Kessler, 2023), and speaking performance (Fathi et al., 2024).

Abundantly noted in the literature on the subject matter, GenAI's ability to provide instantaneous and personalized feedback on grammar, syntax, spelling, and vocabulary (Bishop, 2023; White et al., 2023) directly influences the quality of EFL writing, which results in the majority of research focus in language learning being tendered to the context. Guo and Wang (2023) examined the ability of GenAI to support teacher feedback in argumentative writing tasks by comparing feedbacks generated by conventional and GenAI-mediated sources.

Consequently, the results further supported the foundation for the perception that the new generation of AI is capable of rectifying time constraint issues and liberating teachers to engage in core pedagogical responsibilities (Barrot, 2023). Moreover, Zhao (2023) evaluated the pedagogical applications of GenAI as a writing assistant for use during the writing process, instead of the revision and editing stages, analyzing its capabilities to suggest alternatives for variance in tone and length. Thus, it alludes to the imperativeness for language learners to develop a positive attitude and proficiency for GenAI use in autonomous learning activities. Yan (2024) applied a mixed-method approach to evaluate the GenAI feedback-seeking abilities of three EFL learners in L2 writing classrooms. The findings revealed the perception of a role transition in language learners from feedback recipients to seekers, creating an educational setting of increased involvement with enhanced agency, creativity, and proactivity. Subsequently, the participants held a positive perception of GenAI's implication for learning outcomes, a consequence of the instantaneous provision of feedbacks and explanations. The immediate application, direct influence, and impact level of GenAI relating to EFL writing practices suggests a necessity for further exploration into the context.

In the realm of speaking-based learning, GenAI is capable of providing a natural and ubiquitous partner for conversation, addressing previous restrictions both internal and external to a conventional educational context (Fathi et al., 2024). Limitations of peer linguistic competence and teaching resource constraints are areas that GenAI can prospectively offer favorable avenues of recourse. Considering the comparable level of language proficiency among the majority of EFL students, the potential for gaining extra insight from peer-to-peer interactions may encounter obstacles (Fryer et al., 2019). Fathi et al. (2024) investigated the use of a GenAI chatbot to support speaking activities in comparison with traditional peer-interaction speaking activities. The results indicated that GenAI-supported interactive speaking activities exhibited more effectiveness in enhancing speaking skills and willingness to communicate. This finding was confirmed by a study on L2 Korean speakers, which additionally evinced a reduction in speaking anxiety (Kim and Su, 2024). Jeon (2024) explored the motivational variables influenced by GenAI-mediated language learning by assessing the impact of pedagogical, technological, and social affordances of chatbots on the psychological aspects of 36 Korean EFL learners. The results imply that the motivations of students to pursue language learning are affected by their perception of chatbots. When perceived as authentic interlocutors, students exhibited a willingness to engage in conversational tasks with the chatbot and persisted in applying the technology in language learning. Conversely, perceiving the chatbot as a *machine* resulted in negative attitudes toward the class and reduced their willingness to communicate. Students who perceived chatbots to be pedagogically valuable exhibited a tendency to minimize individual technical limitations and maintained a willingness for continued use (Fryer et al., 2019), thereby facilitating intrinsic motivation to perform tasks (Dörnyei, 2002). Students that primarily interacted with the chatbot revealed positive perceptions due to the creation of an environment with reduced social anxiety (Kim and Su, 2024), which corroborated previous sentiments.

The novelty and niche of the technology have yet to result in educators and students ignoring GenAI's ability to address obstacles and challenges that are insurmountable for conventional methods. Despite the recent scholarly focus on writing and speaking

applications, the maturation and development of additional GenAI functions underscores its immense application potential across multiple facets of language education, which leaves a broad context for researchers to further investigate (Yan, 2023).

2.2 Conceptual metaphor and metaphor analysis

Exploration into the conceptualization that humans possess of specific objects is a means to comprehend their surrounding environment, concurrently, it permits the understanding of their behaviors, and ways relationships are established with others (Schmitt, 2005). Metaphors, a tool for conceptualization, provide the capability to transfer meaning which permits comprehension for the manner that humans interpret events, facts, and concepts through analogies (Saban et al., 2007). Its function transcends mere literary grammar beyond a form of stylistic add-ons that enhances the literariness of writing, metaphors are a fundamental aspect of the language practiced every day, more importantly, it is representative of reasoning and thinking (de Guerrero and Villamil, 2002; Shaw et al., 2021). According to the conceptual metaphor theory, it is argued that a significant proportion of thinking are embodied by conceptual metaphors which reflect the manner in which an individual represents their surrounding world and their experiences within the world context to themselves (Lakoff and Johnson, 1980). For example, when “learning” is described as “a process of construction,” the student is reflecting their understanding of the specific subject through “building,” which may be allude their worldly interpretation of “learning” as “a step-by-step process,” can be effectively executed with a “blueprint,” and potentially require considerable investment of financial and psychological resources (Oxford et al., 2014; Wegner et al., 2020). Thus, language of the metaphoric nature can assist to reveal the subconscious beliefs and attitudes, and implicit assumptions that lie beneath consciously held opinions and actions for specific subjects (McGrath, 2006) which have been utilized for reflection and awareness development (Cameron and Maslen, 2010) among education stakeholders to shape classroom practices (Tobin, 1990) and to mediate classroom learning and predict learning behaviors (de Guerrero and Villamil, 2002).

The acquisition of metaphoric natured language that reveals subconscious beliefs requires inquiries to employ the means to conduct analysis metaphorically. Metaphor analysis (MA), defined as a method that systematically examines elicit or spontaneous metaphors as a means to uncover underlying conceptualizations (de Guerrero and Villamil, 2002), is a practice that offers an assorted bundle of information on the perceptions, attitudes, and values of education stakeholders for specific subjects (Amin, 2015). The analytical method is based on relevant investigations of metaphors in cognitive linguistics (Lakoff, 1993), revealing metaphors to be conceptual representatives of subconscious or deep thought. Commonplace metaphorical expressions can be analyzed to identify underlying views if these metaphors are systematically examined (Jin and Cortazzi, 2011). The present method requires respondents to provide three key elements, notably a target domain, source domain, and entailment. Generally, two approaches are applied to collect metaphorical data. The first extracts the spontaneous use of metaphors from instances of discourse that occur naturally such as conversations

or interviews (Armstrong, 2008). The second approach instruct individuals to deliberately generate explicit metaphors by means of research-constructed prompts such as “X is like Y” (Cortazzi and Jin, 2020). In studies that pertain to the L2 education context, the elicitation approach to manufacture metaphors have become increasingly commonplace for the investigation of subjective knowledge and concepts (McGrath, 2006; Saban et al., 2007).

MA have revealed notable characteristics of language teaching through elicited metaphors, for example, a facilitator of intercultural connections (Farrell, 2011) and the diversity of roles in which a language teacher will possess for varying language aptitudes and competences (Nguyen, 2016). Additionally, it was applied to evaluate the experts’ personal narratives of language learning strategies to uncover insights into sociocultural background, way of thinking, sense of identity, underlying realities and underlying motivations (Oxford et al., 2014). While Tabata-Sandom et al. (2020), by means of elicited metaphors from Japanese learners, indicated learners’ belief were mediated by longitudinal factors which produced evolving interpretations of social realities across multiple time scales. The results, generally, showcased a positive belief about the learners’ progress, access to cultural perspectives, and sense or change of identity while highlighting paradoxical experiences, for example, “learning” was viewed as both “fun” and “difficult.” In the EFL context, studies that applied to examine the students’ beliefs on speaking English and being a good speaker (Dincer, 2017), student’s perception of English writing (Erdogan and Erdogan, 2013; Wan, 2014), the role of teachers (Saban et al., 2007; Wan et al., 2011), feedback in second language writing (Yu et al., 2023), students’ belief about textbooks and English public speaking anxiety (Gao and Tay, 2023).

However, studies that investigate the metaphors for GenAI in relation to learning or teaching have been sparse, possibly attributing to relatively recent nature of the subject matter in the language learning field. Lim et al. (2023) elicited metaphors to analyze the conception of artificial intelligence education for young children by pre-service childhood teachers. The study examined the responses of 137 pre-service early childhood teachers in the United States to discover the manner in which AI is conceptualized positively or negatively among seven metaphor categories. The results alluded that the teachers’ beliefs about the methods related to AI in a learning setting may be an important indicator of the thoughts and attitude of teachers when adopting AI in curriculums and its perception by students. While Carbonell et al. (2016) analyzed the manner metaphors act to characterize emerging technologies (e.g., artificial intelligence), their evolution and the public perception of such objects. The study presents the manner in which metaphors in society influence the evolutionary development of technologies while revealing the opposite holds true, indicating a two-way process. It goes to suggest that technologies are capable of creating the emergence of new structures of feeling and perception which highlights the need for MA of new technologies with immense disruptive potential that can alter the shape and dynamic of society, namely GenAI. Despite the findings proposed in the study, its subject of focus predate the wide public access of GenAI which suggests the need for renewed investigation into the topic. Anderson (2023) analyzed the conceptualization of GenAI’s (ChatGPT) capabilities and limitations with the dichotomic metaphors of *tool* or *collaborator* extracted from recent scholarly and news discourse, and author’s individual writing process. The results emphasized the value of adopting multiple metaphors to more accurately portray GenAI’s

unique characteristics that insufficiently embody human components and extends to implications in its utilization. The study highlighted that GenAI, more specifically ChatGPT, exists beyond the definition of a *tool*, which is capable of generating poetic content that could potentially be construed as “creative.” At the same time, its technical dependence on human manipulation and inability to be attributed with ethical responsibility prohibit the technology to be defined as a *friend*, *coauthor*, or *collaborator*. The multiple metaphor proposal reflects the varying manner individuals apply its functions to daily, professional or academic activities which warrants further investigation.

In regards to the general conceptualization of GenAI, paradoxical positions surrounding the discourse of the technology have become the status quo perception within higher education, a juxtaposition of the vast challenges it presents for educators (Stokel-Walker, 2023) and immense opportunities it creates for educators and students (Pavlik, 2023). The capability of GenAI Chatbots to intelligently generate responses which effectively mimic human qualities have seen it referred to as a *friend*, *philosopher*, and *guide* (Chatterjee and Dethlefs, 2023), while critics classify the technology as a *foe* that obstructs novel insight, suggesting its use to be high-tech plagiarism. The perceptual paradox of GenAI extends beyond its potential rewards and hazards, the restrictiveness and accessibility toward its intended users are in contradiction. While advocated to be a beneficiating force for all humanity by the technology’s parent companies, financial, and geographical restrictions are implemented which may detrimentally widen the socio-economic gap between student populations and hinder the democratization of knowledge (Lim et al., 2023). The technology’s application in education have spawned a perception of the *successful*, effective users with accessibility, and *losers*, non-users with accessibility restricted due to circumstances (Luo et al., 2024). Nonetheless, GenAI is perceived to offer higher education members of non-English speaking profiles, through translation and language editing functions, equity in opportunity and educational resources.

2.3 The present study

At present, GenAI remains an emerging technology with unpredictable disruptive potential central to the future of EFL, which necessitates further exploration to disclose the perception, value, and belief that students hold toward the technology. Thus, it is timely and paramount to explore the issues of GenAI in the EFL context for Chinese university students through an analysis of metaphorical language, thereby uncovering the conceptualization of GenAI in the learning experience of students. Additionally, the present study seeks to examine the underlying factors that affect the teaching and refinement of EFL curriculums through the use of metaphor analysis. Since the metaphor is based on the EFL student’s perception of GenAI, it can provide information on the propensity for future curriculum implementation and curriculum improvement (Shaw et al., 2021). Specifically, for these purposes, the study attempts to address the following questions.

- (1) How do Chinese university students use metaphor to indicate GenAI use in L2 learning?
- (2) What attitudes do Chinese university students hold toward GenAI use in L2 learning?

3 Materials and methods

3.1 Participants

The sampling method employed was convenience sampling, gathering a total of 281 university students from four key universities in China. These students represented diverse academic backgrounds, including 200 from English majors. The sample comprised predominantly female students, with 226 (80.4%) females and 55 (19.6%) males. Their ages ranged from 18 to 26 ($M = 20.79$, $SD = 1.517$). Participants encompassed all academic levels, with 48 freshmen (16.0%), 44 sophomores (15.7%), 95 juniors (33.8%), and 97 seniors (34.5%). They all speak Chinese as their L1 and learn English as their L2.

3.2 Instruments and data collection

Metaphorical data were obtained through the administration of online questionnaires, structured with specific objectives. Firstly, the questionnaire sought to articulate the purpose and voluntary aspect of participating in this study. Secondly, it aimed to procure demographic data from the participants. Thirdly, the questionnaire provided two exemplar metaphorical constructs, formulated as “GenAI in learning English is ...” to assist in stimulating subsequent metaphorical expressions. The questionnaire core involved a prompt requesting participants to formulate their own metaphors by completing the sentence: “In my English learning, GenAI is _____, because _____.” This open-ended question encouraged participants to draw upon personal experiences and perceptions to create unique metaphorical constructs. To facilitate and stimulate the generation of metaphorical expressions, the questionnaire included two exemplar metaphorical constructs with explanations. Participants were presented with statements such as, “In my English learning, GenAI is a bridge, because it connects me to a wealth of knowledge that I would not have access to otherwise,” and “GenAI in learning English is like a dictionary, because GenAI can provide definitions, translations, and explanations, akin to how a dictionary is used to look up words and their meanings.” These examples were provided to assist participants in conceptualizing and framing their own metaphorical responses.

Data collection occurred through the online platform *Wenjuanxing*, with the survey link disseminated within WeChat groups to solicit voluntary participation from students. Prior to engagement, participants were briefed on the research’s objective and requested to provide written responses in the form of a metaphor, reflecting their perceptions of GenAI use in L2 learning. Additionally, participants were asked to accompany their metaphor with a written explanation. All participants provided consent to partake in the study voluntarily. The completion of the writing tasks typically required participants to allocate approximately 5–10 min.

3.3 Data analysis

The overall data analysis adhered to the established approach outlined by Cameron and Low (1999), which involved collecting linguistic metaphors, generalizing them to conceptual metaphors, and

using the findings to suggest understandings or construct people's beliefs. The whole procedure involved three steps: (a) data coding and elimination, (b) sorting and categorizing, and (c) analyzing data.

Initially, linguistic metaphors provided by participants (e.g., "GenAI is like a friend") were subjected to coding procedures, wherein each response was meticulously analyzed to discern three fundamental components: the topic (i.e., GenAI), the vehicle (i.e., the comparative term), and the ground (i.e., the underlying relationship between the topic and the vehicle). Notably, certain metaphors failed to meet the criteria for analytical validity. Consequently, guided by the parameters delineated by [Saban et al. \(2007\)](#), 18 literal statements from five first-year students, two second-year students, six third-year students, and three fourth-year students were omitted from the analysis. This selective exclusion resulted in a refined sample comprising 281 participants and 298 remaining metaphors for further analysis. Next, conceptual metaphors were examined individually before integrating the findings to obtain a more comprehensive perspective. To ensure consistency in metaphor data analysis, inter-coder reliability was established. A linguistics doctoral colleague was enlisted to review all 298 linguistic metaphors and categorize them into six conceptual categories based on the metaphors themselves, the entailments provided by participants, and similarities with other metaphors. The proposals made by the guest linguist were then compared with the initial categorization. In cases of discrepancies, the researchers engaged in a negotiation process to achieve consensus. This process involved re-evaluating the metaphors, considering alternative perspectives, and occasionally re-categorizing metaphors based on new insights from the discussions. For instance, the metaphor "GenAI is like a human brain," was initially categorized by the guest linguist under the HUMAN metaphor. However, after extensive discussion, it was concluded that it would be more appropriately categorized under the BRAIN metaphor. This decision was based on the recognition that the metaphor primarily emphasizes the cognitive and processing capabilities of GenAI, which align more closely with the functions of a brain rather than the broader characteristics of a human.

Following [Miles and Huberman's \(1994\)](#) formula, which calculates the agreement rate by dividing the number of agreements by the total number of agreements plus disagreements, the initial inter-coder agreement rate stood at 99%. Regular discussions were conducted regarding categorization and the formulation of suitable conceptual categories. Discrepancies in classification were addressed through negotiation until a mutual decision was reached. Additionally, students' metaphors are categorized based on both the metaphors and their entailments, discerning positive, negative, or critical attitudes toward GenAI use in L2 learning, achieving a perfect inter-coder agreement rate of 100%.

4 Findings

The research team members transcribed and translated the data and categorized the metaphors by identifying naturally occurring themes. The following findings present the metaphors based on types of metaphors created ([Figure 1](#)) and learners' attitudes ([Figure 2](#)).

4.1 Quantitative findings

4.1.1 Types of metaphors created by L2 learners

The types of metaphors generated by EFL learners can be classified into six superordinate categories. The "Humans" category exhibits the highest frequency, with 148 instances, indicating a pronounced tendency among learners to anthropomorphize GenAI. The second most prevalent category, "Tool/Machine," comprises 87 instances, reflecting a perception of GenAI as a functional and instrumental entity. The remaining categories include "Brain" (eight instances), "Resources" (44 instances), "Food/Drink" (seven instances), and "Medicine" (four instances). This distribution of metaphorical constructs elucidates the diverse conceptualizations through which EFL learners understand and relate in GenAI.

4.1.2 Attitudes toward GenAI through metaphors

The analysis of participants' attitudes toward GenAI use in EFL learning reveals the following is as following distribution: 82% positive metaphors, 2% negative metaphors, and 16% critical metaphors. This distribution indicates a predominantly positive perception of GenAI among the language learners, with a significant portion adopting a critical perspective that weighs both the advantages and challenges. The notably low percentage of negative metaphors suggests minimal outright opposition to GenAI among the participants surveyed.

4.2 Qualitative findings

4.2.1 HUMANS metaphor

The analysis reveals 148 HUMANS metaphors provided by participants. Based on [Table 1](#), it is evident that individuals frequently conceptualize GenAI through metaphors associated with familiar human roles and relationships. These metaphors reflect how students relate to GenAI in ways that mirror human interactions, indicating a strong anthropomorphization of the technology. The specific metaphors and their entailments offer insight into the varied and complex roles that GenAI plays in the EFL learners' experiences.

GenAI is conceptualized as a supportive figure (assistant) that aids students in learning authentic expressions and assists in editing and refining articles. This suggests a perception of GenAI as a reliable helper that enhances the quality of their work and learning process. Moreover, GenAI is likened to an English teacher who provides localized sentences, corrects grammatical errors, and facilitates speaking practices. This metaphor indicates EFL learners' trust in GenAI to improve their language skills and provide immediate, constructive feedback, akin to a human instructor. Students characterize GenAI as a valuable aid in their academic work, improving the quality of language learning and providing practical assistance in editing and the comprehension of nuanced expressions.

Students describe GenAI as a friend who can be consulted for advice and support during challenging periods. While acknowledging the potential imperfections in GenAI's responses, they value its presence as a comforting listener and source of assistance, reflecting a significant emotional connection. The *Friend* metaphor suggests an emotional reliance on GenAI for support and advice, indicating that EFL learners value its presence beyond mere academic assistance.

GenAI is perceived as a highly knowledgeable and intelligent entity (personal advisor) that provides guidance across various aspects

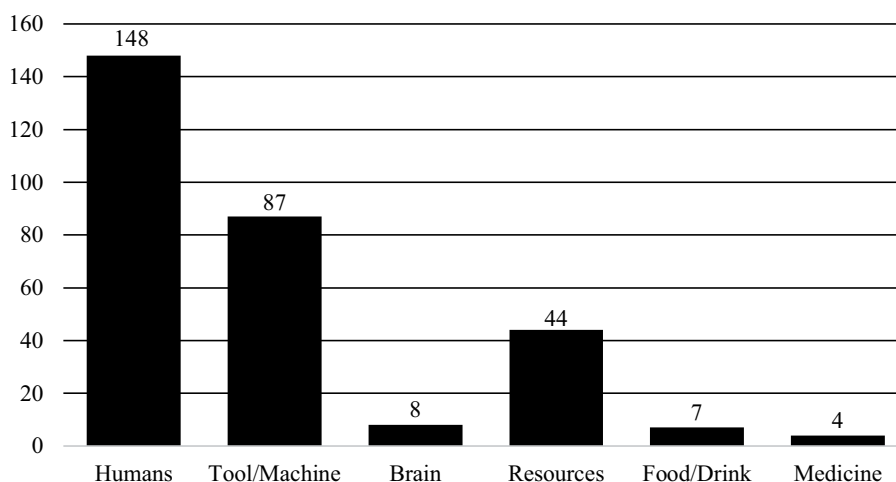


FIGURE 1
Different types of metaphors.

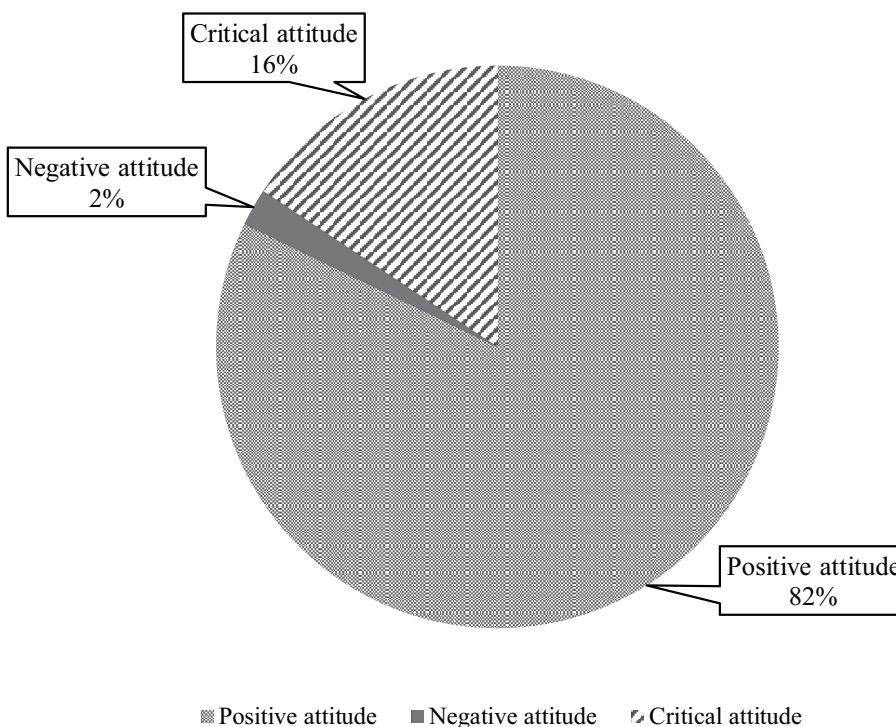


FIGURE 2
Students' attitudes toward GenAI use in L2 learning through metaphors.

of life. This metaphor implies that students view GenAI as a comprehensive resource capable of logical application and personalized responses, demonstrating a high level of trust in its capabilities. Viewing GenAI as a personal advisor reflects a high level of trust in its knowledge and intelligence, with students relying on it for comprehensive guidance and personalized responses.

Additionally, GenAI is conceptualized as a source of inspiration and wisdom (wiseman), providing novel perspectives and supplementing students' own thinking and writing. This metaphor

underscores the value EFL learners place on GenAI's ability to enhance their creativity and intellectual endeavors. The *Wiseman* metaphor indicates that students regard GenAI as a source of intellectual enrichment, providing new ideas and supplementing their learning with additional knowledge.

Overall, these metaphors and their entailments reveal that the students perceive GenAI as a multifaceted tool that plays critical roles in their academic and personal lives. The students regard it not only as a practical aid but also as a comforting presence and a source of

TABLE 1 Examples of HUMANS metaphors.

Metaphors	Frequency	Entailment
Assistant	41	GenAI can help me learn some very authentic expressions and assist me in editing and polishing articles.
English teacher	35	GenAI can provide more localized sentences to make my expressions closer to those of native speakers. They can help correct grammar mistakes and practice speaking with me. can promptly resolve any questions I have, practice English language usage with me, and provide corresponding suggestions.
Friend	30	When encountering difficulties, I can seek advice from GenAI (although what they provide may just be a bunch of nonsense). When I have negative emotions, I can treat them as a sounding board, and they will patiently reply (although what they say may also be a bunch of nonsense). When studying, if I have some questions, I may consult GenAI. For example, if a teacher asks us to read an article, I may use tools like GPT to search for background information about the article, the author, and other related materials (although sometimes what it generates is really hard to describe...).
Personal advisor	11	GenAI is exceptionally intelligent and incredibly knowledgeable, encompassing almost all knowledge and information in the English-speaking world, and capable of logically applying it to almost any scenario. Additionally, it can answer my questions, provide guidance, and adjust whenever I am dissatisfied.
Wiseman	10	GenAI can provide inspiration and additional knowledge at any time and place. It helps me come up with perspectives that I may not have thought of and supplements the theoretical shortcomings in my writing.

inspiration, indicating a predominately positive attitude toward its use in EFL learning.

4.2.2 TOOL/MACHINE metaphor

A total of 87 TOOL/MACHINE metaphors were elicited from students to gauge their perception of using GenAI in EFL learning. This category encapsulates their diverse experiences and expectations regarding its capabilities and limitations. The metaphorical constructs delineated in Table 2 illustrate the multifaceted aspects of EFL students' conceptualization of GenAI, revealing insights into its perceived strengths and weaknesses.

Students conceptualize GenAI as a resource (learning tool) that provides ideational support and assistance with English-related tasks, particularly when confronted with intellectual impasses. This conceptualization suggests that students perceive GenAI as a supportive tool that aids in overcoming obstacles and enhancing learning experiences. The metaphor of *translation machine* acknowledges GenAI's capability to provide accurate translations, highlighting its pivotal role in fostering language comprehension and communication. Students appreciate its efficacy in rendering accurate translations of texts, thus enhancing their grasp and acquisition of the target language. Consequently, students generally view GenAI as a useful tool that bolsters their learning by providing ideas, assistance, and precise translations. These metaphorical constructs reflect a positive attitude toward its utility in facilitating language-related tasks.

The metaphor of *The Thread Sewing Fabric* implies a perception of GenAI's textual production as a process of "stitching" together existing content, suggesting skepticism toward its creative faculties and autonomy in generating novel ideas. This metaphorical construct reflects a critical stance on GenAI's generative capabilities, highlighting its perceived limitations in producing genuinely original content. The students regarded the technology as a tool that reconfigures and amalgamates existing content rather than engendering original concepts.

GenAI is viewed as an entity capable of algorithmically producing analogous results based on integrated experiences, akin to navigational systems recommending routes. This metaphor emphasizes its role in summarizing information and broadening perspectives, while concurrently recognizing that the ultimate

decision on which learning path to pursue relies on human discernment. It underscores the importance of critical thinking and judicious evaluation of GenAI's responses. This metaphor indicates a balanced view that recognizes the value of GenAI's guidance while maintaining the necessity of critical thinking.

GenAI was metaphorized as a mobility aid for non-disabled individuals. This cautionary metaphor serves as an admonition about the potential dangers of indolence or dependency resulting from excessive reliance on GenAI. It emphasizes the significance of maintaining an equilibrium in GenAI usage, ensuring that it supplements rather than supplants human capabilities. The metaphor cautions about dependency which highlights concerns about becoming over-reliant on the technology in language learning. Students acknowledge the potential risks and emphasize the need to use GenAI as a supplement rather than a replacement for effort.

Additionally, GenAI was compared to an *airplane or anything high-reward but high-risk*. This metaphor recognizes the potential benefits of GenAI in expediting English learning, similar to how airplanes facilitate long-distance travel. However, it simultaneously highlights the importance of acknowledging GenAI's limitations and potential fallibilities, suggesting that while it can be highly advantageous, it also harbors risks that necessitates judicious management. This metaphor encapsulates the Janus-faced nature of GenAI, recognizing its substantial benefits for language learning while also acknowledging the potential for errors. It implies a need for meticulous oversight and cognizance of GenAI's constraints.

In sum, these TOOL/MACHINE metaphors illustrate a complex and multifaceted perception of GenAI among EFL learners, characterized by appreciation of its support and utility, critical awareness of its limitations, and an emphasis on the need for balanced and discerning use.

4.2.3 BRAIN metaphor

Eight BRAIN metaphors were identified, reflecting students' positive beliefs regarding the utilization of GenAI in EFL learning. These metaphorical constructs, encompassing *human brain*, *external brain*, and *super brain*, underscore students' perceptions of GenAI as a powerful cognitive amplifier that augments human intelligence and problem-solving prowess.

TABLE 2 Examples of TOOL/MACHINE metaphors.

Metaphors	Frequency	Entailment
Learning tool	30	GenAI can provide ideas and assists in English-related tasks. When my thoughts are blocked, the content provided by AI helps me break free from limitations.
Translation machine	25	GenAI is sometimes accurate in its translations.
Airplane or anything high-reward, high-risk	6	The advantages of GenAI invention are apparent, much like how airplanes greatly facilitate long-distance travel. Similarly, GenAI can greatly facilitate English learning. However, just as airplanes have a probability of accidents, GenAI can also make mistakes. Ignoring these errors could potentially lead to disastrous consequences.
A wheelchair for non-disabled individuals	3	GenAI may seem like a bit of an unnecessary extravagance, as I could do it myself, but I still seek GenAI assistance. It feels like I am just being lazy.
The thread sewing fabric	2	I feel that GenAI writing is a process of taking existing content and stitching it together, as GenAI does not possess subjective consciousness or the ability to write independently.
A map showing multiple routes to the destination	2	GenAI can algorithmically produce similar results for different processes based on integrated experiences. This process resembles intelligent maps recommending routes based on previously successful passages by people. For me, its role lies in summarizing experiences and expanding perspectives, while the judgment of whether the route can be smoothly traversed and is suitable for current needs still relies on human decision-making.

Equating GenAI to a human brain bespeaks students' conceptualization of it as a cognitive prosthesis capable of reducing mental exertion and enhancing efficiency. The comparison implies a perception of GenAI as an invaluable resource for streamlining cognitive tasks and heuristics processes, resembling the analytical and logical faculties of human cognition. This metaphor reflects a profound level of confidence in GenAI's analytical and logical capabilities.

Describing GenAI as an *external brain* reveals a belief in its capacity to proffer alternative perspectives and holistic solutions transcending individual cognitive boundaries. This metaphor suggests that students envision GenAI as a collaborative instrument that complements human intellect, offering diverse perspectives and refined approaches to complex challenges. EFL learners value GenAI's ability to complement their own cognitive processes, providing sophisticated strategies for various intellectual quandaries.

Comparing GenAI to a *super brain* underscores a conviction in its unparalleled capacity for information processing and organization. Students acknowledge its potential to manage voluminous data sets with remarkable efficiency, highlighting its role in enhancing their cognitive capabilities by providing expeditious and well-organized information. Students recognize its potential to swiftly and effectively navigate large data sets, thereby aiding language learning and problem-solving efforts.

To summarize, the BRAIN metaphors indicate a robust appreciation of GenAI's cognitive augmentation capabilities among students. They perceive it as an invaluable resource that enhances their intellectual capacities, provides diverse perspectives, and improves efficiency in language learning and problem-solving tasks. This positive attitude underscores the significant role that students believe GenAI can play in their academic and cognitive development, positioning it as a pivotal tool in their intellectual arsenal (Table 3).

4.2.4 RESOURCES metaphor

A total of 44 RESOURCES metaphors were provided by students, comparing GenAI to various informational tools or references. These metaphors underscore GenAI's ability to offer knowledge, assistance, and support across different contexts. Students perceive GenAI as an expansive source of information, acknowledging its efficiency and usefulness while also recognizing its limitations.

TABLE 3 Examples of BRAIN metaphors.

Metaphors	Frequency	Entailment
Human brain	5	Gen AI is comprehensive in analysis, with broad knowledge coverage and logical structure, resembling results obtained by human thought and search.
External brain	2	GenAI may offer a different perspective and potentially a more comprehensive and refined approach.
Super brain	1	GenAI can search through vast amounts of information and organize it effectively.

Students conceptualize GenAI as polymath capable of providing pertinent responses from multiple perspectives in a lucid and comprehensive manner. This metaphorical construct reflects their perception of GenAI as a vast repository of erudition, akin to an encyclopedia, offering detailed and multifaceted information across various domains. Students extol GenAI's capacity to furnish detailed and multi-perspective responses, drawing parallels to an encyclopedia tome. This metaphor indicates a high level of credence in GenAI's capacity to provide extensive and reliable information on an eclectic array of topics.

When confronted with unfamiliar topics or when concise English expressions is requisite, students gravitate toward GenAI for assistance. They envisage it as an instrument for generating outlines for articles and providing reference and succor, similar to the utilization of a compendium for guidance and support. The metaphor of a *reference book* emphasizes GenAI's role in offering guidance and assistance with recondite topics and generating outlines. EFL learners perceive it as an invaluable tool for clarifying concepts and organizing ideas.

GenAI is perceived as substantially improving the efficacy and celerity of information retrieval compared to individual forays into search engines. It facilitates more expeditious and comprehensive access to desired content, akin to unearthing essential information in a vast knowledge repository. This metaphor highlights its role in streamlining the learning process by providing swift access to relevant materials. The metaphorical

construct reflects EFL learners' appreciation of GenAI's ability to expedite their learning trajectory by providing rapid access to necessary materials.

Students acknowledge that while GenAI can proffer information for reference or as a foundation, it may not invariably be entirely veracious. This metaphor suggests a circumspect approach to utilizing GenAI, recognizing the need to critically evaluate its output and supplement it with other credible sources. This cautious stance underscores the importance of critical thinking and the need to corroborate information obtained from GenAI.

In summation, the RESOURCES metaphors depict GenAI as an indispensable instrument for language learning and research, esteemed for its extensive knowledge, efficiency, and support. However, students also recognize the paramount importance of critical evaluation and supplementing GenAI's output with other reliable sources to ensure veracity and comprehensiveness in their language learning endeavors. This balanced perspective reflects a sophisticated understanding of GenAI's potential and limitations in the educational sphere (Table 4).

4.2.5 FOOD/DRINK metaphor

Seven FOOD/DRINK metaphors are provided to describe GenAI, reflecting students' critical perceptions and beliefs regarding its utility and consumption. Identifying similar characteristics to *ice cream*, students conceptualized GenAI as a fount of intellectual delectation and academic sustenance, providing a source of satisfaction and fulfillment in their academic or everyday endeavors. However, there exists an awareness of moderation and caution, recognizing that excessive reliance on GenAI, akin to excessive ingestion of *ice cream*, may ultimately prove to be deleterious. Similarly, the juxtaposition to a *sports drink* highlights GenAI's role as an intellectual elixir, replenishing cognitive vigor and assisting the

completion of tasks, yet it is not deemed an absolute *sine qua non* for language learning. This metaphorical construct intimates that while students appreciate the convenience and assistance GenAI offers, they concomitantly understand that it cannot become a substitute for independent thinking and learning. Moreover, the comparison of GenAI to *pre-made meals* implies that although it provides readily accessible epistemic sustenance, students must still actively engage in the mastication and digestion of that knowledge to derive maximum benefit. Collectively, the gastronomic metaphors depict GenAI as a utilitarian and gratifying instrument, valued for its convenience and assistance in language learning. However, EFL learners also recognize the importance of balance, moderation, and active engagement in its application. The FOOD/DRINK metaphors emphasize a critical and contemplative approach to leveraging GenAI, ensuring that it complements language learners rather than supplant their independent thinking and learning trajectories (Table 5).

4.2.6 MEDICINE metaphor

The quartet of MEDICINE metaphors employed to describe GenAI reveals students' perceptions and beliefs regarding its role as an auxiliary and supportive entity. The Comparison of GenAI to *drugs* suggests that while it can provide temporary alleviation, it may be potentially harmful to the imagination and English proficiency longitudinally. This metaphor reflects a critical view of excessive reliance on GenAI, highlighting potential negative impacts on creativity and language skills. Resembling the attributes of *Ibuprofen*, students conceptualize GenAI as a panacea capable of ameliorating difficulties or challenges encountered in language learning pursuits. They acknowledge its effectiveness in addressing specific issues, such as writer's block or lack of clarity, and extol its capacity to provide relief. However, there persists an understanding that GenAI should not be solely relied upon as the lone viable solution. Just as *Ibuprofen* does not constitute a cure-all solution for all ailments, students recognize that GenAI's inherent limitations and its potential inadequacies in addressing underlying issues or promoting independent thinking. The metaphoric parallelism with a *quick-acting heart rescue pill*, a form of cardiac medication, underscores the urgency and importance students ascribe to GenAI's ability to expeditiously provide assistance and extricate them from dire academic struggles. Hence, the MEDICINE metaphors depict GenAI as a utilitarian and supportive instrument, valued for its ability to alleviate specific language learning challenges and provide swift assistance. However, EFL learners simultaneously recognize the need

TABLE 4 Examples of RESOURCES metaphors.

Metaphors	Frequency	Entailment
Encyclopedia	15	GenAI can provide users with relevant answers from multiple perspectives, in a clear and comprehensive manner.
Reference book	13	When faced with many things I do not understand, and when I want concise English, I can seek help directly from GPT. Besides that, I can also use GenAI to generate outlines for articles and so on, which can be helpful as reference and assistance.
Database	12	GenAI greatly improves efficiency and speed of retrieval compared to individually searching unfamiliar learning materials. It enables faster and more comprehensive access to desired content, akin to finding one's own nutrients in a vast knowledge repository.
A dictionary (immature version)	4	GenAI can provide some information for reference or as a basis, but it may not be entirely accurate.

TABLE 5 Examples of FOOD/DRINK metaphors.

Metaphors	Frequency	Entailment
Sports drink	3	A bottle of sports drink is effective for replenishing energy after exercise, but it is not a necessity; one can still live without drinking it.
Ice cream	2	It is delicious and enjoyable to eat, but consuming too much of it is not good for me.
Pre-made meals	2	It requires further processing by humans before they can be consumed.

for balance, critical thinking, and independent problem-solving in its employment. These metaphorical constructs emphasize a thoughtful and measured approach to utilizing GenAI, ensuring that it complements rather than supplants their academic efforts and skills in the language learning process (Table 6).

5 Discussion

The analysis of elicited metaphors produced by the Chinese L2 learners has suggested six conceptual themes. The most frequent conceptual metaphor, HUMAN, emphasizes the learners' perception of GenAI as human-like entities or entities with human-like qualities. The metaphorical theme underscores the learners' tendency to anthropomorphize GenAI, viewing it as possessing characteristics akin to humans, such as intelligence, assistance, and companionship, aligning with the sentiments of Anderson (2023) and Chatterjee and Dethlefs (2023). The prominence of the HUMAN metaphor suggests that learners conceptualize GenAI as active participants in their language learning journey, capable of providing guidance, support, and interaction similar to that of human counterparts. The finding discloses the learners' inclination to relate to GenAI on a human level, highlighting the significance of interpersonal dynamics and social interactions in their engagement with language learning technologies, which echo the sentiments of Yan (2024). The subcategories of the HUMAN metaphors allude to the specific roles and responsibilities learners perceive GenAI satisfy in their language learning pursuits.

The *English teacher* role indicates that GenAI has assumed the responsibilities of instructors in the language learning process, which is in line with the findings proposed by Kim and Su (2020), indicating that students hold a generally positive attitude to AI in language learning. The *Assistant* role prescribed to GenAI by the respondents, though exhibiting similarities in the entailments of the *English teacher*, presents a variance in the power dynamic between the instructor and technology. The *English teacher* conceptualization elevate the power of GenAI to an equal status of the instructor and above the student, which emphasizes a more dominant and authoritative presence in the classroom (Wan et al., 2011). Contrastively, the *Assistant* conceptualization lowers GenAI's power status below the learner and instructor, affirming its role as support to the teacher and the learning process. As noted by Lim et al. (2023), the findings potentially reflect the teacher's competence relating to GenAI application in curriculum development and characteristics of educational settings. Lim et al. (2023) suggested that despite the

technology being positively perceived by teachers, its application remains difficult for teachers to master due to insufficient expertise in computer science, which, consequently, may relegate GenAI to a supportive role. Additionally, in classrooms that emphasize an interactive dynamic, speaking-oriented EFL courses, GenAI are perceived as assistive teaching agents that support classroom practices and permit teachers to focus on qualitative interactions with language learners. Thus, the perception of respondents may be attributed to the teacher's competence for interpreting GenAI's pedagogical role in language learning environments. Furthermore, the *Wiseman* and *Personal Advisor* roles conceptualized by the respondents align with the notion of Chatterjee and Dethlefs (2023) which conceptualizes GenAI as a *philosopher* and *guide*. The respondents attach responsibilities to GenAI that extend beyond the fundamentals of language learning, operating the model as an encyclopedic source for worldly knowledge usurping the responsibilities of other disciplines in the humanities and sciences. The *Friend* metaphor indicate the formation of emotional attachments by the learners to GenAI that breach the standard ethical limitations of human and machine which presents an increasingly realistic scenario of perceived machine consciousness which is enhanced by the belief of humans that GenAI are embodying more humanistic characteristics and traits.

Similarly, the intelligent functions of GenAI have been implied in the conceptual metaphor of "BRAIN" metaphors, highlighting learners' perceptions of GenAI's cognitive capabilities and functions akin to those of the human brain, supporting the sentiments of Carbonell et al. (2016). It extends from the traditional metaphorical comparison of *computational systems* to *brains*, and considers the brain as a distinctive selectional system which is capable of understanding the environment by emphasizing experiences. By comparing the parallels between GenAI and the human brain, learners emphasize the technology's role in facilitating learning processes, streamlining tasks, and enhancing cognitive functions related to language learning (Barrot, 2023). Metaphors of this classification underscore language learners' recognition of GenAI as a powerful cognitive resource that holds capacities equivalent to their own cognitive abilities, aiding them in accessing, analyzing, and synthesizing linguistic information more efficiently as an agent of equitable competence. Through these metaphors, it appears that language learners attribute agency, personality, or social roles to GenAI as suggested by Yan (2024), and seeks to establish a sense of familiarity, trust, or relatability, thereby prompting heightened engagement with and acceptance of the technology (Jeon, 2024). However, suggesting GenAI possesses characteristics resembling of the human brain may indicate precarious implicit assumptions. Although the responses demonstrate a positive attitude and explanations, it perilously insinuates that GenAI and the human brain, an organ that distinctively defines human existence, are cognitively interchangeable. The findings echo the concerns posited by Janssen et al. (2020) and Keyes et al. (2021) which indicate a constraint to the development of critical thinking in language learners by means of restricting access to well-rounded information and personalization limits.

While humans-oriented metaphors tend to emphasize familiarity, trust, and relatability with GenAI, in the "TOOL/MACHINE" and "RESOURCES" metaphors, learners view GenAI primarily as a functional tool or resource, highlighting its instrumental role in achieving specific language learning goals. Similarly noted by Anderson (2023), the comparison draws on GenAI's capability to

TABLE 6 Examples of MEDICINE metaphors.

Metaphors	Frequency	Entailment
Drugs	2	GenAI (in English learning) can just provide temporary pleasure but are harmful to imagination and English proficiency.
Ibuprofen	1	It can provide assistance and alleviate pain, but it should not be relied upon as a sole solution.
Quick-acting heart rescue pill	1	GenAI saves me from nights of incoherent speech, inability to express myself, and lack of ideas while doing homework.

reduce rote operations, support creativity, and enhance practice opportunities for language learners. It is viewed as a mechanical appendage by which its effectiveness is dependent on the operator. The pragmatic perspective may yield more critical attitudes as learners evaluate GenAI's effectiveness, reliability, and impact on learning outcomes. The learners may scrutinize its utility, efficiency, and practicality, assessing whether GenAI realistically enhances the language learning experience or poses potential limitations or drawbacks. As suggested by Pavlik (2023), the critical attitudes toward GenAI use may stem from concerns about overreliance, dependency, or the limitations of AI's capacity to replicate human-like language or behavior. While recognizing the benefits of GenAI in providing assistance and support, learners remain cautious of its shortcomings or the risk of substituting genuine language learning experiences with technology-mediated interactions, a sentiment indicated by Casal and Kessler (2023).

From a more cautious perspective, the FOOD/DRINK and MEDICINE metaphors serve as reminders of the potential risks and limitations associated with GenAI use in learning contexts, exemplifying a critical attitude toward GenAI. The FOOD/DRINK metaphors, which juxtapositions GenAI to *ice cream*, suggests that while GenAI can offer immediate gratification and assistance, excessive reliance on the technology may ultimately result in detrimental behavioral traits, dependency, and hinder the development of critical thinking skills, echoing the concerns of Casal and Kessler (2023). The *ice cream* metaphor indicate that language learners are aware that indulgence in the item may produce short-term gratification, resembling GenAI's immediate resolution to a personalized inquiry regarding a learning task. However, over-ingestion could negatively affect an individual's physical health, promoting a reliance on GenAI that may impede students' ability to foster independent thinking and engage deeply with the learning materials. Meanwhile, the *sports drinks* metaphor illustrates that the utilization of GenAI is capable of creating overall benefits, yet, it is not a necessity for the completion of learning tasks. The respondents displayed limited awareness of GenAI's disruptive nature in language learning, as previous literature have sufficiently highlighted (Fathi et al., 2024), which to suggest the technology have yet to pervasively influence the behaviors and impact the surrounding environments of the respondents, as posited by Carbonell et al. (2016). Additionally, it could potentially be a consequence of regional accessibility issues, as noted Luo et al. (2024). The perception of GenAI may be further attributed to unfamiliarity and limited skill competence that EFL instructors demonstrated with its incorporation into language learning, as suggested by Lim et al. (2023). The subcategory of pre-made meals reiterates the importance of the human function in the comparison, akin to the sentiments provided by Anderson (2023) relating to the TOOL metaphors.

The MEDICINE metaphor, tantamount in nature to FOOD/DRINK metaphors, portrays GenAI as a remedy or "quick fix" for academic challenges, such as writer's block or lack of clarity. The responses suggest that while GenAI can provide "relief," overconsumption may result in abated effectiveness and dependency, potentially stifling an individual's propensity for creativity beyond the confines of GenAI's prompts and responses, sentiments echoed by Luo et al. (2024). Respondents expressed a critical attitude, advocating that GenAI should be applied judiciously and in moderation, similar to medication, as excessive reliance may mask underlying issues or inhibit students' ability to develop essential cognitive skills. Such perceptions are representative of the participants' reasoning and thinking as noted

by Shaw et al. (2021). However, the subcategories demonstrate a level of discrepancy relating to the concept of "relief" provided by GenAI, specifically the conceptualizations of *Ibuprofen* and *Quick-acting heart rescue pill*. Whereas the conceptualization of *Ibuprofen*, pain-relief medication, emphasizes the alleviation of pain to minimize suffering endured during the completion of challenging tasks, the subcategory of *Quick-acting heart rescue pill*, a cardiac medication, accentuates the urgency of the tasks and the severity of potential consequences. In essence, the MEDICINE metaphors caution against the uncritical use of GenAI in learning contexts and emphasize the importance of maintaining a balanced approach. The findings align with the notions proposed by Luo et al. (2024), suggesting that while GenAI can offer valuable assistance and support, it is essential to raise awareness among instructors and students about the functionalities of GenAI. Moreover, it is imperative to ensure all parties remain vigilant regarding the technology's limitations and strive to develop independent thinking and problem-solving skills, recognizing its increased application heightens the importance to these traits for the future.

Cumulatively, the differences in attitudes toward GenAI use in L2 learning across various metaphors reflect the complexity of learners' perceptions and interpretation of events. These attitudes are shaped by the conceptualization of GenAI's role, functionality, and potential impact on the language learning journey, particularly within the educational environment of current Chinese EFL learners in higher education (Schmitt, 2005). These nuances highlight the importance of considering learners' diverse perspectives and attitudes, and insights into sociocultural background, way of thinking, sense of identity, underlying realities and underlying motivations toward technology integration in language education (Oxford et al., 2014).

5.1 Implications

These findings offer several implications for L2 teaching practices. Firstly, educators should prioritize promoting critical thinking by encouraging students to evaluate GenAI-generated content actively (Zhou et al., 2023). This practice involves guide students to remain skeptical and question the accuracy and reliability of information provided by AI tools (Barrot, 2023). Secondly, curriculums should incorporate the development of AI literacy, as prevalent application of GenAI involves a pedagogical shift toward perfecting inquiry skills, a necessity induced by the technology's prompt-oriented design (Luo et al., 2024). Additionally, engagement with GenAI should be promoted, encouraging students to actively participate in the learning process rather than passively relying on AI assistance (Yan, 2024). Teachers can achieve this objective by designing activities that require students to interact with and analyze AI-generated content. Thirdly, a balanced approach to technology integration is essential to ensure that GenAI is used as a supplementary tool rather than a replacement for traditional learning methods. Educators should emphasize the importance of combining AI resources with other learning strategies to foster comprehensive language development and maintain language learning motivations (Luo et al., 2024). Additionally, addressing practice based ethical concerns related to GenAI use, such as plagiarism and intellectual property rights, should be incorporated into the curriculum through discussions and activities (Casal and Kessler, 2023). While GenAI can provide valuable support, it should not overshadow students' own agency and autonomy in the learning process. Empowering students to take ownership of their learning

journey involves instructions on the responsible manner to effectively utilize GenAI as a resource while emphasizing the importance of independent thinking and learning skills (Luo et al., 2024). Furthermore, educators, when integrating GenAI into curriculums, are to be aware of certain socio-economic, cultural, and geographical limitations, which could potentially manifest in social injustice scenarios and negation of pluralistic values. This issue requires educators to ensure the technology's accessibility for the entire student population so as to avoid granting an unjust competitive edge and hinder the democratization of knowledge (Lim et al., 2023). By implementing these concrete strategies, educators are able to optimize the benefits of GenAI in L2 learning while preparing students for responsible and effective use of technology in their academic pursuits.

5.2 Limitations and suggestions for future research

Limitations of the current study include the sample size and scope, as it focused solely on Chinese L2 learners' perceptions of GenAI in English learning. Future research could expand the investigation to include diverse learner populations and languages to provide a more comprehensive understanding of GenAI's impact on language learning. Additionally, longitudinal studies could be conducted to examine the long-term effects of GenAI integration in language learning environments. Furthermore, exploring the role of contextual factors such as educational settings, instructional methods, and technological infrastructure on learners' perceptions and experiences with GenAI would provide valuable insights. Methodologically, employing mixed-methods approaches combining qualitative interviews with quantitative surveys could offer deeper insights into learners' attitudes, beliefs, and behaviors regarding GenAI use. Finally, investigating the effectiveness of pedagogical interventions aimed at promoting responsible and effective use of GenAI in language learning contexts could inform the development of evidence-based instructional practices.

6 Conclusion

In conclusion, this study explored Chinese L2 learners' perceptions of GenAI in English language learning through metaphorical expressions. The findings revealed that learners conceptualize GenAI in diverse ways, ranging from viewing it as a helpful assistant to a powerful tool, a source of inspiration, and even a potential threat. While some learners appreciate the convenience and assistance provided by GenAI, others express caution regarding overreliance and the potential loss of critical thinking skills. These perceptions are reflected in metaphors related to human entities, tools/machines, brains, resources, and food/drink. The study underscores the need for educators to consider learners' diverse attitudes and beliefs toward GenAI when integrating it into language learning contexts. It also

highlights the importance of fostering critical thinking skills and promoting responsible GenAI use to ensure optimal learning outcomes.

Data availability statement

The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding authors.

Ethics statement

Ethical review and approval was not required for the study on human participants in accordance with the local legislation and institutional requirements. Written informed consent from the patients/participants or patients/participants legal guardian/next of kin was not required to participate in this study in accordance with the national legislation and the institutional requirements.

Author contributions

YY: Writing – original draft, Writing – review & editing. WS: Writing – original draft, Writing – review & editing. XZ: Funding acquisition, Project administration, Supervision, Writing – review & editing.

Funding

The author(s) declare that financial support was received for the research, authorship, and/or publication of this article. This study was supported by the General Project of Ministry of Education Foundation on Humanities and Social Sciences Grant number: 21YJA740055.

Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Publisher's note

All claims expressed in this article are solely those of the authors and do not necessarily represent those of their affiliated organizations, or those of the publisher, the editors and the reviewers. Any product that may be evaluated in this article, or claim that may be made by its manufacturer, is not guaranteed or endorsed by the publisher.

References

- Amin, T. G. (2015). Conceptual metaphor and the study of conceptual change: research synthesis and future directions. *Int. J. Sci. Educ.* 37, 966–991. doi: 10.1080/09500693.2015.1025313
- Anderson, S. S. (2023). "Places to stand": multiple metaphors for framing ChatGPT's corpus. *Comput. Compos.* 68:102778. doi: 10.1016/j.compcom.2023.102778
- Armstrong, S. L. (2008). Using metaphor analysis to uncover learners' conceptualizations of academic literacies in postsecondary developmental contexts. *Int. J. Learn.* 15, 211–218. doi: 10.18848/1447-9494/CGP/v15i09/45948
- Baidoo-Anu, D., and Ansah, L. O. (2023). Education in the era of generative artificial intelligence (AI): understanding the potential benefits of ChatGPT in

- promoting teaching and learning. *SSRN Electron. J.* 7, 52–62. doi: 10.2139/ssrn.4337484
- Barrot, J. S. (2023). Using ChatGPT for second language writing: pitfalls and potentials. *Assess. Writ.* 57:100745. doi: 10.1016/j.asw.2023.100745
- Bishop, L. (2023). A computer wrote this paper: what ChatGPT means for education, research, and writing. *Res. Writ.* doi: 10.2139/ssrn.4338981
- Cameron, L., and Low, G. (1999). Metaphor. *Lang. Teach.* 32, 77–96. doi: 10.1017/S0261444800013781
- Cameron, L., and Maslen, R. (2010). *Metaphor analysis*. London: Equinox.
- Carbonell, J., Sánchez-Esguevillas, A. J., and Carro, B. (2016). The role of metaphors in the development of technologies. The case of the artificial intelligence. *Futures*. 84, 145–153. doi: 10.1016/j.futures.2016.03.019
- Casal, J. E., and Kessler, M. (2023). Can linguists distinguish between ChatGPT/AI and human writing? A study of research ethics and academic publishing. *Res. Methods Appl. Ling.* 2:100068. doi: 10.1016/j.rmal.2023.100068
- Chai, C. S., Lin, P.-Y., Jong, M. S.-Y., Dai, Y., Chiu, T. K. F., and Qin, J. (2021). Perceptions of and behavioral intentions towards learning artificial intelligence in primary school students. *Educ. Technol. Soc.* 24, 89–101. doi: 10.2307/27032858
- Chatterjee, J., and Dethlefs, N. (2023). This new conversational AI model can be your friend, philosopher, and guide ... and even your worst enemy. *Pattern* 4:100676. doi: 10.1016/j.patter.2022.100676
- Cortazzi, M., and Jin, L. (2020). “Elicited metaphor analysis: researching teaching and learning” in *Handbook of qualitative research in education*. eds. M. R. Ward and S. Delamont (Cheltenham: Edward Elgar Publishing), 488–505.
- de Guerrero, M. C. M., and Villamil, O. S. (2002). Metaphorical conceptualizations of ESL teaching and learning. *Lang. Teach. Res.* 6, 95–120. doi: 10.1191/1362168802lr101oa
- Dincer, A. (2017). EFL learners’ beliefs about speaking English and being a good speaker: a metaphor analysis. *Univ. J. Educ. Res.* 5, 104–112. doi: 10.13189/ujer.2017.050113
- Dörnyei, Z. (2002). “The motivational basis of language learning tasks” in *Individual differences in second language acquisition*. ed. P. Robinson (John Benjamins: Amsterdam), 137–158.
- Erdogan, T., and Erdogan, Ö. (2013). A Metaphor Analysis of the Fifth Grade Students’ Perceptions about Writing? *Asia Pac. Educ. Rev.* 22, 347–355. doi: 10.1007/s40299-012-0014-4
- Farrell, T. S. C. (2011). Exploring the professional role identities of experienced ESL teachers through reflective practice. *System* 39, 54–62. doi: 10.1016/j.system.2011.01.012
- Fathi, J., Rahimi, M., and Derakhshan, A. (2024). Improving EFL learners’ speaking skills and willingness to communicate via artificial intelligence-mediated interactions. *System* 121:103254. doi: 10.1016/j.system.2024.103254
- Fryer, L. K., Nakao, K., and Thompson, A. (2019). Chatbot learning partners: connecting learning experiences, interest, and competence. *Comput. Hum. Behav.* 93, 279–289. doi: 10.1016/j.chb.2018.12.023
- Gao, F., and Tay, D. (2023). Metaphor use in describing English public speaking anxiety by Chinese university EFL learners. *System* 118:103091. doi: 10.1016/j.system.2023.103091
- Guo, K., and Wang, D. (2023). To resist it or to embrace it? Examining ChatGPT’s potential to support teacher feedback in EFL writing. *Educ. Inf. Technol.* 29, 8435–8463. doi: 10.1007/s10639-023-12146-0
- Hawking, S. (2014). Stephen Hawking: ‘AI could spell end of the human race’. BBC News. Available at: <https://www.bbc.com/news/technology-30290540>
- Hwang, W. Y., Nurtantiana, R., Lai, Y. F., Chiang, I. C. N., Ghenia, G., and Tsai, M. H. M. (2023). “The combination of recognition technology and artificial intelligence for questioning and clarification mechanisms to facilitate meaningful EFL writing in authentic contexts” in *Innovative technologies and learning: ICITL 2023*. Lecture Notes in Computer Science. eds. Y. M. Huang and T. Rocha, vol. 14099 (Cham: Springer).
- Janssen, M., Hartog, M. H. D., Matheus, R., Ding, A. Y., and Kuk, G. (2020). Will algorithms blind people? The effect of explainable AI and decision-makers’ experience on AI-supported decision-making in government. *Soc. Sci. Comput. Rev.* 40, 478–493. doi: 10.1177/0894439320980118
- Jeon, J. (2024). Exploring AI chatbot affordances in the EFL classroom: young learners’ experiences and perspectives. *Comput. Assist. Lang. Learn.* 37, 1–26. doi: 10.1080/09588221.2021.2021241
- Jin, L., and Cortazzi, M. (2011). “More than a journey: “learning” in the metaphors of Chinese students and teachers” in *Researching Chinese learners: Skills, perceptions and intercultural adaptations* (Houndmills: Palgrave Macmillan).
- Kasneci, E., Sessler, K., Küchemann, S., Bannert, M., Dementieva, D., Fischer, F., et al. (2023). ChatGPT for good? On opportunities and challenges of large language models for education. *Learn. Ind. Diff.* 103:102274. doi: 10.1016/j.lindif.2023.102274
- Keyes, O., Hitzig, Z., and Blell, M. (2021). Truth from the machine: artificial intelligence and the materialization of identity. *Interdiscip. Sci. Rev.* 46, 158–175. doi: 10.1080/03080188.2020.1840224
- Kim, A., and Su, Y. (2024). How implementing an AI chatbot impacts Korean as a foreign language learners’ willingness to communicate in Korean. *System* 122:103256. doi: 10.1016/j.system.2024.103256
- Lakoff, G. (1993). “The contemporary theory of metaphor” in *Metaphor and thought*. ed. A. Ortony. 2nd ed (Cambridge: Cambridge University Press).
- Lakoff, G., and Johnson, M. (1980). *Metaphors we live by*. Chicago, IL: University of Chicago Press.
- Li, E., Li, S., and Yuan, X. (2022). “Adoption and perception of artificial intelligence technologies by children and teens in education” in *International conference on human-computer interaction* (Cham: Springer International Publishing), 69–79.
- Liang, J. C., Hwang, G. J., Chen, M. R. A., and Darmawansah, D. (2023). Roles and research foci of artificial intelligence in language education: an integrated bibliographic analysis and systematic review approach. *Interact. Learn. Environ.* 31, 4270–4296. doi: 10.1080/10494820.2021.1958348
- Lim, E. M. (2023). Metaphor analysis on pre-service early childhood teachers’ conception of AI (artificial intelligence) education for young children. *Think. Skills Creat.* 51:101455. doi: 10.1016/j.tsc.2023.101455
- Lim, W. M., Gunasekara, A., Pallant, J. L., Pallant, J. I., and Pechenkina, E. (2023). Generative AI and the future of education: Ragnarök or reformation? A paradoxical perspective from management educators. *Int. J. Manage. Educ.* 21:100790. doi: 10.1016/j.ijme.2023.100790
- Luo, W., He, H., Liu, J., Berson, I. R., Berson, M. J., Zhou, Y., et al. (2024). Aladdin’s genie or Pandora’s box for early childhood education? Experts chat on the roles, challenges, and developments of ChatGPT. *Early Educ. Dev.* 35, 96–113. doi: 10.1080/10409289.2023.2214181
- McGrath, I. (2006). Using insights from teachers’ metaphors. *J. Educ. Teach.* 32, 303–317. doi: 10.1080/02607470600782443
- Mertala, P., Fagerlund, J., and Calderon, O. (2022). Finnish 5th and 6th grade students’ pre-instructional conceptions of artificial intelligence (AI) and their implications for AI literacy education. *Comput. Educ. Artif. Int.* 3:100095. doi: 10.1016/j.caeai.2022.100095
- Miles, M. B., and Huberman, A. M. (1994). *Qualitative data analysis*. Thousand Oaks, CA: Sage.
- Nguyen, C. D. (2016). Metaphors as a window into identity: a study of teachers of English to young learners in Vietnam. *System* 60, 66–78. doi: 10.1016/j.system.2016.06.004
- Oxford, R. L., Griffiths, C., Longhini, A., Cohen, A. D., Macaro, E., and Harris, V. (2014). Experts’ personal metaphors and similes about language learning strategies. *System* 43, 11–29. doi: 10.1016/j.system.2014.01.001
- Pavlik, J. V. (2023). Collaborating with ChatGPT: considering the implications of generative artificial intelligence for journalism and media education. *J. Mass Commun. Educ.* 78, 84–93. doi: 10.1177/10776958221149577
- Rudolph, J., Tan, S., and Tan, S. (2023). ChatGPT: bullshit spewer or the end of traditional assessments in higher education? *J. Appl. Learn. Teach.* 6, 1–22. doi: 10.1093/oso/9780192867193.003.0001
- Saban, A., Koçbeker, B. N., and Saban, A. (2007). Prospective teachers’ conceptions of teaching and learning revealed through metaphor analysis. *Learn. Instr.* 17, 123–139. doi: 10.1016/j.learninstruc.2007.01.003
- Schmitt, R. (2005). Systematic metaphor analysis as a method of qualitative research. *Qual. Rep.* 10, 358–394. doi: 10.46743/2160-3715/2005.1854
- Shaw, D., Parsons, S. C., and Vasinda, S. (2021). Collaborative metaphor analysis research methodology: a retrospective self-study. *Qual. Rep.* 26, 3091–3111. doi: 10.46743/2160-3715/2021.4743
- Stokel-Walker, C. (2023). ChatGPT listed as author on research papers: many scientists disapprove. *Nature* 613, 620–621. doi: 10.1038/d41586-023-00107-z
- Su, J., and Yang, W. (2023). Unlocking the power of ChatGPT: a framework for applying generative AI in education. *ECNU Rev. Educ.* 6, 355–366. doi: 10.1177/20965311231168423
- Tabata-Sandom, M., Nishikawa, Y., and Ishii, D. (2020). Metaphorical conceptualizations of language learning by post-tertiary learners of Japanese. *System* 94:102335. doi: 10.1016/j.system.2020.102335
- Tobin, K. (1990). Changing metaphors and beliefs, a master switch for teaching? *Theory Pract.* 29, 122–127. doi: 10.1080/00405849009543442
- van Dis, E. A., Bollen, J., Zuidema, W., van Rooij, R., and Bockting, C. L. (2023). ChatGPT: five priorities for research. *Nature* 614, 224–226. doi: 10.1038/d41586-023-00288-7
- Wan, W. (2014). Constructing and developing ESL students’ beliefs about writing through metaphor: an exploratory study. *J. Second. Lang. Writ.* 23, 53–73. doi: 10.1016/j.jslw.2014.01.002
- Wan, W., Low, G. D., and Li, M. (2011). From students’ and teachers’ perspectives: metaphor analysis of beliefs about EFL teachers’ roles. *System* 39, 403–415. doi: 10.1016/j.system.2011.07.012
- Wang, X., Sanders, H. M., Liu, Y., Seang, K., Tran, B. X., Atanasov, A. G., et al. (2023). ChatGPT: promise and challenges for deployment in low-and middle-income countries. *Lancet Reg. Health Western Pac* 41:100905. doi: 10.1016/j.lanwpc.2023.100905
- Wegner, E., Burkhart, C., Weinhuber, M., and Nückles, M. (2020). What metaphors of learning can (and cannot) tell us about students’ learning. *Learn. Individ. Differ.* 80:101884. doi: 10.1016/j.lindif.2020.101884
- White, J., Fu, Q., Hays, S., Sandborn, M., Olea, C., Gilbert, H., et al. (2023). A prompt pattern catalog to enhance prompt engineering with ChatGPT. arXiv. doi: 10.48550/arXiv.2302.11382

- Yan, D. (2023). Impact of ChatGPT on learners in a L2 writing practicum: an exploratory investigation. *Educ. Inf. Technol.* 28, 13943–13967. doi: 10.1007/s10639-023-11742-4
- Yan, D. (2024). Feedback seeking abilities of L2 writers using ChatGPT: a mixed method multiple case study. *Kybernetes*. doi: 10.1108/K-09-2023-1933
- Yang, H., Gao, C., and Shen, H. Z. (2023). Learner interaction with, and response to, AI-programmed automated writing evaluation feedback in EFL writing: an exploratory study. *Educ. Inf. Technol.* 29, 3837–3858. doi: 10.1007/s10639-023-11991-3
- Yu, S., Yuan, K., and Wu, P. (2023). Revisiting the conceptualizations of feedback in second language writing: a metaphor analysis approach. *J. Second Lang. Writ.* 59, 100961. doi: 10.1016/j.jslw.2022.100961
- Zhao, X. (2023). Leveraging artificial intelligence (AI) technology for English writing: introducing wordtune as a digital writing assistant for EFL writers. *RELC J.* 54, 890–894. doi: 10.1177/00336882221094089
- Zhou, T., Cao, S., Zhou, S., Zhang, Y., and He, A. (2023). Chinese intermediate English learners outdid ChatGPT in deep cohesion: evidence from English narrative writing. *System* 118:103141. doi: 10.1016/j.system.2023.103141