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Article

Human-AI Collective Agency in Augmenting Language Teaching Materials: Co-creation, Adaptation, Curation, and Humanization

Tao Xiong*
Guangdong University of Foreign Studies, China

Wenli Xu
Guangdong University of Foreign Studies, China
Guangzhou Xinhua University, China

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Abstract
Language teachers in English as a Foreign Language (EFL) contexts are increasingly using Generative AI (GenAI) to augment teaching materials, yet existing research tends to overlook how these materials are produced in situ. Drawing on Actor-Network Theory (ANT), this qualitative study explores how 12 Chinese university EFL teachers exert agency to use AI in augmenting language teaching materials. Data were collected through semi-structured interviews and digital artifacts from all 12 teachers, as well as classroom observations of two of these teachers. The findings reveal that human and AI form collective agency, which is manifested through four synergy modes: Co-creation, Adaptation, Curation, and Humanization. In Co-creation, teachers work with AI to transcend modal limits and construct innovative multimodal assemblages. In Adaptation and Curation, acting as Obligatory Passage Points (OPP), teachers translate GenAI outputs by calibrating linguistic difficulty and enacting ideological and cultural gatekeeping to filter out cultural biases and factual hallucinations. In Humanization, teachers engage in clandestine labor and strategic transparency to re-assert human authorship, defending their professional legitimacy against the internal cheating mindset and re-legitimizing their professional identity. This study conceptualizes teacher agency as a collective achievement and demonstrates how GenAI amplifies the materials augmentation power of frontline teachers. It calls for the advancement of teacher education towards critical AI literacy and the establishment of sound institutional support to stabilize the dynamic educational network.

Keywords
Actor-Network Theory (ANT), collective agency, EFL teachers, generative AI, teaching materials augmentation

*Corresponding author. Email: txiong@gdufs.edu.cn

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1 Introduction

Teacher agency has received sustained attention in English as a Foreign Language (EFL) teacher education not only because it is "an indispensable element of good and meaningful education" (Biesta et al., 2015, p. 624), but also because of the multifaceted nature of English language teaching which involves a wide array of changing social, cultural, economic, ideological, and technological conditions. Instead of being viewed as a static individual possession, teacher agency is increasingly conceptualized as a dynamically, socioculturally, and sometimes collectively mediated capacity to make choices and decisions (Kayi-Aydar, 2019; Miller & Gkonou, 2018; Tao & Gao, 2021).

Language teaching materials are increasingly being recognized as dynamic resources (Tomlinson & Masuhara, 2018) that carry the cultural, political and ideological implications of the language curriculum (Qin et al., 2026; Xiong & Hu, 2022). In this process, teachers exert their agency by adding, deleting, and modifying textbook materials to accommodate student needs (Bouckaert, 2019; Li et al., 2023; McGrath, 2013). Language teachers' engagement with teaching materials has emerged as a key site for exploring teacher agency. By creatively using and re-developing (Yu, 2005) textbooks and materials to achieve better outcomes, teachers transform their identity from passive consumers into active agents, functioning as curriculum-makers and materials augmenters (Bouckaert, 2019; Chen & Shu, 2026; Li et al., 2023; Shawer, 2010; Tomlinson & Masuhara, 2018; Xu & Li, 2025). However, manually selecting and adapting materials was time-consuming and labor-intensive, requiring strategic responses to overcome these challenges (Li et al., 2026), which ultimately created a bottleneck restricting their agency as active teaching materials augmenters. In recent years, as generative AI (GenAI) has become an increasingly indispensable part of language teaching and learning, its integration in teaching materials augmentation presents new opportunities and challenges for language teachers. While the human-AI partnership enables frontline teachers to creatively and agentively use existing textbooks and materials (Öksüz Zerey, 2025), this entanglement introduces unprecedented messiness into the process of using materials because GenAI could exhibit a potentially disruptive agency, occasionally generating knowledge fabrications, hallucinations, and cultural biases, which leads to technostress among teachers (Kohnke et al., 2023; Lo, 2023).

So far, existing research on GenAI and language teaching has largely centered on its technical affordances, learner outcomes, and teacher readiness (Q. Chen et al., 2026; Edmett, 2025; Li & Liang, 2025; Wu, 2026). However, the issue of how teachers actually navigate the simultaneously promising and disruptive human-AI partnership remains largely under-explored. Or, more theoretically, do existing theories on language teacher agency still possess sufficient explanatory power when GenAI is deeply integrating into language education? What role does GenAI play between teachers' individual agency and collective agency? In response, this qualitative study seeks to investigate how a cohort of Chinese university EFL teachers, in collaboration with AI, exert "human-AI collective agency" in using and augmenting teaching materials. This human-AI collective agency is a collaborative achievement produced through ongoing human-AI negotiation which is crucial for stabilizing the potentially fragile heterogeneous network of EFL. The data were collected through semi-structured interviews and digital artifacts from all 12 teachers, as well as classroom observations of two teachers (T1 and T2), and were then analyzed to examine the interactions and knowledge flows between teachers and AI. By adopting Actor-Network Theory (ANT) (Latour, 2005) as the theoretical perspective, this study sees AI as an active participant in the educational network, expanding the idea of collective agency (Kayi-Aydar, 2019; Tao & Zhao, 2025) to involve both human and non-human actors. We contend that the teachers, in the stabilizing process, have been able to enact ideological and cultural gatekeeping by performing the role of Obligatory Passage Points (OPP) through which an alliance of actors must pass (Callon, 1986). The study contributes to current literature by dialoguing with the idea of entangled pedagogy (Barnes & Tour, 2026; Fawns, 2022) and expanding the notion of collective agency from being confined to human-human interactions to human-AI interactions. By demonstrating how AI amplifies the teaching materials

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augmentation power of frontline teachers, the study calls for critical AI literacy and sound institutional support. Specifically, the study is guided by the following two research questions:

RQ1: What specific practices do Chinese university EFL teachers employ when using GenAI to augment language teaching materials?

RQ2: From an ANT perspective, how is human-AI collective agency negotiated within these practices?

2 Language Teacher Agency, GenAI, and Entangled Pedagogy

Language teacher agency, put simply, is "language teacher's intentional authority to make choices and act accordingly in his or her local context" (Kayi-Aydar, 2019, p. 15). Agency is a pivotal concept situated at the intersection of teacher belief, identity and emotions, contributing to teacher learning and professional development (Biesta et al., 2015). It can be explored from multiple perspectives, including social-cognitive, sociocultural, and ecological approaches, involving the interaction between teachers and multiple ecological contextual systems. Agency is not purely an individual action; teachers exercise agency in collective ways with "available support network systems" (Kayi-Aydar, 2019, p. 16). In the meantime, Kayi-Aydar (2019) points out that it remains unclear how individual and collective agency interact, calling for further research to clarify the contextual factors and what these available support network systems entail.

In recent years, growing attention has been paid to GenAI's emerging role as a powerful actor that supports teachers' capacity. GenAI emerges as an active, non-human partner working in close collaboration with the teachers to transform teaching materials from static texts to dynamic, multimodal content (Moorhouse & Kohnke, 2024; Öksüz Zerey, 2025). For example, Wu (2026) presents preliminary findings from two contrasting teacher cases, Chan (Hong Kong) and Lau (Macau), showing that GenAI integration involves fluid movement between proactive and reactive agency rather than a fixed binary, shaped by institutional support, peer pressure, self-directed adaptation, prior experience, and future goals. When engaging with the textbooks and materials, the teachers' work has shifted from manual adaptation to highly automated and efficient creation (Öksüz Zerey, 2025), which enhances teachers' materials preparation efficiency (Lo, 2023) by providing immediate textual simplification (Dewi, 2025), personalizing learning in line with students' levels (Davin et al., 2025), facilitating trans-semiotizing, and converting texts into multimodal assemblages (Chiu, 2024). In the meantime, GenAI brings about risks and raises ethical concerns. The convenience of automation can induce bias (Lo, 2023) and insidious teacher de-skilling (Moorhouse et al., 2023). More alarmingly, because AI models are mostly trained on datasets from high-income countries, their outputs often contain Western-centric, culturally biased content (Lo, 2023) alongside overly broad, contextless discussions (Pack & Maloney, 2023). This means that teachers must adapt AI-generated content for cultural and contextual appropriateness. Specifically, they need to incorporate affective values to connect with learners' lived experiences, thereby evoking emotional resonance (Mishan & Timmis, 2015; Tomlinson, 2003). In this process, teachers serve the roles of gatekeepers and curators.

The complex landscape of GenAI and its application in teaching and learning has sparked discussions to reconceptualize how this intricate array of participants, actors, and support systems relate to one another. One notable construct has been "entangled pedagogy" which resists the binary opposition between technology and pedagogy (Fawns, 2022, p. 711). According to this perspective, language teaching is increasingly connected and entangled with technology, methods, goals, values, and contexts, which is far more complex than the dichotomy of pedagogy and technology (Barnes & Tour, 2026). It follows that teacher agency is no longer limited to an individual's capacity to make decisions in response to specific contexts; rather, agency is more entangled, shared, and distributed across contexts, involving the interaction between teachers and their environment, including human and non-human participants.

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In summary, teacher agency has become a prominent topic in the field of language teaching. A key issue that remains to be addressed is how to explain the relationship between individual agency and collective agency, along with the contextual constraints and support systems that shape them. The arrival of the GenAI era has brought both opportunities and challenges, further complicating this issue (C. Chen et al., 2026). In response, recent research has indicated a posthuman turn to concepts such as entangled pedagogy, offering new perspectives on teacher agency.

3 Actor-Network Theory

The Actor-Network Theory (ANT) (Latour, 2005) is adopted in this study to conceptualize the collective agency between language teachers and AI in teaching materials augmentation. Its principle of "generalized symmetry" treats non-human entities, in this study, AI, not as a submissive instrument, but as a powerful actant that interacts with teachers to shape teaching materials and therefore, classroom activity (Guerrettaz, 2021; Guerrettaz et al., 2021). As Stewart's (2019) definition of agency in the ANT framework reveals, agency should not be " regarded as a uniquely human force", but extends to objects and technologies (p. 82).

Viewed through this theoretical lens, while existing literature acknowledges that teachers actively exercise their agency in adapting traditional materials to suit specific teaching contexts (Brown, 2014; Carabantes & Paran, 2022; Chen & Shu, 2026), the integration of GenAI fundamentally transforms this dynamic. Because GenAI acts as such a generative non-human actant, it shifts AI-augmented materials use from a purely human endeavor into a co-constituted practice. Consequently, teacher agency is no longer exercised in isolation; rather, it is enacted and dynamically distributed across the human-AI network (Barnes & Tour, 2026).

How, then, do language teachers manage this collective agency in teaching materials augmentation? ANT frames this negotiation process as translation (Callon, 1986). As Latour (2005) clarifies, translation is not a simple cause-and-effect relationship, but a transformative process that causes mediators to coexist, ultimately generating "traceable associations" (p. 108). In this study, translation means AI is by no means a panacea that correctly responds to teachers' demands. On the contrary, it may generate biases, thus forcing teachers to act as Obligatory Passage Point (OPP), a central node through which all other actors must pass to achieve a certain goal (Callon, 1986).

To effectively implement this OPP role, the translation process unfolds through four interrelated moments (Callon, 1986). It begins with problematization, where teachers identify the misalignment between AI's default outputs and local pedagogical needs, thereby establishing themselves as the OPP. This is followed by interessement and enrollment, where teachers employ various strategies such as continuous linguistic calibration and forcing prompts, to lock the unruly AI actant into their specific instructional roles, overcoming its inherent biases and hallucinations. Finally, mobilization occurs when the curated and humanized outputs are finalized and represented as reliable teaching materials ready for classroom implementation. Through these dynamic moments, teachers enact factual, cultural, and ideological gatekeeping. Ultimately, as teachers successfully navigate these translation moments, the fragile human-AI network achieves temporary stabilization. In ANT terms, the resulting teaching materials become a black box (Latour, 2005), a stabilized, co-constituted entity where the complex backstage labor and negotiations between the teacher and the AI are concealed. Therefore, guided by this analytical lens, the present study seeks to open this black box and empirically trace how language teachers navigate these translation moments in situ.

In sum, this study integrates insights of language teacher agency, entangled pedagogy and Actor-Network Theory (ANT) to address theoretical gaps arising from GenAI-enhanced use of language teaching materials. Entangled pedagogy rejects the conventional human-technology binary, aligning with the central tenet of ANT that dissolves rigid subject-object divides, treating human actors, technologies,

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materials and texts as equivalent nodes within a network. Together, they offer a theoretical foundation to re-imagine agency beyond the human teacher alone. The study thus adopts Human-AI collective agency as its overarching idea to account for the emergent, entangled agency co-produced by language teachers, GenAI and curricular resources when teachers refine and organize teaching materials.

4 Methodology

To explore how human-AI collective agency is enacted in teaching materials augmentation, this study adopts a qualitative study design (Creswell & Poth, 2018). This approach was chosen because it allows for a robust understanding of teachers' various experiences of engaging with GenAI in using teaching materials. Moreover, ANT requires us to "trace associations" among heterogeneous actors (Latour, 2005, p. 5). A qualitative design enables us to investigate how collective agency is relationally exercised, capturing the diverse yet patterned ways different teachers use AI to augment teaching materials. Formal informed consent was obtained from all research participants prior to data collection. This study is part of the PhD project of the second author and was formally reviewed and approved by the institution in which she conducts the study.

Table 1
Participant Demographics

Interviewee Code	Gender	Teaching Experience	Course Type	Key AI Tools Used
T1	Female	1.5 years	College English; ESP (Degree English)	Doubao, Yuanbao, DeepSeek
T2	Female	9 years	College English; Chinese Culture	Kimi, Doubao, DeepSeek
T3	Male	2 years	College English; ESP (Medical English);	Yuanbao, ChatGPT
T4	Female	1.5 years	College English	Kimi, Doubao
T5	Female	15 years	ESP (Business English); College English	DeepSeek, Doubao
T6	Female	12 years	College English; ESP (Engineering)	DeepSeek, Doubao
T7	Female	12 years	English Education; Writing; Business English	ChatGPT, Manus
T8	Female	7 years	College English; Public Speaking	Kimi, DeepSeek
T9	Male	29 years	Linguistics; Translation; American Culture	DeepSeek
T10	Female	5 years	College English; ESP (E-commerce English)	ChatGPT
T11	Female	18 years	College English; Film English	DeepSeek, Doubao
T12	Female	18 years	Teacher Education; English Pedagogy	Doubao

4.1 Participants and context

This study was conducted at universities in Southern China, where teachers face dual pressure: the push for digital transformation, which demands the use of AI in teaching; and the curriculum reform, which

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requires the integration of ideological and political content in classrooms. We employed a maximum variation purposive sampling to select participants that could reflect different situations of Chinese EFL in diverse teaching ecosystems. Twelve EFL teachers (T1-T12) were selected from various institutes (See Table 1). These teachers differ in professional experience (ranging from novice teachers with under 5 years of experience to expert teachers with over 15 years) and the courses they teach (ranging from College English and English for Specific Purposes to English major courses). All twelve teachers were subsequently invited to consent to classroom observation. Due to convenience considerations including geographic separation, only two participants (T1 and T2) agreed to be observed. The triangulation of interview data and digital artifacts from all 12 participants, complemented by classroom observations of T1 and T2, provided a richer understanding of their teaching practices.

4.2 Data collection

To ensure methodological triangulation and capture the complex process of agency negotiation, data were collected from three complementary sources: semi-structured interviews, classroom observations, and digital teaching artifacts.

Semi-structured interviews were conducted with all 12 participants between November 5 and December 8, 2025. The interview protocol was designed to find out teachers' dynamic interactions with GenAI in augmenting teaching materials. At the beginning of each interview, teaching materials were broadly defined to encompass not only textbooks but any teaching resources (e.g., PPTs, supplementary readings). The interview protocol was theoretically informed by the combined framework of Actor-Network Theory, entangled pedagogy, and collective agency. It addressed several lines of inquiry: (1) How did participants augment teaching materials before generative AI, and what prompted them to start using AI? (2) What does their step-by-step interaction with AI, including prompting, reviewing, and refining AI-generated outputs, look like? (3) How do they respond to AI hallucinations, factual inaccuracies, and cultural mismatches? and (4) How has AI integration reshaped their classroom practice and student–teacher interactions? These thematic areas were designed to operationalize the study's theoretical framing, foregrounding human-AI collective agency as the central analytical lens. Each interview lasted approximately 40-60 minutes, resulting in over 10 hours of audio data, which were transcribed verbatim.

Classroom observations of T1 and T2 were conducted in November 2025, beginning approximately one week after their respective interviews. Four sessions were observed, two each for T1 and T2, totaling 160 minutes. The observed lessons were selected based on their relevance to the research questions and practical accessibility. After being informed of the study's focus on GenAI-augmented teaching materials, T1 and T2 identified lessons in which such materials would be used and invited the researcher to observe them. Given the supplementary role of classroom observations in this interview-centered study, no further observations were conducted. The observation protocol focused on tracing the translation moments between teachers and the AI-augmented materials. Field notes recorded: (1) how teachers present AI-augmented teaching materials to students; (2) how they align these materials with students' proficiency levels and learning needs; and (3) students' immediate reactions and engagement with the materials. Critical incidents, such as teachers acting as cultural gatekeepers, were documented to capture tensions unfolding within the human-AI network. Consistent with the combined theoretical framework foregrounding collective agency, these observational dimensions were designed to trace the dynamic, distributed agential relations among actors in situ.

Following the interviews, all 12 participants voluntarily shared digital materials, of which 29 relevant artifacts were included in the analysis (see Table 2). These included prompt logs, AI-augmented PPT decks, and interactive or multimodal teaching materials. These artifacts served as material traces (Latour, 2005) that document the backstage labor of human-AI collective agency.

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Table 2
Inventory of Digital Teaching Artifacts by Participants

Participant	Number of Prompt logs (turns)	Number of AI-augmented PPT decks (number of slides)	Interactive / multimodal materials (n)	Other artifacts (excluded from analysis, n)
T1	2 (181+115 turns)	1 (16)	4	6
T2	1 (5 turns)	1 (18)	0	5
T3	0	0	1	1
T4	2 (3+4 turns)	2 (10+38)	0	4
T5	2 (18+10 turns)	1 (5)	0	0
T6	1 (3 turns)	1 (3)	1	0
T7	0	1 (26)	0	0
T8	0	1 (3)	1	2
T9	0	1 (18)	0	2
T10	0	2 (35+51)	0	0
T11	1 (6 turns)	0	0	3
T12	0	0	2	0
Total	9 (345 turns)	11 (223)	9	23

Note. Prompt logs are counted as individual conversation records, with the number of turns indicated in parentheses. AI-augmented PPT decks are counted as individual presentation files, with the number of slides indicated in parentheses. Interactive/multimodal materials are counted as individual items. Other artifacts refer to supplementary materials voluntarily shared by participants that were not directly relevant to the research questions and were therefore excluded from the analysis.

Digital artifacts were collected on a voluntary basis following the interviews. Participants were invited to share relevant materials illustrating their use of GenAI in teaching materials augmentation, without being required to provide specific types or quantities of artifacts. Consequently, the types and amounts of materials varied across participants, depending on their willingness to share and the availability of relevant records. The absence of particular artifact types, such as prompt logs, should therefore not be interpreted as an indication that participants had not engaged in such practices.

4.3 Data analysis

A reflexive thematic analysis (reflexive TA) approach (Braun & Clarke, 2019) guided the interpretation of participants' sense-making of AI-mediated pedagogical practice. Central to this version of reflexive TA is recognition of the researcher's active role in knowledge production. In reflexive TA, researchers remain cognizant of the philosophical and theoretical assumptions shaping their analysis, enact these commitments consistently across analysis, and consciously deliberate over all analytical judgements. The first author led data collection, initial immersion in the dataset, and primary open coding.

Both researchers immersed themselves fully in the corpus. Coding was oriented around ANT constructs, with particular attention to identifying moments of translation and how teachers enacted agency in assemblage with AI. The researchers met regularly to compare codes and tentative interpretations. Divergent interpretations were discussed reflexively, prompting the researchers to revisit the data, examine their analytical assumptions, and refine the developing themes. Codes were clustered into provisional themes, which underwent continuous collective review and refinement. Four final themes were constructed: Co-creation, Adaptation, Curation, and Humanization, which elaborate the enactment of human-AI collective agency. Digital artifacts and classroom observation data were not subjected to

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formal line-by-line coding. Instead, they were analyzed holistically to provide contextual, supplementary evidence that triangulates and supports the primary findings generated from the interview data.

Table 3 provides an overview of the main themes and specific categories of teacher agency enactment identified in this study.

Table 3
An Overview of Themes and Categories

Themes	Categories	Illustrative extracts
Co-creating materials with enhanced interactiveness and multimodality	• Translating static vocabulary lists into interactive web-based games • Developing interactive AI agents for simulated conversations • Trans-semiotizing textual documents into vivid multimodal videos and images • Creating knowledge graphs and promotional videos for high-stakes evaluations	"For abstract literary metaphors that students found hard to grasp, I had AI visualize them into surrealist images. One picture replaced a thousand words of explanation." (T4)
Adapting AI-generated materials to accommodate learner level	• Utilizing forcing prompts to elevate lexical sophistication for advanced learners • Filtering and screening generated questions to build appropriate cognitive scaffolds	"AI's generated reading comprehension questions were sometimes too literal. I manually edited them to include more inferential questions that require 'reading between the lines'." (T11)
Curating AI-generated materials for cultural and factual appropriateness	• Intervening as ideological and cultural gatekeepers to correct Western-centric misrepresentations • Cross-checking and verifying references to eliminate factual hallucinations	"I always cross-check the specific data, like searching on Google whether Carl Benz actually invented the first car in 1886. I only include it in my slides if it matches." (T5)
Humanizing AI-generated teaching materials	• Performing clandestine labor to sanitize GenAI traces and stylistic markers at a superficial level • Adopting strategic transparency to model critical AI literacy and foster authentic classroom dialogues at an interactive level • Restructuring logical frameworks to overcome the cheating mindset and re-assert human authorship at a deeper level	"I often display a 'failed' AI output in class and say: 'Look, AI hallucinated here.' This teaches students that human critical thinking is still the ultimate authority." (T12)

5 Findings

5.1 Co-creating materials with enhanced interactiveness and multimodality

From the ANT perspective, agency is not confined to human beings, but is produced as an effect of the interactions of heterogeneous actors. Teacher agency, as an effect of entanglements with GenAI, is enacted in previously inaccessible areas such as writing computer code and designing visual materials.

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We found that teachers were using AI to go beyond the text-only boundary, turning abstract knowledge into interactive, visual, and dynamic artifacts. It represents a transition from consuming static textbooks to co-creating multimodal experiences.

For instance, T1 showed an entirely different type of extension of agency by employing AI as a coder. As someone who did not know how to code, T1 managed to get DeepSeek to turn a static vocabulary list into an interactive web-based game (see Figure 1), changing the material form of student practice from rote memorization to gamified interaction.

Figure 1
Screenshot of the Interactive Word Matching Game Generated by DeepSeek



As illustrated in Figure 1 and Extract 1, the visual and interactive design of the webpage materializes T1's extended agency, where the teacher acts as the pedagogical designer and the AI functions as the technical executor, successfully co-creating a new artifact.

> Extract 1
>
> For example, I recently used DeepSeek... I asked it to write a code for me, making a "word matching game" (*Dan Ci Xiao Xiao Le,* 单词消消乐), a webpage version. I just needed to copy the code, open it, and the students could play it directly on the screen... It turned out very well. (T1)

Taking this interactiveness one step further, T12, a teacher educator, created her own AI Agent. In this case, instead of giving a static text on a doctor-patient dialogue, she developed an interactive "Doctor Agent" for students to converse with. Thus, the teaching material is no longer an object to be read but an actor who interacts.

> Extract 2
>
> I built an Intelligent Agent... I set it up to play the role of a doctor. Then I let the students ask it questions... The students found it very novel and engaging. (T12)

Beyond enhancing interactiveness, teachers also employed AI to transcend modal limits by trans-semiotizing textual sentences into engaging multimodal resources, a process Lin (2019) defines as expanding "communication resources... in the dynamic flow of the meaning making" through the coordination of "gestures, facial expressions, sounds, [and] visual images" alongside language (p. 5). For

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instance, when teaching the usage of the verb "spend", T1 exercised a form of collective agency. T1 first acted as a prompter, instructing AI to generate a 16:9 comparative image to visually contrast a student "spending too much time on video games" with one who is "experiencing university life" (see Figure 2).

Figure 2

The AI Interface Showing T1's Prompt and the Generated Images for the Target Sentence



Getting what she wanted, T1 embedded these AI-generated visual artifacts into her presentation slide, alongside the target grammar rules and example sentences (see Figure 3).

Figure 3

The Final Teaching Slide Integrating AI-generated Images, Grammar Explanations, and Pedagogical Guidance



Note: All quoted excerpts retain original wording, including linguistic inaccuracies. These are not presented to assess teachers' language proficiency. For example, there is an error "college students spends".

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As illustrated in Figure 2 and Figure 3, the teacher delegates the task of visual design to the non-human actor AI, effectively transforming a traditional text-based grammar lesson into a dynamic multimodal assemblage. More importantly, through this visual trans-semiotization, the teacher successfully embeds moral and value education (e.g., advising against gaming addiction) into language teaching, showcasing how teacher agency orchestrates both linguistic and ideological components within the newly established educational network.

Similarly, T11 used AI to extend beyond this limit of textual literature reviews. T11 said that she turned dry textual documents into vivid digital videos, and students could watch the videos to understand the complicated theories. This is a process of trans-semiotizing (from text to video) based on a collective agency: teacher's selection and AI's rendering capability.

Furthermore, T10 mentioned that she used AI for some "high-stakes" professional affairs: when applying for a "First-class Course" (*Yi Liu Ke Cheng,* 一流课程), she applied AI technology to create knowledge graphs and made promotional videos, things that used to be done by professional technical teams.

> Extract 3
>
> Especially when we were applying for the First-class Course... we needed to make knowledge graphs. At that time, we used AI to generate them... and also used AI to help edit and generate some videos. (T10)

As noted in recent studies, GenAI tools are capable of generating "human-like content such as audio, code, images, text, simulations, 3D objects, and videos" (Moorhouse & Kohnke, 2024, p. 1). In language teaching materials augmentation, GenAI fosters teachers' creativity and expands the modal affordances, in ways previously inaccessible to frontline teachers (Dewi, 2025). This is how collective agency is enacted in materials co-creation.

5.2 Adapting AI-generated materials to accommodate learner levels

Although GenAI has considerable generative capabilities, its outputs do not always align with learners' specific proficiency levels and pedagogical needs. From the perspective of ANT, the connection between the AI actor and the student actor is not necessarily direct; there may also be mediation by the teacher. Here, we see how, by means of "linguistic calibration" (modification, reorganization, see McGrath, 2013 for traditional materials adaptation), teachers act as intermediaries between GenAI and students, adapting AI outputs so that they are pedagogically "safe" for their particular students, thereby augmenting the raw generated content into effective teaching materials.

Another frequent observation is that AI usually has trouble correctly figuring out the language proficiency of Chinese EFL learners. As some teachers explained, AI may generate materials which are "too childish" or "too abstract". Either way, teachers would have to step in to re-calibrate the linguistic difficulty.

T7 provided a vivid example of correcting the AI's underestimation of learner proficiency. She noted that the reading materials generated or adapted by AI often defaulted to a simplified language style unsuitable for English majors. Her agency was enacted through her critical scrutiny of AI-generated materials, as well as her follow-up prompts that pushed AI to elevate the linguistic difficulty so as to match her students' needs:

> Extract 4
>
> Sometimes it generates something that I feel is too simple for my students. So I will tell it, "You need to increase the difficulty." Because although my students are university freshmen, the vocabulary needs to be at a certain level to push them make progresses. I can't let it (the

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> vocabulary) be too simple... I will verify it (AI outputs) myself to see if it meets the students' level. (T7)

In this case, T7 is acting as a quality control OPP. She is not accepting the AI's default setting and raw output, but instead enforcing a standard that reflects the curriculum requirements and students' level for vocabulary acquisition. This resonates with Q. Chen et al.'s (2026) notion of AI-pedagogical knowledge, the specialized ability to translate teaching intentions into explicit, actionable instructions for GenAI. In T7's case, this knowledge was manifested in her iterative prompting and evaluation of AI-generated materials against students' proficiency levels.

As opposed to T7's "adjusting upward", T4 concentrated on "feeling out" in terms of oral production. In particular, in her oral English class, she discovered that the automatically generated discussion questions were grammatically accurate but cognitively inappropriate for prompting student participation. Therefore, her adaptation strategy was to filter the material very carefully so that it would help rather than hinder student speech.

> Extract 5
>
> I need to screen them. Some questions generated by AI might be good, but they are too broad or too difficult for students to answer immediately in class. I have to pick those that are grounded and fit their current level. I act as a gatekeeper. (T4)

In other words, this theme suggests that even though AI can create infinite content, it is insensitive to context and cannot meet learners' needs. Thus, the teacher's role changes from being a content provider to a rigorous filter and adjuster. In this way, the teacher serves as another OPP. Specifically, through translation, the teacher changes the raw, unstable AI output into valid language teaching materials; by calibrating difficulty (T7) and building scaffolds (T4), the teacher makes it feasible. Through such calibration, screening, and scaffold-building, the teacher ensures that the human-AI-teaching materials-learner network will be stable and effective.

5.3 Curating AI-augmented materials for cultural and factual appropriateness

In addition to linguistic calibration, teachers also need to curate AI materials so that they are culturally appropriate and factually accurate. As Xiong and Hu (2022) emphasize, the inculcation of cultural and moral values is an integral part of English language teaching (p. 42), making teachers' role as cultural gatekeepers all the more critical when GenAI introduces potentially misaligned content. Since LLMs are loaded with cultural biases and factual hallucinations that are embedded in their training data (Tao et al., 2024), several interviewees reported having to function as ideological and cultural gatekeepers, and intervene to correct these distortions, to ensure that the AI materials fit both local cultural values and academic facts. The data shows that English language-based AI models may apply Western cultural frames to Chinese content or fabricate academic information. Teachers also display agency in identifying and overwriting such "foreign" or "fake" scripts.

There was a typical case of cultural misrepresentation for T2 in relation to the generation of Chinese cuisine. The AI included "General Tso's Chicken" as a representative dish of Chinese food, which is obviously an example of American-centric bias. T2 intervened in time to correct the factual error, avoiding the spread of wrong cultural knowledge.

> Extract 6
>
> It (AI) listed "General Tso's Chicken" (as a traditional Chinese dish), but this is actually American-Chinese food and cannot represent Chinese culture at all. I commented on this mismatch immediately, telling them (my students) why it cannot represent Chinese cuisine. (T2)

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This cultural gatekeeping was not an invisible backstage preparation, but a visible teaching intervention in the classroom. Classroom observation captured how T2 explicitly pointed out AI's cultural misrepresentation to her students, turning the AI bias into a teachable moment.

> Classroom Observation Extract 1
>
> T2: So, the AI suggested "General Tso's Chicken" as a classic Chinese dish to introduce to foreign guests. What do you think?
>
> S1: I never heard of "General Tso's Chicken", maybe it's not a typical Chinese dish.
>
> T2: Well, it is a famous dish in many American-Chinese restaurants. The point is, it does not represent authentic cuisine in China, right? I think maybe this AI is also trained on some Western data, so it provided a wrong answer..
>
> S2: AI can produce wrong answer? Can we use "Kung Pao Chicken" instead?
>
> T2: "Kung Pao Chicken" is OK. Here I'd like to take the opportunity to tell you that we cannot just accept whatever the AI feeds us, instead, we must be critical AI users.

This classroom episode shows how T2 functions as the OPP. She stabilizes the educational network by purposefully involving students in critiquing AI's cultural mismatch. In this way, the co-created materials were corrected to align with authentic local cultural facts. Such gatekeeping practices are important since many LLMs are mainly trained on Western-centric datasets, often encoding cultural biases, stereotypes or other inaccurate representations in materials (Tao et al., 2024).

T5 also mentioned her fear of the AI hallucinations when generating reports. The AI has the ability to fabricate an entire report that is "100% fake and looks like it is for real." In response, T5 emphasized the importance of critically checking AI-generated information, particularly reports and references that appeared credible but might contain fabricated content.

> Extract 7
>
> It (AI) has a capability to fake things. The report it created can be 100% fake although it looks very real. But once you check it, the data can be all wrong. This is the same when you ask it to give references. So we also prohibit students from using AI to write, especially for literature reviews. (T5)

In this theme, the AI is not regarded as a neutral provider, it becomes an unreliable actor that occasionally produces cultural bias and fake facts. Therefore, the teachers are forced to act as the OPP to curate the materials AI generates for cultural and factual appropriateness. Through the process of translation, the raw, unstable and sometimes culturally and factually biased AI output is converted into reliable materials. By pointing out cultural mismatches (T2) and emphasizing the need to verify potentially fabricated AI-generated information (T5), teachers seek to ensure that AI-generated materials serve their pedagogical goals.

5.4 Humanizing AI-augmented teaching materials

The fourth theme of agency enactment is Humanization. From an ANT perspective, the network formed by teachers, students, and AI is fragile. If the visibility of the non-human actor (AI) increases, it may challenge the legitimacy of the human teacher, resulting in a loss of trust. Thus, teachers use ways to sanitize the AI traces, re-assert their human authorship, and stabilize the educational network.

To illustrate this fragility, the necessity to reassert authorship is shown very clearly by the example of T9, which has revealed the "vulnerability of collective authorship". T9 produced courseware with the help of AI, and one of his students complained about him to the "12345 Government Hotline" that he was "lazy because he used AI to augment teaching materials".

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Extract 8

Students reported me to the 12345 hotline... saying I used AI to be lazy... And after the incident, leaders who encouraged us to use AI implied me to decrease the use of AI, I am really confused. (T9)

This incident shows that without the enforcement of teacher agency, the AI-augmented teaching materials may lead to a break-down in educational network. As Barnes and Tour (2026) observe, when "relational and contextual factors" position GenAI "as something that threatened the fidelity of language learning and teaching" (p. 24), teachers may deliberately conceal their use of it. T9's experience gives weight to this legitimacy threat claim in reverse. When universities merely pay lip service to encouraging AI use, yet lack clear written policies or institutional mechanism to protect teachers, teachers are likely to feel forced to hide traces in their teaching materials. Meanwhile , T9's case confirms that humanization is not only about quality control, but also about surviving legitimacy threats in a context where AI use remains institutionally unprotected.

In response to the abovementioned legitimacy crises, teachers employ coping strategies firstly on a surface level. Many teachers feel forced to sanitize the artificial look and mask AI traces as they expressed anxiety about the visibility of AI-augmented materials. In order to preserve their professional authority, they perform backstage labor to cover up the visual and stylistic traces of AI. For instance, T3 stated that he has to "format and beautify" AI-augmented content because he senses a crisis of legitimacy: when students find out that certain content is AI-generated, his authority to assign tasks is questioned.

Extract 9

I have to adjust the format because once students find out that the questions are asked by AI, they will ask back: "Then can I also use AI to answer?" So I must avoid letting them know. And I call it a kind of clandestine labor. (T3)

T10 talked about "De-AI-ing" at the textual level. She found that AI-generated PPT drafts were full of redundant, robotic language, what she calls "car-wheel talk". Her agency is manifested in "stylistic cleansing," i.e., the removal of non-human markers so they conform to professional standards.

Extract 10

In PPTs generated by AI, the language is often piled up with a lot of "car-wheel talk" (redundancy). I have to clean it up by extracting non-human like words or other markers, and make it fit the professional standard of a teacher. (T10)

Besides the clandestine labor on the surface level, a contrasting yet equally agentive strategy emerged from the classroom observation data: strategic transparency. Rather than concealing AI traces, some teachers explicitly claimed the use of AI in generating teaching materials to re-assert their authority. To illustrate, during a classroom observation, T2 deliberately displayed a PPT slide with AI watermarks (Generated by Doubao AI), using it as a teachable moment to clarify the human-AI boundary (see Figure 4).

Classroom Observation Extract 2

T2: As you can see from the AI watermark on this slide, I generated these pictures using Doubao. However, I did not just blindly use AI and copy the outputs to my PPT. I prompted the AI repeatedly and tailored these contents exclusively for your class, I hope you like these.

From an ANT perspective, this explicit exhibition of AI watermark is a proactive boundary-setting behavior. By openly acknowledging the GenAI's contribution in providing the vivid images, while simultaneously emphasizing the teacher's intent (e.g., "specifically tailored...exclusively for your class"),

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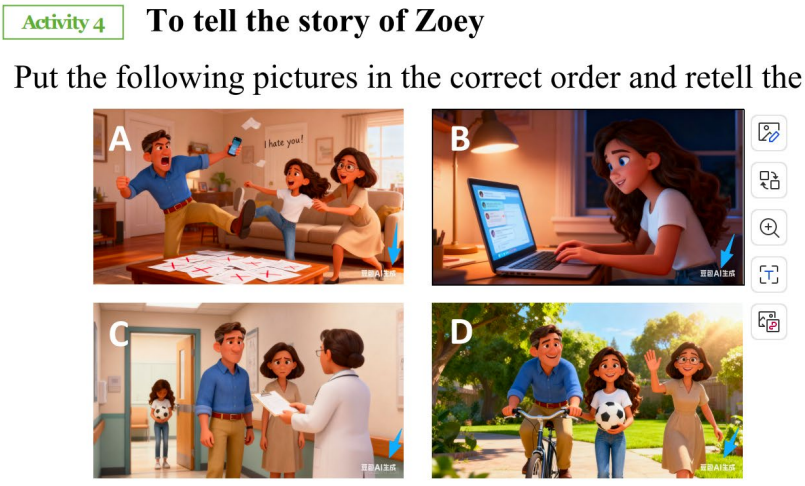
T2 effectively shifts her professional identity from a vulnerable materials creator that faces legitimacy threat, to an authoritative and transparent co-creator. This AI usage disclosure serves as an ethical shield. T2 openly defines the AI as a subordinate tool rather than a hidden author, thus avoiding potential legitimacy crisis and stabilizing the educational network.

At a deeper level, teachers also grapple with psychological barriers. T5, for instance, admitted that she keeps having a "cheating mindset," in her mind. According to her, the absence of clear institutional guidelines left her with lingering guilt about AI use in teaching materials augmentation. She is afraid that when students find out she is relying on AI to generate teaching materials, she is "being lazy." This unease echoes the emerging concern of technostress among language teachers in the GenAI era, where the rapid advancement of AI, together with inadequate institutional guidance, can erode teachers' professional confidence (Kohnke et al., 2024). In response to these struggles, T8 offered a compelling metaphor: the teacher should be a chef, not a porter. As she further explained, AI may provide the ingredients (in this study, AI-generated materials), only the teacher can restructure the underlying logic and give these materials more depth, thereby transforming raw GenAI outputs into quality teaching materials.

The final theme reveals the hidden struggles of language teachers in using AI to generate materials and the urge for them to humanize the materials. The integration of AI in augmenting teaching materials is not a one-time fix, it requires ongoing maintenance if teachers are to sustain their professional identity and authority, and humanization constitutes an important dimension of the ongoing work through which teachers negotiate their professional identity and authority. Without sanitizing the AI look or strategic transparency to re-assert teachers' authorship, the teacher's professional identity would be threatened. Such humanization exemplifies teacher-AI collective agency, and it shows that teachers' value is not assumed, it has to be reclaimed through humanization of AI-augmented materials.

Figure 4
A PPT Slide Explicitly Labeled With "豆包 AI 生成 (Generated By Doubao AI)" as A Transparent Orchestration Strategy



6 Discussion

6.1 Collective agency in AI-empowered teaching materials augmentation

The present work aims to unravel the complex reconfiguration of language teacher agency which is distributed in the complex human-AI actor network. It has been found that when using GenAI to augment

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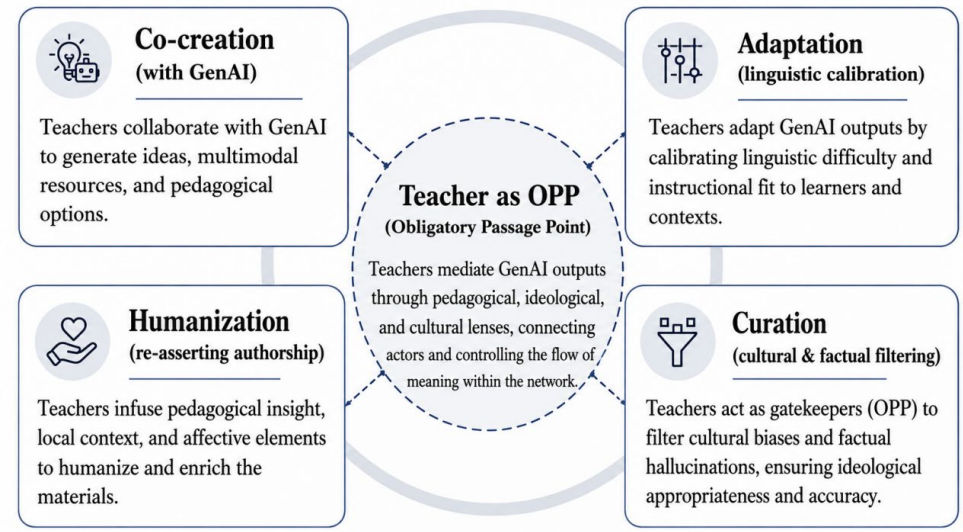
language teaching materials, the teachers have been involved in a model of Co-Creation, Adaptation, Curation, and Humanization (Figure 5). It is within these processes that the human-AI collective agency is manifested. In this paper, we extend the notion of collective agency in language teaching materials augmentation. While it is pertinent to discuss how language teachers enact collective agency by building closely-knit professional networks, aligning goals, and providing mutual support to deal with institutional stress (Tao & Zhao, 2025), it becomes equally relevant to consider collective agency as distributed between human and non-human actors including GenAI. Put in other words, agency has become a shared capacity distributed in the human-AI assemblage. As evidenced by T1's word-matching game through computer programming under the guidance of AI (Extract 1) and T12's development of a doctor agent (Extract 2), teachers are no longer constrained by their technological or modal limitations. Instead, they "collaborate" with AI to form a synergistic partnership, in which collective agency unfolds. These cases illustrate how teachers' pedagogical intentions become intertwined with GenAI's generative affordances, consistent with the relational perspective of entangled pedagogy (Barnes & Tour, 2026; Fawns, 2022). They suggest that materials augmentation may involve forms of agency emerging through human–AI interaction, extending discussions of collective agency beyond collaboration among teachers alone.

Figure 5
Human-AI Collective Agency in Augmenting Language Teaching Materials



6.2 De-legitimation and re-legitimation of teacher agency in the era of AI

The other main issue in this study is concerned with how human-AI collective agency is developed through interaction from the perspective of ANT. As opposed to looking at technology as a docile instrument, an ANT perspective allows us to see GenAI as something active and possibly rebellious. Guerrettaz (2021, p. 39) conceptualizes materials-in-action through pedagogical ergonomics and intra-action, foregrounding how teaching materials, teachers, and students jointly shape classroom activity. This sociomaterial perspective helps illuminate the relational dynamics through which GenAI participates in materials augmentation. However, our results show that such powerful non-human agency poses a risk of "de-legitimation" for human teachers. When AI becomes too prominent, teacher authority and authorship will be destabilized. Such effect of de-legitimation can be shown clearly through how T9's experience of being reported to a government hotline for "being lazy with help of AI" (Extract 8). Therefore, the human-machine collective authorship can be acutely vulnerable. This kind of vulnerability manifests as psychological struggles or technostress (Kohnke et al., 2024), such as T5's confession that she has been suffering from a "cheating mentality" and feelings of guilt.

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In order to counter this disruption and re-legitimize authority, teachers need to proactively perform OPP roles (Callon, 1986). Often, they manage this role through what Smith (2024) calls textbook reflexivity in situ. In plain words, teachers constantly reflect on and adjust teaching materials in real time, sometimes right in the classroom. For instance, T2 turns AI's Western-centric bias regarding "General Tso's Chicken" to a teachable moment by explicitly talking about AI's cultural bias with her students (Classroom Observation Extract 1), fostering their critical cultural awareness. Furthermore, T8's vivid metaphor that teachers should act as a chef rather than a mere porter shows how teachers reorganize AI-generated materials and re-assert their authorship. Similarly, T2's strategic transparency in retaining the AI watermark on her PPT slides (Classroom Observation Extract 2) is also a means of re-legitimizing her professional identity and authority. As visually synthesized in the conceptual model, through continuous translation, which encompasses linguistic calibration, ideological and cultural gatekeeping as well as strategic humanization, teachers successfully mitigate the AI disruption, re-legitimate their professional identity, and finally stabilize the fragile educational network.

Understanding teacher agency as a collective accomplishment has profound practical implications for language teacher development. The distribution of agency between human and non-human actors in language teaching materials use makes it no longer sufficient to train teachers merely as computer users. Teacher education should now prioritize critical AI literacy, empowering teachers to actively discern AI hallucinations and biases. Teachers are required to play the role of OPP, exerting the human-AI collective agency rather than passively relying on AI to take over their tasks. Institutionally, the unremitting anxiety, clandestine labor, and cheating mindset reported by the participant teachers show that there exists a lag in policy making regarding using AI to augment teaching materials. When policies fail to catch up with technological realities, teachers tend to be vulnerable to legitimacy crises. In light of this reality, authorities are supposed to establish transparent, supportive ethical frameworks that validate teachers' collaboration with AI in materials augmentation.

7 Conclusion

In this study, we seek to understand how language teacher agency has been reshaped in the age of GenAI. Drawing on the ANT perspective, the research moves beyond the binary of AI as either a one-size-fits-all panacea, or a de-skilling threat to teachers. Our findings reveal that teacher agency is no longer an individual capacity, but a collective accomplishment between human and non-human players. EFL teachers are less like mere consumers of textbooks than more of content co-creators, cultural gatekeepers and network orchestrators. And through the intricate translation process of linguistic calibration, cultural filtering and strategic humanization, teachers re-legitimate their professional identity and stabilize the often-fragile network of human-AI co-created teaching materials. While this study offers fresh theoretical and empirical insights into the human-AI cooperation in augmenting language teaching materials, it is not without limitations. Firstly, culturally confined to EFL teachers in China, its findings cannot be readily generalized to other educational contexts. Secondly, the dataset is unbalanced for triangulation, given that classroom observations were conducted with only two participants, which may constrain the robustness of the conclusions. Future research could investigate human-AI collective agency in diverse cultural and educational environments. Additionally, it is important to examine how students perceive, engage with, and co-construct agency around AI-augmented materials in and beyond the classroom.

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Tao Xiong is Professor at the MOE Key Research Center for Linguistics and Applied Linguistics, Guangdong University of Foreign Studies, China. His research interests center on language teacher development, textbook studies, and discourse analysis. He has published in journals such as *Modern Language Journal*, *TESOL Quarterly*, and *International Journal of Bilingual Education and Bilingualism*. He also serves on the editorial board of *Linguistics and Education*, and *International Journal of Chinese Language Teaching*.

ORCID: https://orcid.org/0000-0002-0522-8747

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Wenli Xu is currently a PhD candidate at the MOE Key Research Center for Linguistics and Applied Linguistics, Guangdong University of Foreign Studies, China, and a faculty member at School of International Studies Guangzhou Xinhua University. Her research interests include AI-augmented materials development and use in language education, language teacher professional development, and sociolinguistics.

ORCID: https://orcid.org/0009-0008-3598-3357

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