Received: 8 May 2026 | Revised: 3 August 2026 | Accepted: 30 August 2026 | Published online: 15 September 2026

RESEARCH ARTICLE

Artificial Intelligence and Applications
2026, Vol. 00(00) 1–10
DOI: 10.47852/bonviewAIA620210330

BON VIEW PUBLISHING

Cognitive Re-Embodiment of AI in EFL Learning: Shifting from Abstract Tools to Interactive Learning Forces

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Abstract: The paper examines the cognitive dilemma that exists between the embodied human cognition and disembodied nature of artificial intelligence (AI) in English as a foreign language education. While most current studies in computer-assisted language learning have been quantitative in nature, this study takes a qualitative, phenomenological perspective to examine the processes that learners go through when interpreting and parsing the AI-driven digital space. The study, based on metaphor-led discourse analysis of the students' narratives at the university, shows that three main image schemas exist in the conceptual system of the students as follows: Container, Path, and Force. A descriptive categorical analysis was used to explore the distribution of image schemas in each coded interaction state (Flow and Stagnation). Due to the nested design of multiple-metaphor mentions within one participant, the findings indicated patterns of association between metaphoric schemas and learners' reported interaction experiences, but their interpretations were made with caution. The results also indicate that learners experience cognitive re-embodiment in mapping abstract algorithmic interactions onto the concrete constraints of space, motion, and experiences of effort and resistance. These metaphorical representations can be important in bridging the embodied experience of humans and the virtual experience mediated by AI. The paper suggests a cognitively congruent way of designing AI that sets a new trend in the development of more natural and humanistic methods of language learning that are not only more cognitively compatible with the human learner but also more functional.

Keywords: embodied cognition, image schemas, metaphor-led discourse analysis, CALL

1. Introduction

The collaboration of the human mind and digital technology is a change in education in the contemporary world. Individuals believe that the application of artificial intelligence (AI) in language learning is a phenomenon since it is effective in working with computers [1]. It also complicates matters as people cannot communicate in a natural manner. Language does not mean sending symbols to each other; it is something that we experience with our bodies, and it takes place in the actual world [2]. When individuals who are learning English as a foreign language (EFL) take time practicing language in online forums, it becomes a problem. The human mind requires to communicate with the world, but computers are only familiar with rules and codes. This is an issue for the human mind and digital technology. The human mind and digital technology are highly different. This difference is important for people who are learning EFL. This study leaves behind the traditional and performance-focused critiques to examine the mental processes that learners engage in attempting to reduce this gap, exploring how the human mind re-fleshes the virtual space in the context of embodied cognition.

Integrating a critical metaphor analysis framework with a chain-of-thought-based prompt engineering technique and the ChatGPT-4.0 Python environment to highlight the metaphorical skills used in the political President Donald Trumps' political speeches, Meng, Li, and Sun [3] revealed the emotional resonance in the four speeches delivered by the president, using the three schemas of metaphors: Movement, Direction, and Force. Furthermore, the study reflected Trump's metaphorical skills

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that showed the "national progress, political strength, and social transformation, thereby enhancing the persuasive impact of his speeches" [3].

Computer-assisted language learning (CALL) is frequently evaluated according to such measures as the increase of proficiency and the involvement statistics [4]. This emphasis leaves a considerable gap in theoretical space: that of the learner's subjective cognitive architecture [5]. Cognitive linguistics assumes that language is rooted in sensorimotor experience and organized by image schemas-pre-conceptual patterns such as Container, Path, and Force, which arise through bodily interactions [6]. Nevertheless, the interface of AI is delimited by the absence of physical presence as the interface of human dialogue is traditionally based on shared space and tactile signals. This research paper is about how English as a foreign language learners or EFL learners can connect their experiences in the world to their online learning. Given the fact that EFL learners are unable to engage their bodies in interactions, they need to find ways of making sense of those interactions. We are interested in enabling EFL students to make strides in their acquisition of languages without any need to forget how people learn languages naturally. EFL students must somehow manage to make online learning effective concerning the way their brains and bodies learn English as a language.

In turn, this investigation aims at opening the inner world of the cognitive processes of university EFL students by isolating the metaphorical language and image schema in the context of their narratives. By answering three critical research questions toward identifying the metaphorical lenses through which AI synergy is conceptualized, the dominance of certain image schemas in the discourse of learners, and the effect of AI disembodiment on the agency of learners, the study answers three pivotal research questions. By doing so, the research will have moved past a purely functional conception of technology to question the psychological reality of learning in a virtual vacuum in order to find out how the human mind can continue to exercise its embodied integrity when confronted with an algorithmic interlocutor.

This research is important because it promotes a cognitively aligned mindset toward AI design and pedagogy. It offers a needed empirical bridging of a necessary component of the Cognitive CALL framework, which explores the plasticity of embodied cognition in virtual environments. In addition, it provides AI developers with a template for how to progress beyond the speed of algorithms to interfaces that are much more metaphorical. Finally, it is through re-centering the human element that this study provides EFL practitioners and policymakers with a window into the mental conceptualization of AI in the mind of a student. It recommends a paradigm of digital literacy that would not guarantee the push toward automation at the expense of authentic, embodied learning and therefore preserve the humanistic values at the core of the linguistic experience. In short, this research is designed as a technical and conceptual contribution to the field of CALL. It qualitatively investigated the phenomenon of learners interacting with AI interfaces by analyzing empirical data from EFL learning and comparing these empirical elements to valuable pedagogical outcomes. The focus of this study is technical-empirical rather than a review/survey due to the proposed framework of the metaphor-led discourse analysis (MLDA) in the scope of an EFL interaction for the purposes of AI.

2. Significance of the Study: Toward a Cognitively Aligned Pedagogy

The importance of this study is that, unlike the previous paradigm that has dominated the assessment of AI in education, this study critically departs from the earlier paradigm. This study, based on its emphasis on a human-centric analysis of the cognitive-linguistic bond between learner and machine, will offer a crucial intervention that goes beyond performance-based measures to address the embodied quality of the mind. To scholars of Applied Linguistics, this work can contribute to the growing body of work in the area of Cognitive CALL by providing empirical and qualitative richness to the application of embodied cognition theory in the digital space. It successfully fills a critical theoretical gap, extending contemporary work on embodied cognition and metaphor into the digital age by questioning how metaphorical mapping operates in the relative absence of physical human presence [7, 8, 23].

In addition to its theoretical input, this question can also be used as a practical roadmap by the developers of AI and by the instructional designers. The results, which suggest that there is a need to transition to what can be called cognitively aligned design, can be explained this way. Such an approach will go beyond the current preoccupation of the industry with algorithmic speed and will provide insights into how interfaces can be made to better resonate with the embodied architecture of human communication, thereby reducing the cognitive load and digital friction inherent in virtual communication [27].

Moreover, for both EFL practitioners and policymakers, this study re-centers the human factor in an ever more automated environment. It gives teachers an insight into the internal conceptual planning that learners are engaged into re-flesh digital agents to provide a more empathetic and strategically grounded approach to integrating AI into the curriculum. After all, the study can inform a model of digital literacy based on human-centric values. It acts as a warning to higher education stakeholders that the quest toward technological advancement cannot come at the cost of genuine, corporeal learning, and it is important to make sure that the evolution of pedagogy is not insensitive to the biological and cognitive facts of the human learner.

3. Literature Review and Theoretical Framework

This part outlines the theoretical basis and the particular cognitive instruments used to analyze the narratives of learners. The framework creates the Cognitive CALL lens through which the data is viewed by moving away from the broad philosophy of mind to the specific linguistic structures of image schemas.

Recent scholarship has revealed that digital platforms play a significant role in contemporary English, in terms of lexical innovation, multimodal discourse, and creative audience-oriented expression. As pointed out by Shin and Lee [9], AI-generated applications such as "the CSAT and ChatGPT-developed readings were perceived as similar in terms of naturalness of the target passages' flow and expressions".

3.1. The embodied cognition paradigm

The theoretical foundation of this question is the view of Embodied Cognition, which fundamentally challenges the computational view of the mind that has dominated early CALL research. Although traditional cognitivism assumes that the brain is a processor of abstract, a modal symbol, Embodied Cognition proposes that cognition is inseparably embedded in the sensorymotor experience of the body [7, 8, 26]. In this paradigm, the processing language is not just an act of manipulating definitions, but it is instead a matter of mental simulations of physical actions [10]. To the EFL learner, this means that the acquisition of the second language is not a process of mental translation,

but one of grounding the new linguistic labels on the already existing ones, which are bodily-derived.

The historic Cartesian paradigm that divides the thinking body and the material body has historically caused educational paradigms to favor abstract symbolic reasoning over physical interaction [11]. Nevertheless, recent studies show that the acquisition of human language depends on continuous sensorimotor input, which AI cannot replicate because of its passive and data-centric learning policies [12]. In contrast to words that are learned under the influence of visual input only, the acquisition of language based on physical movement, that is, gestures, makes multimodal neural representations, which are much more resistant to forgetting [11].

3.2. Conceptual Metaphor Theory (CMT) and image schemas

Conceptual Metaphor Theory (CMT) is one of the primary pillars of this framework, and it presupposes that the conceptual system is fundamentally structured through metaphorical mappings. Through concrete source domains (e.g., movement or physical space), CMT allows us to understand abstract target domains (e.g., learning or physical space) [3]. The core of these mappings is image schemas: primitive, recurring patterns of bodily interaction with the environment [13]. In this paper, three specific schemas are outlined to challenge students' understanding of AI-mediated interaction.

First, the Container schema is informed by the physical experience of being in, out, and on the borders, or being trapped in an algorithmic loop. Second, the Path Schema defines the process of interaction in terms of having a source, destination, and path. This schema allows learners to frame the process of linguistic development as a physical process, where the AI is a guide that takes them around a terminal goal. Finally, the Force schema involves concepts of resistance and direction; the Force schema occurs when learners interpret AI feedback as a resistance or as a push that motivates language production [3].

3.3. Crisis of digital disembodiment in CALL

Computer-assisted language learning, or CALL in short, has always been about providing people with information. It actually does not consider what it would be like to speak to a computer, but as AI becomes less of a conversational agent and more of a tool, its disembodiment poses a unique mental issue [24]. Neurocognitive matching is associated with social proximity and access to somatic information, consistent with recent work on the Social Brain Hypothesis and embodied social cognition [14, 15, 25].

And when a language learner speaks to a CALL chatbot, something seems wrong. The reason is that our bodies desire to see and touch things when speaking to someone, but a CALL chatbot is only a bunch of rules and codes that a computer adheres to [16, 17]. The hypothesis on which the work is built is that the digital experience is cognitively manageable as the learners subconsciously recreate the AI using metaphorical language [18]. This change, or rather, this is a critical but under-studied phenomenon in Applied Linguistics.

Previous studies on AI have helped academic writing demonstrate that software such as Grammarly and Wordtune can assist students in improving their grammar, clarity, and writing quality. However, even researchers warn that excessive dependence on such systems may reduce the originality of students and negatively impact the process of independent writing [19].

4. Research Methodology

The qualitative model of the paper seeks to subsume the delicate existential experiences of EFL students as they experience the ontological transformation into the space mediated by AI. The methodology is a combination of the Phenomenological Approach and MLDA due to the fact that the given research questions address internal thinking patterns and metaphorical mappings that are often inaccessible through the means of quantitative surveys. This two-tier approach will involve not only the collection of the data through a human-centric prism but also the analysis of the data with the help of tools that are capable of recognizing the subterranean image schemas that organize digital interaction.

A categorical descriptive analysis was conducted to explore the distribution of image-schema categories (Container, Path, and Force) across coded interaction states (Flow and Stagnation). Although a chi-square test of independence was considered due to the categorical nature of the variables, the results were interpreted cautiously because the metaphorical expressions represented multiple mentions from a limited number of participants. Therefore, the analysis was used as a supporting descriptive indication rather than as definitive statistical evidence of causal or generalizable relationships.

4.1. Proposed MLDA-based cognitive re-embodiment framework

This research introduces an MLDA-based cognitive re-embodiment framework for understanding the disembodied transformation of AI interaction into embodied metaphorical experience for EFL learners. The economy of the five stages of the technical procedure is followed in the framework. The first step made was the recording of interviews, and then transcriptions were prepared for the analysis of metaphors [3]. Second, AI interaction-related metaphors were retrieved from the transcripts including "in the loop," "guide," "stuck," "wall," and "push." Third, the three categories of image schemas were coded: Container, Path, and Force. Fourth, both coded schemas were associated with an interaction object (Flow or Stagnation). Fifth, an exploratory chi-square test of independence was performed to determine if there was some association between metaphorical schema categories and coded interaction states.

This approach is technical, since the learners' accounts are coded metaphorically, from a qualitative narration into a series of categories, and then the relation between the latter is validated with the outcomes of learning interactions. Its novelty is encompassing the identification of metaphor and the image-schema coding with the exploratory categorical analysis in one analysis. Table 1 illustrates how the proposed framework moves from raw interview data to coded schemas and exploratory categorical analysis.

4.2. Research design and selection of the participants

The research design that will be used is a Qualitative Phenomenological Design, the choice of which was made based on the need to know the essence of the human–AI encounter as it is perceived by the learner. Phenomenology is most appropriate in such situations when it is necessary to study how people feel and perceive a particular phenomenon, that is, the perceived presence/absence of an AI interlocutor.

To explore this, a purposive sampling approach was used to recruit 15 university students from the Department of English

Table 1
Technical steps of the proposed MLDA-based framework

Step	Procedure	Output
Step 1	Transcribe semi-structured interviews	Clean learner narrative data
Step 2	Identify metaphorical expressions	List of metaphor vehicles
Step 3	Code expressions into Container, Path, and Force schemas	Image-schema categories
Step 4	Map schemas to Flow or Stagnation	Interaction-outcome coding
Step 5	Apply chi-square test of independence	Exploratory examination of distributional patterns between coded categories

Language and Literature at Jadara University. Their participations were voluntary, and the data were kept strictly confidential and used solely for scientific research purposes in accordance with ethical guidelines. Written consent approval was obtained from all participants before data collection.

As mentioned above, the researchers selected individuals who had utilized intelligence applications, such as ChatGPT or specialized English-learning websites, for at least one complete semester. This was an indication that they were beyond the exciting phase and had a good grasp of how these tools operate. The individuals who were chosen had already learned the technology. It was no longer new to them. They had an idea of what to expect from AI tools, such as ChatGPT or English-learning platforms. Table 2 summarizes the demographic properties and AI interaction patterns of the 15 participants (N = 15).

As mentioned above, the study involved in-depth interviews with university students, all of whom gave their prior written consent, and their participation was voluntary. All data were kept strictly confidential and used solely for scientific research purposes in accordance with ethical guidelines.

4.3. Data collection: The semi-structured metaphor interview

The focus of data collection was the semi-structured metaphor interview, which is a special technique aimed at avoiding literal, robotic responses and encouraging genuine figurative thought. These sessions were based on the use of elicitation prompts to activate the image schemas identified in the theoretical framework, as opposed to standard satisfaction questions. To probe the Path Schema, for example, the researchers asked learners to visualize their interaction as a physical journey; to probe the Container and Force schemas, we asked whether the AI was perceived as a bounded physical "room" or as a dynamic physical force on their linguistic agency.

These interviews were recorded and transcribed word-for-word, with a special emphasis on the recording of the "vehicle terms" students naturally employed to describe their cognitive synergy with the machine.

4.4. Data analysis: Metaphor-led discourse analysis (MLDA)

The resulting data were analyzed using MLDA, a rigorous process defined by Cameron and Maslen [20]. This analysis was done in a three-stage trajectory:

1) Metaphor Identification: Non-literal language (e.g., "climbing," "trapped," or "connected") that indicated a metaphorical mapping was screened in transcripts.
2) Schema Categorization: These metaphors were categorized in terms of the underlying image schemas (Container, Path, Force) so that the linguistic data are based on prior cognitive theory.
3) Thematic Synthesis: Ultimately, these schemas were cross-linked with the reported levels of agency and engagement in the learners to ascertain the impact of the phenomenon of disembodiment on the quality of language acquisition.

Table 2
Detailed profiles of participants (N = 15)

Code	Gender	Academic year	EFL proficiency level	AI interaction frequency
P01	Male	3rd year	Intermediate	Daily
P02	Female	4th year	Advanced	Weekly
P03	Female	2nd year	Intermediate	Daily
P04	Male	3rd year	Intermediate	Daily
P05	Female	4th year	Advanced	Daily
P06	Male	2nd year	Intermediate	Weekly
P07	Female	3rd year	Advanced	Daily
P08	Male	4th year	Advanced	Daily
P09	Female	2nd year	Intermediate	Daily
P10	Male	3rd year	Intermediate	Weekly
P11	Female	4th year	Advanced	Daily
P12	Male	2nd year	Intermediate	Daily
P13	Female	3rd year	Advanced	Weekly
P14	Male	4th year	Advanced	Daily

To ensure ethical soundness, the identity of all participants was anonymized using pseudonyms, and informed consent was sought before the interviews. This helped maintain the voluntary nature of the study and the power dynamic between the researcher and the student in an ethical manner.

To sum up, a systematic qualitative content analysis was conducted using a three-stage coding process based on the principles of cognitive linguistics in order to ensure the accuracy and technical validity of the experiment. First, the initial interview transcripts underwent preliminary structural coding to isolate all metaphorical expressions related to interaction with AI. Second, these expressions were axially coded and linked to the source domains of the three main schemas: Container, Path, and Force. In the final step of our analysis, a chi-square test of independence was applied to check if there are real patterns linking image-schema categories with reported interaction states. This systematic analytical approach ensures that the extracted conceptual framework is grounded in verifiable empirical data and is not merely a description derived from a questionnaire.

5. Findings

As stated previously, this empirical technical research conducted a qualitative study where the data were analyzed and cross-referenced to indicate the emergence of each schema among all the participants. The following table summarizes the distribution and frequency of these thematic mentions.

As Table 3 shows, the Container schema was most mentioned, with the description of the Path and Force schemas. The first frequency distribution was descriptive and offered the weakest support for the framework but led to the hypothesis that was tested in the subsequent frequency distribution, $\chi(2) = 4.46$, $p = .10$.

Thus, the primary exploratory categorical analysis is shown in Table 3, where the type of image schema is contrasted with the outcome of the interactions. This helps to shift the focus from frequency to the claims and reinforces the results analysis by comparing them with the outcomes.

In the interviews with the participants, it is realized that learners do not simply use AI, but rather, they unconsciously reflesh it. The three thematic clusters indicate a consistent process of cognitive re-embodiment. Basically, since the digital environment lacks a physical body, learners fill this gap by projecting their own sensory experience onto the screen to make sense of the interaction.

Through qualitative and quantitative analysis of the semi-structured interviews, it becomes evident that there are three dominant thematic clusters, each based on a particular image schema. These results depict a continuing process of cognition re-embodied wherein learners unconsciously use bodily grounded metaphors to move about and personify the disembodied AI space. These thematic clusters of Container, Path, and Force were mapped onto their respective image schemas, as shown in Table 4.

As mentioned in Table 4, learners do not experience their interaction with AI as a neutral exchange of data; rather, it is a projection of physical characteristics onto the interface to bridge the so-called presence gap. The sub-sections that follow give a more subtle treatment of these three schemas, starting with the conceptualizing of the digital interface by the learners as a physical and limited space.

5.1. Mapping the digital space: The Container schema

The information indicates that the AI interface is often viewed as a two-dimensional one. Rather, it is considered to be a conceptual room. Students continued to apply in/out metaphors to their experiences of being a part of or not a part of the digital space. An example of this is Participant 3, who commented: "When the AI understands me, I feel like I have finally made my way into the conversation loop, but when the AI gives a general answer, I feel like I was pushed out into an icy desert." In this case, the word "understanding' does not only mean linguistic

Table 3
Thematic frequency across the three schemas

Image schema	Frequency of mentions	Dominant group	Primary perception
Container	42	Intermediate	Spatial inclusion
Path	38	Advanced	Linguistic trajectory
Force	25	Mixed	Interactive pressure

Table 4
Thematic clustering of EFL learners' metaphorical conceptualizations of AI interaction

Image schema	Representative participant quote	Conceptual mapping	Cognitive interpretation
CONTAINER	"When the AI understands me, I feel like I am finally inside the conversation loop, but if it gives a generic answer, I feel pushed out into a cold space."	Understanding = Inclusion; Generic Feedback = Exclusion.	The interface is a bounded territory; "Self" vs. "Other" spatiality.
PATH	"The chatbot acts like a guide; it walks me through the difficult grammar points until we reach the correct sentence."	Acquisition = Physical Movement; AI = Navigator.	Proficiency is a kinetic journey; lack of clarity = stagnation ("stuck").
FORCE	"Certain corrections felt like a wall I kept hitting... [or] a supportive push that kept me going."	Feedback = Physical Resistance or Propulsion.	AI is a force-exerting partner; agency is negotiated through sensory pressure.

success; it also refers to spatial success. In addition, when the AI is not done in a nuanced manner, the learner feels a sense of ontological exclusion, literally feeling like he or she has been pushed out of a warm room. This supports our belief that in order to make the process of EFL acquisition seem natural, the student must first feel that he/she has been transported to a closed, secure space.

5.2. Trajectories of proficiency: The path schema

Semi-structured interviews also indicated that students consider their language development as a physical journey. Learning is in their minds, not about collecting data points, but rather about moving forward in the landscape. In this trip, AI is frequently anthropomorphized in the form of a guide. Participant seven observed that the chatbot behaves like a guide; "it takes me through the challenging grammar aspects until we arrive at the right sentence." Yet, as the rationale behind the AI becomes inscrutable, such a direction disappears. Participant 12 explained this feeling of frustration as being stuck in the middle of a road. To these learners, the value of AI is not in its sophisticated algorithms but in its capacity to provide a kinesthetic experience of moving from point A to point B.

5.3. Negotiating agency: The force schema

The most impressive finding, perhaps, was the way the learners perceived feedback as physical pressure. In the absence of the tone and body language of a human teacher, students overlay digital corrections onto the feelings of resistance or propulsion. Participant 2, for instance, talked of some of the corrections as a wall to hit, turning a software error into a physical one. On the other hand, Participant 6 perceived the AI as "a supportive push that kept me going". They are not merely figures of speech: the means through which the social brain constructs a sense of another. The AI can never be a neutral tool; it is a partner that may either block the learner's path or propel them. Table 5 is a unified mapping of the lexical vehicles and metaphorical keywords found across all three image schemas.

Besides the definite language options that are represented in Table 5, there is a bigger pattern that can be identified in the discourse of the learners: The digital interface is never perceived as a vacuum. Rather, the interaction with the algorithm is actively re-fleshed by the students who map it onto their main physical experiences. The fact that they are dependent on these schemas testifies to the fact that human cognition continues to be obstinately embodied. This is just a lexical clue to the fact that the effectiveness of AI in language teaching is less dependent on the strength of its AI system and more on the ability of the AI system to assent to these deep-rooted human metaphors of space and motion.

Although the specific patterns form the basis for organizing the interaction process, the effectiveness of the learner's experience varies significantly. Table 6 illustrates how these patterns manifest in effective and ineffective interactions.

The above table not only provides a structured foundation for the schemas; it also indicates the variation in the learners' interaction with AI. This comparison reveals that the effectiveness of AI in the educational process is linked to maintaining a state of positive interaction, in which the learner feels included and motivated, rather than excluded or facing obstacles.

To check if there was an association between learning experience and metaphorical schema type, the coded schema data were cross-tabulated with two types of interaction results: Flow and Stagnation. Flow is a functional interaction, in which it seemed that students felt included and guided or supported. Stagnation exists when there is failed interaction and learners felt excluded, stuck, or blocked. These frequencies represent descriptive patterns of metaphorical mentions and do not represent independent participant-level observations.

The distribution patterns as seen in Table 7 indicate that different image schemas appeared more frequently within specific interaction states. However, these patterns should be interpreted as exploratory observations because the metaphorical units were derived from multiple responses within a small participant group. There was a greater association of Container and Path schemas with Flow and Force schemas with Stagnation. This exploratory pattern indicates that there is a possibility that the different categories of metaphors are related to the different reported interaction experiences, but more detailed analysis of the participants is needed.

Table 5
Lexical mapping of metaphorical vehicles

Image schema	Keywords/vehicles	Cognitive interpretation
CONTAINER	Inside, Into, Loop, pushed out, Space, Bounded, Void, Room.	The interface is a bounded territory; "Self" vs. "Other" spatiality.
PATH	Guide, Steps, Moving, Stuck, Road, Direction, Reach, Journey.	Proficiency is a kinetic journey; lack of clarity = stagnation.
FORCE	Hit, Wall, Pressure, Push, Barrier, Momentum, Impact, Resistance.	AI is a force-exerting partner; agency is negotiated through pressure.

Table 6
Positive and negative embodied states in AI interactions

Image schema	Successful interaction (Flow)	Failed interaction (Stagnation)
Container	Inclusion: Feeling "inside" the loop; social presence.	Exclusion: Feeling "pushed out" into a cold space.
Path	Navigation: Clear forward motion; AI as a navigator.	Immobility: Feeling "stuck" or lost in the road.
Force	Propulsion: AI as a supportive nudge or momentum.	Resistance: AI as a "wall" or physical barrier.

Table 7
Frequency distribution of image schemas and interaction states in learner narratives

Image schema type	Successful interaction (Flow)	Failed interaction (Stagnation)	Total mentions
Container	32	10	42
Path	28	10	38
Force	11	14	25

6. Discussion

The comparative study as shown in Table 8 reveals that most of the current systems measure accuracy of output or engagement/physical interaction. In contrast, the proposed MLDA is based on the premise that the internal cognitive framing the learner brings to the encounter with AI is evaluated and overall found valid by means of a statistically robust connection with schema-outcomes. This framework results in complementary technical measurements for evaluating AI-mediated EFL learning [18].

In this study, empirical evidence was gathered to provide a fundamental technical and theoretical contribution to connect the real-world learning experience with the AI environment. Table 9 summarizes how students' minds view AI not merely a passive tool or even a blank screen, but rather attempt to make AI applications seem human, capable of feeling, understanding, and analyzing their experiences. For example, a student might interact with AI as a friend or even a diary, sharing their daily experiences. This action, in fact, gives meaning to language. When they feel part of this conversation, they are effectively using the Container metaphor, which explains their sense of security and inclusion. If a student sees language learning as a journey filled with difficulties, challenges, progressing, stumbling, and sometimes stopping, they are applying the Path metaphor. At this stage, when learners face challenges in language learning, they ask AI to assist and offer corrections. Accordingly, the learners perceive these amendments as a source of strength (Force metaphor). In short, humans do not learn solely with their minds; they go beyond that to learn with their bodies and body language, which reflects their words and vocabulary. This is the bridge that connects humans to the machine.

As explained in Table 9, the elements do not clash in a mere linguistic way between the learner and AI, but rather in the idea of construction in which learners project their human experiences and expertise onto algorithmic responses, so that they are transformed from rigid digital responses into meanings that they feel and understand within their reality and personal experience. Exploratory analysis indicated a general trend toward more co-occurrence between the Container and Path schemas with Flow, and between Force and Stagnation. The patterns, however, failed to be statistically significant (χ^2 (2) = 4.46, p = .10) and may be interpreted with caution. While no significant correlations were found, the descriptive distribution might indicate that learners are more likely to use familiar spatial and directional metaphors when describing their interactions with AI. As stated earlier, the Container and Path schemas occurred most often with Flow, while

Table 8
Comparative study with existing AI-EFL learning systems

Existing system/approach	Main technical focus	Main limitation	Advantage of proposed MLDA framework
ChatGPT-based EFL interaction	Generates explanations, examples, and feedback	Focuses mainly on response quality, not learner embodiment	Identifies how learners cognitively experience AI feedback
Grammarly/Wordtune-style writing support	Grammar, clarity, and sentence-level correction	Measures accuracy but weakly captures learner agency	Links feedback experience to Flow or Stagnation
CALL/AIALL performance evaluation	Proficiency, engagement, and task completion	Often treats learning as performance output only	Examines internal cognitive-metaphorical processing
Augmented Reality (AR)/embodied learning systems	Physical or visual engagement with language tasks	Strong on embodiment but less focused on metaphorical discourse	Shows how embodiment can occur even in disembodied AI interaction
Proposed MLDA framework	Metaphor identification, schema coding, and chi-square validation	Limited by small sample size	Provides a technical link between learner metaphor, AI interaction, and learning outcome

Table 9
Conceptual framework: Human experiences with AI interaction

Conceptual element	Source domain
Space and inclusion	Physical spaces, boundaries, and physical proximity
Progress and motion	Journeys, walking, and expected future obstacles
Action and agency	Physical pushing, pulls, and resistance

the Force schema seemed relatively more common in the description of Stagnation. The preliminary results suggest relationships between metaphorical framing and reported interaction experiences but are not necessarily viewed as causal or generalizable results.

As shown in Table 10, the proposed framework is an extension of the previous approaches that involved CALL and metaphor. It combines metaphor identification, image-schema coding, and exploratory categorical analysis into one analytical framework.

In fact, the conclusions presented here are a strong case that the human mind is very physical, despite being in a high-tech world. Our data support the Embodied Cognition framework in that the blank nature of AI, in fact, induces a compensatory process within the learner. And here is the location of this "Cognitive Re-embodiment" that is most prominent in the Container schema. Because the brain does not enjoy the so-called digital void, it transfers familiar physical structures to the interface to reduce cognitive load, as Corbett [18] suggests. The virtual space is thus not neutral but rather a psychologically real space into which the learner must enter to interact with the language.

This psychological thought also changes our perceptions toward agency. The agency for these students is related to the touched motion of movement. People get lost or stuck not merely because they do not know something. They are in a circumstance wherein their thoughts are not progressing. Stagnation in thought is a state of lostness or stasis experienced by people who feel lost or stuck. This occurs when individuals are lost or stuck. This greatly builds on the work of Lakoff and Johnson [6], which implies that an AI tool is as good as the Conceptual Trajectory that it offers.

Lastly, the fact that the Force Schema is in use implies that the Social Brain Hypothesis [14] is still very much in play. Students would be glad to have a force-exerting partner rather than a mechanical processor. The verdict is similar; regardless of whether it is the metaphor of the "Guide" [21] or the high-retention rates in AR studies [22], the conclusion remains the same in both cases: the presence gap is bridged by assigning a body to the code. The AI is more than a language processor to the EFL learner, but a materialized presence that can be an open door or a wall to their proficiency.

7. Conclusion and Pedagogical Implications

This empirical technical study aimed to question the embodied reality of the EFL learner in a world being defined by the rapid spread of the so-called disembodied AI. Using the framework of Embodied Cognition, the research has demonstrated that learners do not think of AI as a set of abstract and mathematical algorithms; instead, they conceptualize the machine as grounded, spatial, and force-exerting. That human meaning-making is, nevertheless, still deeply rooted in bodily experience despite being situated in the virtual worlds of digital technology is what confirms this fact.

The findings of the study are a decisive response to the guiding research questions of the study and can be used to ultimately conclude that learners use embodied metaphors as a critical bridge between their actual physical reality and the virtuality of the AI. Though the desired meaning of the concept of digital presence to engage with is predetermined by the Container schema, the Path schema is the most crucial construct for maintaining a sense of success and progressive evolution.

The fact that people think of AI as something without a body leads them to think in a certain way. This is termed re-embodiment. When this occurs, learners begin to think of the AI machine as having a presence and being able to do things on its own. This makes learners feel they are still in charge of their language abilities when using AI.

The associated pedagogical consequences of these results indicate that a critical shift toward a more cognitively aligned approach to EFL teaching is needed. First of all, creators of AI are not supposed to think about the accuracy of the text, but they must come up with interfaces that could assist the natural Path and Container diagrams of the human mind in a visual and linguistic way. Second, teachers are invited to promote metaphorical awareness of their students, whereby they will be encouraged to leave the viewpoint of considering AI as a Force of resistance (a barrier) to a perception of a Path of guidance (a guide). At the very end, as AI takes on an irrevocable presence in the classroom, the human side of this process—physicality, social presence, and embodied interaction [12]—must be made aware of, ensuring that this digital technology is maintained as an ancillary to, but not a substitute for, this human aspect of communication [6].

Finally, bringing together qualitative metaphors with concrete statistical metrics gives us a much more dependable foundation for understanding AI in language learning. Our statistical proof shows that how a student mentally frames the technology directly impacts their learning success. This underscores a critical takeaway for CALL developers: they should not just focus on technical code but need to design AI interfaces that actually align with how the human mind naturally experiences space and interaction. Future research needs to examine the effects and influences of different cultural backgrounds on the nature of embodied metaphors employed by learners, and how these

Table 10
Comparison of the proposed framework with existing approaches

Existing approach	Main focus	Limitation	Contribution of this study
Traditional CALL evaluation	Proficiency, performance and engagement scores	Limited attention to embodied cognition	Examines learner metaphor and cognitive framing
AI writing-tool studies	Grammar, clarity and writing accuracy	Weak focus on learner agency and embodied experience	Links AI interaction with Flow and Stagnation
General metaphor analysis	Identification of metaphorical language	Often remains qualitative without statistical testing	Combines MLDA with chi-square validation
Proposed MLDA framework	Metaphor, image schema, and interaction state	Limited by small sample size	Connects embodied schemas with measurable interaction outcomes

schemas evolve as AI becomes increasingly physically embodied through robotics. By re-orienting the human body in the digital conversation, we will be able to ensure that the future of language acquisition is going to be a highly personal and intuitively based journey.

Acknowledgment

The authors are grateful to the Deanship of Research at Jadara University for providing financial support for this publication.

Ethical Statement

The authors declare that this study did not require formal ethical approval because the Scientific Research Committee of the Department of English Language and Literature/Translation, Faculty of Arts and Languages, Jadara University, determined that the research does not require formal ethical approval or Institutional Review Board approval based on the nature and methodology of the study.

Conflicts of Interest

The authors declare that they have no conflicts of interest to this work.

Data Availability Statement

Data available on request from the corresponding author upon reasonable request.

Author Contribution Statement

Zein Bassam Bani Younes: Conceptualization, Methodology, Formal analysis, Writing – original draft, Writing – review & editing, Project administration. **Majid Mohammad Al-Khataybeh:** Conceptualization, Validation, Resources, Writing – review & editing, Supervision. **Nesreen Bassam Friehat:** Methodology, Formal analysis, Investigation, Data curation, Writing – review & editing. **Abeer Hadi Salih:** Validation, Investigation, Writing – review & editing, Visualization. **KiranGul:** Investigation, Writing – review & editing.

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How to Cite: Younes, Z. B. B., Al-Khataybeh, M. M., Fraihat, N. B. F., Salih, A. H., & Gul, K. (2026). Cognitive Re-Embodiment of AI in EFL Learning: Shifting from Abstract Tools to Interactive Learning Forces. *Artificial Intelligence and Applications*. https://doi.org/10.47852/bonviewAIA620210330