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Knowledge thresholds of pre-service efl teachers interpreting traditional Chinese medicine in “*journey to the west*”

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Abstract

It is a cultural and pedagogical issue on how to describe Traditional Chinese Medicine (TCM) by using English. To globalise Chinese cultural heritage, it cannot be realised without TCM. However, the pre-service EFL teachers usually have insufficient knowledge to understand TCM cultural annotation properly from “*Journey to the West*”. Therefore, this study sets out to identify the knowledge base that pre-service EFL teachers need to acquire in order to comprehend and convey TCM cultural knowledge in the classroom. The theories were behaviourism and andragogy theory of adult learning. A sequential explanatory design was utilised combining surveys and focus group interview. A total of 486 pre-service EFL teachers, 36 teacher educators, 40 medical lectures and 30 medical professors participated in the study. They were recruited by random and purposive sampling technique for different phases. Survey gauged 592 participants' perceived competence to interpret TCM cultural knowledge in the “*Journey to the West*.” Focus group interview with 5 teacher educators, 2 medical lecturers and 3 medical professors further investigated perceived gaps in knowledge. The analysis was descriptive and thematic. Results indicated that pre-service EFL teachers experienced significant level of ambiguity in interpreting the TCM vocabularies. Qualitative data showed a pressing need for more integrated teaching models to develop TCM cultural knowledge and intercultural communicative competence together. It implicates a necessary change in EFL teacher education. It is to integrate explicit TCM culture into the curriculum. Future studies should focus on the creation and testing of culturally materials to maximise cultural influence and promote cross-cultural teaching effectiveness in EFL settings.

Keywords: Traditional chinese medicine cultural knowledge, Pre-service EFL teachers, Intercultural communicative competence, Behaviourism, Andragogy theory of adult learning

Introduction

In China, Traditional Chinese Medicine (TCM) is viewed as a diplomatic symbol of its civilisational legacy. However, the pedagogical praxis of intermediating TCM in the English as a Foreign Language (EFL) in higher education has been underexamined. Little research available has focused on either macro-level policy analysis (Liu et al., 2023)

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or on translating individual TCM cultural knowledge for specific stakeholders (Zhou, 2022). They somehow not take into account the epistemic and intercultural challenges China pre-service EFL teachers are confronted with.

But new policies suggests that such neglect is no longer tenable. The “Compulsory Education English Curriculum Standards” approved by the Ministry of Education in 2022 requires prominent incorporation of TCM into English curriculums. In addition, “Implementation Plan for the Dissemination of TCM Culture (2021–2025)” clearly states the necessity of a well-regulated fundamental skill-training for China pre-service EFL teachers to ensure synchrony between teaching and learning. In addition, the 14th Five-Year Plan for Education Development (2021) suggests deepening educational reforms and strengthening international cooperation provide policy support for pre-service English teachers to develop intercultural communicative competence. It encourages universities to enhance intercultural education in curriculum design and teacher training (Ministry of Education, 2023). Specifically, the Guidelines for Undergraduate Foreign Languages and Literatures Programs in Chinese Universities requires to cultivate pre-service EFL teachers’ understanding of cultural phenomena, awareness of cultural differences and intercultural communicative competence (Ministry of Education, 2020). Thus, teaching should highlight the diversity of world cultures, foster respect for cultural diversity and enhance critical cultural awareness to enable students to describe and evaluate different cultural phenomena. These policy convergences situate TCM not as an extracurricular but rather as a core part of professional training, as it is a core of core competencies of pre-service teachers (Zhao & Liu, 2024).

Despite this imperative, much of the current teacher education literature defines intercultural competence in generic terms (Zhang et al., 2025). They draw on Western cultural referents and marginalise indigenous epistemological systems (Tovar-Correal & Pedraja-Rejas, 2025). Significantly, while these empirical studies have questioned Chinese cultural content, even those that empanel traditional literatures like “The Analects” or Tang poetry, they rarely take into account the hybrid mytho-medical narratives of “*Journey to the West*”, where alchemical elixirs and herbal therapeutics intersect. As a result, there is no evidence-based mapping of the particular conceptual, linguistic and pragmatic knowledge domains that novice Chinese pre-service EFL teachers need to at their command to make TCM cultural knowledge intelligible and credible to learners. In addition, few studies have looked at needs-analysis based on teacher cognition to shed light on Chinese pre-service EFL teachers’ imagination of the relevance, complexity and pedagogical translatability of TCM.

In addition, “*Journey to the West*” is well suited as the focal text because it integrates traditional Chinese medical culture within a narrative form. As one of the Four Great Classical Novels, it incorporates key TCM ideas such as herbal remedies, qi circulation, Yin and Yang and the Five Elements into plot events and character development. For example, Sun Wukong uses herbal medicine to heal others and characters are associated with elemental properties that reflect their temperament. Unlike technical medical treatises, the novel presents these concepts through familiar story situations, which makes TCM knowledge more accessible and meaningful. Its international readership also provides opportunities for cross cultural understanding. At the same time, the combination of mythological content and specialised medical concepts creates pedagogical difficulties

for EFL teachers when introducing culturally embedded knowledge to diverse students. These features make “*Journey to the West*” a relevant and challenging text for examining pre-service EFL teachers’ interpretations of TCM culture and their instructional needs.

This gap is problematic for three interrelated reasons. Without detailed knowledge of what is required at the different levels, teacher education programme is unable to provide the scaffolding needed for learning pathways. Second, an underspecified knowledge base can impact the fidelity with which culturally rich stories are passed on. It might lead to misinforming. Third, the failure of such preparations would inevitably compromise the overall objective of nurturing cross-cultural communication via health humanities as a strategic frontier of China’s global engagement.

Therefore, this current study holds a needs analysis in order to work out and categorise the knowledge domains that Chinese pre-service EFL teachers consider necessary for understanding TCM in the novel of “*Journey to the West*”. By triangulating the evidence from surveys and interviews, this study adds to the literature of a data-driven analysis that will support curriculum planning, assessment and professional standards. Following that, this study answered the research questions:

- i. Which knowledge domains do pre-service EFL teachers identify as indispensable for mediating TCM cultural references embedded in “*Journey to the West*” for an English-medium audience?
- ii. Which specific knowledge domains do teacher educators, medical lecturers and professors regard as critical for preparing pre-service EFL teachers to interpret and teach TCM to learners?
- iii. How do the perceptions of essential knowledge held by pre-service EFL teachers align with/or diverge from those of teacher educators, medical lecturers and professors?

Literature review

Theories

Current discussions in instructional design increasingly emphasise the need for theoretical frameworks that bridge micro-level learning processes and the sociocognitive constraints of tertiary education. This study responds to this call by integrating behaviorism and andragogy into a cohesive framework to examine the knowledge requirements of pre-service EFL teachers tasked with negotiating TCM in “*Journey to the West*”.

First of all, behaviourism is often critiqued as reductionist. It offers critical precision in this study. Its focus on observable performance and criterion-referenced goals enables the delineation of discrete conceptual, linguistic and pragmatic behaviors underlying TCM competence (Morrison et al., 2019). By operationalising learning goals as measurable stimuli and responses, such as accurate glossing of TCM vocabulary, behaviourism provides a specific evaluative grammar that constructivist approaches often lack (Schunk, 2020). However, behaviorism alone risks overlooking the agentic and self-regulatory capacities of pre-service EFL teachers as adult learners. Andragogy addresses this gap by emphasising that adult learners bring relevant experiences, goal orientations and intrinsic needs to learning.

In this study, pre-service EFL teachers' language proficiency and career aspirations act as potent filters shaping their uptake of TCM knowledge. Thus, the needs analysis prescribed by andragogy functions not as a marginal diagnostic tool but as an epistemic foundation that frames the entire instructional intervention. Empirical evidence supports that needs-responsive curricula enhance adult learners' motivation, persistence and learning transfer. They are attributes critical when engaging with high-stakes and culturally rich content like TCM (Suárez-Álvarez et al., 2024).

The integration of these theories forms a dialectical framework that mutually addresses their limitations. Behaviorism's methodological specificity, such as guiding sequenced learning experiences is complemented by andragogy's macro-level focus, which embeds these experiences within pre service EFL teachers' professional trajectories and cultural backgrounds. For example, behaviourism's underemphasis on learner autonomy is mitigated by andragogy's focus on self-direction, while andragogy's vague assessment guidelines are strengthened by behaviourist performance standards. This synthesis aligns with El-Amin (2020) concept of "contingent alignment." Learning stimuli are dynamically adjusted to adults' varying competence profiles. In practice, this means needs analysis drives iterative modifications to the learning environment for sustaining a virtuous cycle of behavioral feedback and motivational relevance.

Following that, by integrating behaviourism and andragogy, this framework transcends the descriptive scope of a needs analysis to offer theoretical contributions. It demonstrates how complementary theories can operationalise both the granular behaviors and the agentic contexts necessary for teaching culturally complex content like TCM. This hybridity not only validates precise mapping of knowledge behaviours but also honours pre-service EFL teachers' autonomy and experiential capital. Thus, it lays groundwork for a competency framework that balances accuracy and sensitivity in TCM instruction.

Pre-service teachers' knowledge base

Shulman (1986) makes teachers' knowledge base as subject-matter content knowledge (SMCK) and pedagogical content knowledge (PCK) (Sarkar et al., 2024). In this present study, SMCK must include TCM cultural knowledge and intertextual mythography. Mere knowledge of English words is obviously inadequate. Similarly, PCK is not simply a set of general vocabulary pre-teaching or comprehension checking strategies. Rather, it must code in terms of principles of intercultural mediation, metalanguage for explicating epistemic divergence between Western biomedicine, TCM and translational pragmatics for retaining doctrinal subtlety without exoticising the originating culture.

The literature hints at the futility of accounting for these complex instructional ecologies using a dual-component model. Research on L2 cultural teaching (Li, 2025) and content-based language teaching (Villabona & Cenoz, 2022) in practice indicate that novice teacher often misunderstands the nature of culture as static artifact but not dialogic practice. It is related to limitations in both deep structure SMCK and adaptive PCK. In addition, translation studies emphasise that if teachers are not given explicit training in genre-specific translation strategies that they resort to paraphrase, it might lead to a loss of semantic fidelity (Chen, 2024). These converging results hint at a third stratum of knowledge that is frequently ignored, namely translational and

intercultural pedagogical knowledge (TIPK). It is an amalgam in which discourse-level translation competence meets intercultural communicative awareness (Baker, 2024).

This is why calling into question pre-service EFL teachers' knowledge base is crucial. First, this teacher education programme is the last formal opportunity for them to acquire TCM cultural knowledge before they become tacit through practice. Second, Ministry of Education in China's culture-infused EFL standards have made TIPK a minimum professional standard (Ministry of Education, 2020). If the content were taught, entitlement to teach that curricular content requires epistemic preparedness to teach it. Thirdly, the lack of a data-driven model in pre-service EFL teachers leads to a curricular drift. They may not have a map to guide the sequencing of courses. Following that, writing test developers are unable to operationalise valid assessment indicators.

Therefore, this present study integrates SMCK, PCK and TIPK into a novel knowledge structure for TCM cultural knowledge. By triangulating surveys and focus group interview, it aims to articulate nuanced knowledge dimensions and relational weightings. These could provide a scaffold for programme design, benchmarking of accreditation and axes for further empirical study. It is important to fill this gap, not only for pedagogical improvement, but also for the epistemic security of China's heritage culture in English classrooms.

Needs analysis

Needs analysis is not a formality requirement. It is an epistemic engine that enables to convert abstract curriculum needs into customised learning paths (Dou, 2024). The andragogy theory of adult learning postulates that adults put in effort if they perceive an appreciable difference between their pre-existing competency and some valued achievable stage (Branch, 2018; El Amin, 2020). In this present study, pre-service EFL teachers in China stage their own translanguaging moves that preserve the TCM culture in "Journey to the West." In the absence of empirical evidence of readiness, teacher educators run the risk that the calibration of instruction will overstate estimates of learner readiness. It is a squandering of instructional capital.

The rationale for this gap is laid out in Macalister and Nation (2020). It makes few concessions but diagnoses with a forceful wallop. But importantly, it transcends the binary of what learners know and do not know by positing two analytically different constructs. First, it provides situation with an elaborate map of conceptual, linguistic and pedagogic competences which it is actually in possession of. Secondly, it addresses the situation including the competency profile adopted for the authentic pedagogic tasks in question. The double-helix form of the second lens is in very good agreement with SMCK, PCK and TIPK mentioned.

Finally, a needs analysis is also a formative evaluative device in that it informs and sets baseline data that measures learning gains when related to syllabus design (Dou, 2024). In general, the embedding of this need analysis in the methodological and theoretical context that supports the andragogy theory of adult learning and the competence frame of this current study is pragmatically necessary in terms of protecting the authenticity of culturally oriented Chinese TCM in EFL classrooms.

Past empirical

Empirical research on EFL teacher education consistently links strong professional competence to the interplay of content knowledge, pedagogical knowledge (PK) and PCK (Almutawa & Alfahid, 2024). However, most studies frame “content” narrowly as canonical L2 literacies. It might sideline epistemically dense indigenous knowledge systems, such as TCM cultural knowledge as analytically peripheral (Li, 2024). Compounding this oversight, existing research rarely addresses the affective and identity-related dimensions of teaching culturally complex content like TCM.

To continue, Wu et al. (2023) noted that this field remains nascent. The prior work overfocused on learners rather than teachers in China and Iran. Systematic exploration of how teachers’ emotion regulation shapes their ability to teach specialised cultural content is lacking. For culture-infused language teaching, this dual gap (knowledge framing and emotional support) is critical. When EFL teachers lack both disciplinary grounding in TCM and strategies to regulate emotions tied to teaching unfamiliar content, the cultural dimension is doubly neglected. It directly contradicts intercultural learning objectives. These pedagogical deficits highlight the urgent need to integrate TCM cultural knowledge (*Journey to the West*) into English classrooms. It is a gap understudied in existing literature regarding how to support teachers’ emotional and identity-related adaptation to such integration.

Previous research on culture in EFL education rarely extends beyond Confucian aphorisms or Tang poetry (O’Dwyer, 2017). They are content rich in semiotics but irrelevant to TCM. As a result, the unique triadic demands of TCM vocabulary (a key focus of this study) remain empirically unexamined. Moreover, the broader challenges of teacher identity formation in TCM-integrated instruction are overlooked. Shi et al. (2025) emphasised that emotion (conceptualised as *Perezhivanie* or “affective experience”) acts as a mediating bridge between external contextual demands (curricular mandates for TCM integration) and teachers’ identity development. Negative emotions (anxiety about teaching unfamiliar TCM content) risk solidifying restrictive identities (incompetent cultural instructor), which further hinder effective pedagogy. This aligns with Song and Ju (2023) acknowledgment that novice pre-service EFL teachers lack expertise to explain TCM translational complexity. But their work stops short of addressing how emotional stress or identity tensions exacerbate this deficit instead vaguely urging “cultural competence.” Such conceptual ambiguity thwarts targeted curriculum design. Similarly, reflective-practice research shows self-regulated inquiry enhances teachers’ cultural sensitivity (Almutawa & Alfahid, 2024) but provides no framework for discipline-specific reflection on TCM, nor does it connect reflection to emotion regulation or identity. These are key factors identified by Wu et al. (2023) and Shi et al. (2025) as critical for teaching success.

This blind spot contrasts sharply with China’s Ministry of Education policy mandating TCM instruction in tertiary education. Furthermore, it also overlooks the downstream impact on learners. Yang et al. (2025) found that teacher practices shape learners’ motivation, engagement and critical thinking (CT) with engagement mediating the link between motivation and CT. Without a data-driven structure for integrating TCM into EFL teacher education, one that addresses not only knowledge gaps but also teachers’ emotional regulation (Wu et al., 2023) and identity construction (Shi et al., 2025). The programmes risk producing graduates who are pedagogically adept

but epistemologically ill-equipped to teach TCM content and emotionally unprepared to foster the learner motivation and engagement needed for effective intercultural CT development (Yang et al., 2025).

Addressing the above scenario, this current study investigates the granular TCM knowledge domains stakeholders deem essential. By narrowing the gap between policy mandates and empirical understanding, while also accounting for the affective and identity-related factors overlooked by past study, it aims to deliver a data-driven curriculum blueprint. It could honour the authenticity of Chinese medical heritage, supports teachers' holistic professional development and advances intercultural literacy in EFL.

Methodology

Research approach and design

The use of mixed-method research approach was strategically chosen to be able to thoroughly answer different but related research questions. Given the complicated process of exploring culturally embedded perceptions of content in TCM, a sequential explanatory research design was considered to be most appropriate. It allows for starting with the overall identification specific knowledge using needs analysis which will be then further explored in details by the qualitative data in order to interpret the results of the quantitative data and spread the methodological triangulation (Ivankova et al., 2006). This study follows Lincoln and Guba (1985) criteria of credibility, transferability, dependability and confirmability to ensure trustworthiness. These criteria guide the planning, data collection and interpretation of findings. Each criterion is applied through specific strategies that are explained in the following sections. These strategies are consistent with Creswell (2014) quality guidelines for mixed methods research. The quantitative phase employed surveys constructed to address two core research questions. First, it was about specific knowledge areas pre-service EFL teachers view as essential to mediating TCM in "Journey to the West." Second, it was about knowledge areas that teacher educators, medical lecturer and professors identified as key and critical to ready pre-service EFL teachers to interpret and transmit TCM in classrooms. It attempts to fill the research gap about the lack of studies of pre-service EFL teachers' pedagogical preparedness to teach TCM on both the content and pedagogical planes (Shulman, 1986; Byram, 2020).

In the qualitative phase, focus group discussions involved the deductive analysis of the points of convergence and divergence in the perceptions between pre-service EFL teachers and the lecturers and professors from teacher education and medicine. Focus group provided a more nuanced understanding and allowed participants to describe their perceptions and experiences in detail. It assisted in elucidating patterns found in the quantitative data (Krueger & Casey, 2015).

Sampling technique and sample

For this study, different sampling strategies were used in different phases to address the respective research questions. In the quantitative phase, systematic random sampling was applied following three procedural steps. First, a complete list of 1032 pre-service EFL teachers in Mianyang, Sichuan, was obtained through cooperation with the academic affairs offices in three teacher education institutions. This step ensured full population coverage and avoided duplication. Following Cohen et al. (2018), the sampling

interval (k) was calculated by dividing the population size (1032) by the intended sample (516). It produced $k=2$. A random starting number between one and two was then generated using the random number function in SPSS 26.0. Every second teacher on the list was selected, which provided each individual with an equal probability of inclusion.

Although 516 pre-service EFL teachers were initially identified, the final number of participants was 486 because 30 declined due to academic workload. This adjustment did not compromise representativeness. The final number still exceeded Krejcie and Morgan (1970) recommended minimum of 384 for a population of 1000. Therefore, it met statistical power requirements for generalisation. The cohort consisted of first (25.5%), second (15.8%), third (20.4%) and fourth (38.3%) year students.

Including students from all academic years was necessary because pre-service EFL teachers possess different levels of theoretical preparation and practicum experience. Fourth year students usually have more hands-on teaching practice, while lower-year students are consolidating theoretical foundations. This distribution supports broader representation of professional knowledge across stages of preparation and strengthens the interpretation of findings for the wider pre-service EFL teacher population in similar contexts.

For the second quantitative research question, 36 teacher educators, 40 medical lecturers and 30 medical professors were selected through purposive and snowball sampling. These non probability procedures were appropriate because access to specialised professional knowledge was required to address the research aims (Patton, 2015). Participants were included based on predefined criteria (Table 1). Teacher educators needed a minimum of five years of EFL teacher training experience to provide insights into curriculum design and pedagogical needs. Medical lecturers were required to have at least five years of traditional Chinese medicine teaching or practice experience to contribute practical perspectives relevant to classroom contexts. Medical professors needed at least fifteen years of TCM research experience and a doctoral qualification to offer theoretical expertise. This tripartite approach ensured that educational, practical and theoretical dimensions of TCM knowledge were represented, which follows Patton (2015) guidance on expert selection for focused inquiry. The total number of 106 experts is consistent with sample sizes used in comparable mixed methods studies of expert perceptions (Morgan & Hoffman, 2018).

For the qualitative phase addressing the third research question, a purposive subset was selected from the quantitative expert sample for focus group discussions, with criteria aligned to the study’s focus on TCM in *Journey to the West* and EFL teaching. All of the 10 participants met the inclusion criteria such as more than 5 years of professional

Table 1 Inclusion and exclusion criteria

Inclusion criteria	Exclusion criteria
Voluntary participation	Involuntary participation
Minimum 5 years of professional experience (teacher educators and medical lecturers)	Less than 5 years of professional experience (teacher educators and medical lecturers)
Minimum 15 years of professional experience (medical professors)	Less than 15 years of professional experience (medical professors)
Hold a doctoral degree	Do not hold a doctoral degree

experience for teachers educators and medical lecturers, more than 15 years of professional experience for professors and a doctoral degree holder.

Affiliated with Mianyang institution, the teacher educators have 6–12 years of EFL experience specialising in intercultural or EFL methodology. In addition, medical lecturers have 7–9 years of professional experience with TCM clinical teaching background. Professors have 16–22 years of research focussing on TCM literature intersections. All demonstrated strong communication skills.

The sample size was determined by data saturation (Guest et al., 2016). It was not a predetermined count. No new themes emerged after the eighth participant, with two additional participants validating saturation. This aligns with qualitative standards (Morgan & Hoffman, 2018) and enhances the credibility of findings directly addressing the research questions.

Research instruments

Two research instruments were used in this study to triangulate the data and enhance the methodological strength and aims of the study. Firstly, a Five-Likert scale survey adapted from Wahba (2019) was used to quantitatively to collect data from 486 pre-service EFL teachers, 36 teacher educators, 40 medical lecturers and 30 medical professors. The instrument contained thirty items organised into four domains of which the first gathered demographic information such as age, sex, work experience, place of work and the three remaining specifically focused on a defined knowledge domain related to the associated knowledge frame. The reliability of this scale was well established with the Cronbach's alpha value, 0.771. According to Taber (2018), it has fair internal consistency.

The construct validity of the survey was adequately tested using factor analysis and a KMO score of 0.7 (Hair et al., 2018). It showed that the sample size grew to be sufficiently large and was valid for statistical analysis. Moreover, the data was adequate. Further, all validation processes that covered face, content, construct and language validity were implemented by a panel of six experts who had practiced in medical specialties, worked as teacher education authorities in EFL and English language studies linguists. It greatly increased the credibility and appropriateness of the survey.

The survey instrument was selected because it aligns with the needs analysis focus of the study and because Wahba (2019) scale has been validated in related research on teacher knowledge needs. Adaptation involved revising items to address TCM cultural knowledge while retaining the original four domains of identifying, understanding, translating and conveying cultural knowledge. For example, items were added on TCM terminology, translation and intercultural teaching strategies. These revisions were necessary because the present study focuses on TCM knowledge in EFL teaching and therefore requires items that measure related constructs. A six member expert panel reviewed the instrument to confirm face and content validity. Three academics specialised in TCM, two were EFL teacher educators and one was an applied linguist. Their feedback confirmed that the items were relevant, clear and culturally appropriate.

For the qualitative phase, a focus group discussion protocol derived from content developed by Bennett (2017) was used. It comprised 10 open-ended questions to encourage in-depth conversation among participants, with each core question grounded in relevant theoretical or empirical literature to strengthen methodological rigor. The

questions were designed to encourage detailed examination and critical reflection on the core concepts identified by 486 pre-service EFL teachers as necessary for recognising, understanding, interpreting, and communicating TCM content in the classroom. They focused on three areas. First, the questions explored essential TCM knowledge required for interpreting *Journey to the West*, drawing on Shulman (1986) PCK framework and Liu et al. (2023) work on TCM cultural transmission in EFL contexts. Second, they examined approaches for connecting the cultural depth of TCM with the practical demands of EFL teaching, informed by Byram (2020) ICC model and Wu et al. (2023) findings on teacher preparation for culturally complex materials. Third, the questions addressed translation strategies that preserve TCM cultural meanings when teaching in English, supported by Baker (2024) intercultural translation theory and Chen (2024) research on maintaining fidelity in TCM terminology translation. The credibility of the focus group protocol was also thoroughly examined through experts' validation, with face, content, construct and language validity checked and appraised by the above panel of experts, which enhanced the methodological strength and trustworthiness of the qualitatively driven data yielded by the instrument (Krueger & Casey, 2015).

The focus group discussion protocol was selected because Bennett (2017) open ended questioning approach supports detailed exploration of expert perspectives, which is central to the third research question. Ten questions were designed to examine core knowledge domains such as essential TCM knowledge for pre service EFL teachers and approaches to integrating TCM culture into EFL teaching. The protocol was reviewed by the same six experts who evaluated the survey. Their comments confirmed that the questions were clear, aligned with the research aims and appropriate for eliciting detailed professional views. The protocol also aimed to obtain nuanced reasoning that could complement the quantitative findings.

Data collection and analysis

Two data collection methods were used for triangulation of results. The quantitative data collection was completed through a survey via WeChat with 486 pre-service EFL teachers. Participants had at least one week to fill in the questionnaires. The data collection was finished in the first week of March. On the other hand, an online survey was sent to 36 teacher educators, 40 medical lecturers and 30 medical professors via WeChat. As a part of professional obligations and busy work schedules, they were given 1 month to respond. The responses obtained through these surveys were subjected to descriptive statistical analysis through the aid of SPSS software. It allowed a systematic and reliable quantitative analysis of data.

Quantitative reliability was checked by identifying missing values and testing normality. Missing responses accounted for less than 5% of the data and were treated through mean imputation. The Shapiro Wilk test indicated normal distribution for all items ($p > 0.05$), which confirmed the suitability of the data for descriptive analysis. Construct validity was examined through confirmatory factor analysis. The model produced acceptable fit indices ($\chi^2/df = 2.31$, CFI = 0.92, TLI = 0.91, RMSEA = 0.05), which supported the four domain structure of the instrument (Hair et al., 2018).

This was followed by the collection of qualitative data via focus group discussions. Five teacher educators, two medical lecturers, and three medical professors from Mianyang,

Sichuan were purposively selected based on expertise. Due to geographical constraints, online interviews were conducted. Explicit informed consent for audio-recording was obtained prior to discussions to ensure ethical compliance. Discussions were scheduled on weekends to accommodate participants' timelines, lasting no more than 120 min to minimize exhaustion and maintain engagement.

Thematic analysis with Atlas.ti was adopted and grounded in a semi-structured focus group protocol (see 3.3) that included core open-ended questions such as "What TCM knowledge is indispensable for pre-service EFL teachers to interpret *Journey to the West*?" and "How to bridge TCM cultural depth with EFL teaching practicality?" Coding and theme development followed Braun and Clarke (2019) six-step framework. First, transcripts were transcribed and read several times to support familiarisation with the data; second, 10% of transcripts were independently open-coded by two researchers to generate initial codes including "TCM terminology translation" and "cross-cultural mediation strategies"; third, codes were clustered into preliminary themes aligned with research questions; fourth, themes were reviewed against the full dataset and expert feedback; fifth, themes were refined with clear boundaries such as "core TCM knowledge" and "complementary intercultural skills"; sixth, findings were synthesized. Coding disagreements were resolved in consultation with a third senior researcher to ensure consistency.

Triangulation was used to ensure trustworthiness in line with Lincoln and Guba (1985) criteria. Method triangulation combined survey and focus group data. Data source triangulation compared the views of pre-service EFL teachers and experts. Researcher triangulation involved two researchers analysing quantitative and qualitative data independently, with disagreements resolved through discussion. An audit trail was also maintained to document analytic decisions, which supported confirmability (Creswell, 2014).

Before the main study, a pilot test was administered to confirm the clarity, understandability and feasibility of the research instruments. The pilot group consisted of 45 pre-service EFL teachers in another part of Sichuan. It could guarantee the representation of the geographic population and the generalisation of the instrument. Further, the pilot survey was applied to a reduced sample of ten teacher educators, eleven medical lecturers, and seventeen medical professors. Feedback suggested that participants understood survey items and focus group protocols broadly. But they recommended that surveys needed more time for completion and that focus group discussion was too long in duration for improving participation and data quality. These suggestions had also been carefully examined. In consequence, they were integrated into the actual study to show methodological mobility and openness to the comments made by the participants.

Ethical consideration

This study strictly followed the ethical considerations to ensure protection of participants' rights and research integrity. For the online survey, participants provided explicit informed consent by ticking a check box that was specifically designed for consent ensuring active realisation of their participation being voluntary. From the same token, focus group discussions informed consent was obtained with explicit statement of the

participants' consent to the audio-recordings used in involved analyses. It falls in line with the above ethical principles provided by Merriam and Tisdell (2015).

Anonymity of participants was maintained to ensure confidentiality and reduce the possible risks of identification. The aggregate data contained no identifying details or demographic information that could potentially lead to the identification of a person and no such data were published or reported from or on the data collected. Also, strict confidentiality has been maintained. Researchers were the only individuals accessing online survey data, recording and transcript materials. There was not admittance to the information from any external sources in keeping with the confidentiality factors highlighted by Cohen et al. (2018).

There were also security protocols in place for data storage ensuring data was appropriately stored and encrypted to prevent unauthorised access. Furthermore, to comply with ethical standards to the utmost extent, all raw data such as audio files and written text will be permanently destroyed after the findings of the study are published in order to support data management accountability prescribed by Guetterman et al. (2019).

Findings

Pre-service teachers' perceptions of knowledge domains for TCM

In this section, the results of the survey using 486 pre-service EFL teachers are provided. The learning necessities for pre-service EFL teachers are contrasted with knowledge claims of teacher educators, medical lecturers and medical professors in 4.2. The comparison intends to explore the basic knowledge to serve pre-service EFL teachers from the aspect of teaching TCM cultural knowledge as efficiently as possible (Table 2).

As reported in Table 3, pre-service EFL in this study perceive background of practices of TCM, historical and cultural background to be of the greatest importance. Both have a mean score of 4.12. They also recognised the important TCM concepts on health and conservation (mean value = 4.03). TCM cross-cultural communication skill descriptors in English were least important ($M = 2.98$). The skill was rated badly by the them.

It is apparent that 486 pre-service EFL teachers place heavy emphasis on TCM. Knowledge and culture for TCM should be founded on the historical and cultural background. Referring to Table 5, teacher educators, medical lecturers and professors have rating scores that are reasonably aligned with what one might expect to rate. There is also some small variation in scores. It is not as important for the pre-service EFL teachers to know the moral and ethical norms of TCM ($M = 1.61$) and the their proficiency in using multimedia tools to present TCM culture in an engaging way ($m = 2.14$) for both groups.

Table 2 Academic year distribution of respondents

Source	No. of respondents	Percentage %
1st year	124	25.5
2nd year	77	15.8
3rd year	99	20.4
4th year	186	38.3
Total	486	100

Table 3 Preferences for the knowledge needed in descending order (N = 486)

Rank No	Dimension 1: Knowledge needed to identify TCM cultural knowledge	Total score: 5 mean
1	S1-7: Basic understanding of TCM practices (e.g., acupuncture, herbal medicine)	4.12
2	S1-4: Historical and cultural background of TCM	4.12
3	S1-8 TCM concepts related to health and wellness	4.03
4	S1-5: TCM terminology and its English equivalents	3.78
5	S1-9: TCM's influence on traditional Chinese literature and folklore	3.76
6	S1-1: Basic TCM theories (e.g., Yin-Yang, Five Elements)	3.51
7	S1-3: TCM diagnostic methods (e.g., inspection, auscultation, inquiry, palpation)	3.45
8	S1-2: Common TCM herbs and their medicinal properties	3.13
9	S1-6 Cultural significance of TCM in ancient Chinese society	3.06
10	S1-10 Cross-cultural communication skills to explain TCM concepts in English	2.98
Rank No	Dimension 2: Knowledge needed to understand TCM cultural knowledge	Total score: 5 mean
1	S2-9: Connotations of TCM terms	4
2	S2-5: Ability to analyze TCM concepts in the context of Journey to the West	3.75
3	S2-2 Knowledge of TCM's role in traditional Chinese cosmology and philosophy	3.40
4	S2-1: Advanced understanding of TCM theories	3.30
5	S2-4: Familiarity with TCM practices and their symbolic meanings in literature	3.07
6	S2-6: Understanding of TCM's influence on character development and plot in Journey to the West	2.43
7	S2-3: Understanding of TCM's connection to ancient Chinese mythology and legends	2.38
8	S2-10 Cross-cultural understanding to explain TCM concepts in a way that is accessible to non-Chinese audiences	2.12
9	S2-7 Knowledge of TCM's historical evolution and its impact on Chinese society	2.04
10	S2-8: Familiarity with TCM's ethical and moral dimensions	1.61
Rank No	Dimension 3: Knowledge needed to translate TCM cultural knowledge	Total score: 5 mean
1	S3-4: Proficiency in using translation strategies such as domestication and foreignization	4.80
2	S3-8: Understanding of the differences between TCM and Western medical concepts to avoid misinterpretation in translation	4.16
3	S3-1 Familiarity with TCM-specific terminology and its accurate English translation	4.09
4	S3-2: Understanding of translation techniques for specialized fields (e.g., technical vs. literary translation)	3.92
5	S3-6: Ability to translate TCM concepts while maintaining their original meaning and cultural significance	3.79
6	S3-5: Awareness of the historical and cultural context of TCM to provide accurate background information in translations	3.78
7	S3-7 Familiarity with translation tools and resources (e.g., glossaries, translation software) for TCM texts	3.66
8	S3-3: Knowledge of cultural nuances and how to convey them in translation	3.65
9	S3-9: Skill in translating TCM-related metaphors and symbolic language found in <i>Journey to the West</i>	3.42
10	S3-10 Knowledge of cross-cultural communication principles to ensure translations are accessible to non-Chinese audiences	3.38
Rank No	Dimension 4: Knowledge needed to convey Chinese medicine-related knowledge and culture	Total score: 5 mean
1	S4-6: Ability to create lesson plans that combine language learning with cultural exploration of TCM	4.18
2	S4-7: Knowledge of how to scaffold learning for students who may be unfamiliar with TCM concepts	4.16

Table 3 (continued)

Rank No	Dimension 4: Knowledge needed to convey chinese medicine-related knowledge and culture	Total score: 5 mean
3	S4-1 Ability to integrate TCM cultural content into English language teaching materials	3.55
4	S4-5: Understanding of cross-cultural teaching strategies to explain TCM concepts effectively	3.53
5	S4-2: Knowledge of designing interactive activities that promote student engagement with TCM concepts	3.14
6	S4-8: Familiarity with techniques for encouraging critical thinking about TCM in a language class	3.07
7	S4-9: Understanding of how to incorporate TCM themes into speaking and writing activities in English	3.05
8	S4-3 Familiarity with methods for assessing students' understanding of TCM-related content in English	2.62
9	S4-10 Proficiency in designing assessments that evaluate both language skills and cultural knowledge related to TCM	2.17
10	S4-4: Proficiency in using multimedia tools to present TCM culture in an engaging way	2.14

Table 4 Distribution of participants

Source	No. of respondents	Percent %
Medical lecturers	40	37.7
Medical professors	30	28.3
Teacher educators	36	34
Total	106	100

In addition, the participants attach importance to the strategies of translations such as domestication and foreignization when they translate TCM ($M=4.80$). They also stress the importance of understanding the differences in TCM and Western medical concepts and the importance of mastering the TCM vocabulary (both 4.16 and 4.09 respectively). However, the score on knowledge of cross-cultural communication was relatively low with a mean of 3.38. It indicates that the pre-service EFL teachers did not perceive it as important. Research Question One has been fully answered.

Teacher educators' and medical academics' perspectives of knowledge domains

First of all, Table 4 below shows the distribution of the participants.

As shown in Table 4, 106 surveys were obtained in Mianyang, Sichuan. In particular, 40 (37.7%) of the included population are medical lecturers. Then, 34% of the 36 additional respondents are teacher educators. Of the 106 who are left, 30 of them are the medical experts. They represent 28.3%.

Table 5 lists the essential knowledge areas participants feel pre-service EFL teachers should master in order to successfully interpret TCM cultural knowledge. History and culture of TCM is identified as the most important to learn followed by a basic understanding of TCM practice. Other important domains are health-related notions, vocabulary of TCM and its English equivalents, basic theories of TCM and diagnosing methods. But in comparison, understanding of the most common TCM herbs and

Table 5 Participants' preferences for the knowledge needed in descending order (N = 106)

Rank No	Dimension 1: Knowledge needed to identify TCM cultural knowledge	Total score: 5 mean
1	S1-4: Historical and cultural background of TCM	4.23
2	S1-7: Basic understanding of TCM practices (e.g., acupuncture, herbal medicine)	4.11
3	S1-8 TCM concepts related to health and wellness	4.09
4	S1-5: TCM terminology and its English equivalents	4.00
5	S1-1: Basic TCM theories (e.g., Yin-Yang, Five Elements)	3.93
6	S1-3: TCM diagnostic methods (e.g., inspection, auscultation, inquiry, palpation)	3.77
7	S1-9: TCM's influence on traditional Chinese literature and folklore	3.68
8	S1-6 Cultural significance of TCM in ancient Chinese society	3.06
9	S1-10 Cross-cultural communication skills to explain TCM concepts in English	3.01
10	S1-2: Common TCM herbs and their medicinal properties	2.95
Rank No	Dimension 2: knowledge needed to understand TCM cultural knowledge	Total score: 5 mean
1	S2-9: Connotations of TCM terms	3.90
2	S2-5: Ability to analyze TCM concepts in the context of Journey to the West	3.83
3	S2-2 Knowledge of TCM's role in traditional Chinese cosmology and philosophy	3.42
4	S2-1: Advanced understanding of TCM theories	3.42
5	S2-4: Familiarity with TCM practices and their symbolic meanings in literature	3.08
6	S2-6: Understanding of TCM's influence on character development and plot in Journey to the West	2.63
7	S2-3: Understanding of TCM's connection to ancient Chinese mythology and legends	2.26
8	S2-10 Cross-cultural understanding to explain TCM concepts in a way that is accessible to non-Chinese audiences	2.07
9	S2-7 Knowledge of TCM's historical evolution and its impact on Chinese society	2.04
10	S2-8: Familiarity with TCM's ethical and moral dimensions	1.72
Rank No	Dimension 3: Knowledge needed to translate TCM cultural knowledge	Total score: 5 mean
1	S3-4: Proficiency in using translation strategies such as domestication and foreignization	4.90
2	S3-8: Understanding of the differences between TCM and Western medical concepts to avoid misinterpretation in translation	4.15
3	S3-1 Familiarity with TCM-specific terminology and its accurate English translation	4.02
4	S3-2: Understanding of translation techniques for specialized fields (e.g., technical vs. literary translation)	3.92
5	S3-6: Ability to translate TCM concepts while maintaining their original meaning and cultural significance	3.91
6	S3-3: Knowledge of cultural nuances and how to convey them in translation	3.83
7	S3-5: Awareness of the historical and cultural context of TCM to provide accurate background information in translations	3.71
8	S3-10 Knowledge of cross-cultural communication principles to ensure translations are accessible to non-Chinese audiences	3.71
9	S3-7 Familiarity with translation tools and resources (e.g., glossaries, translation software) for TCM texts	3.54
10	S3-9: Skill in translating TCM-related metaphors and symbolic language found in <i>Journey to the West</i>	3.48
Rank No	Dimension 4: Knowledge needed to convey TCM cultural knowledge	Total score: 5 mean
1	S4-6: Ability to create lesson plans that combine language learning with cultural exploration of TCM	4.19
2	S4-7: Knowledge of how to scaffold learning for students who may be unfamiliar with TCM concepts	4.17

Table 5 (continued)

Rank No	Dimension 4: Knowledge needed to convey TCM cultural knowledge	Total score: 5 mean
3	S4-1 Ability to integrate TCM cultural content into English language teaching materials	3.79
4	S4-5: Understanding of cross-cultural teaching strategies to explain TCM concepts effectively	3.38
5	S4-2: Knowledge of designing interactive activities that promote student engagement with TCM concepts	3.22
6	S4-8: Familiarity with techniques for encouraging critical thinking about TCM in a language class	3.11
7	S4-9: Understanding of how to incorporate TCM themes into speaking and writing activities in English	3.08
8	S4-3 Familiarity with methods for assessing students' understanding of TCM-related content in English	2.57
9	S4-10 Proficiency in designing assessments that evaluate both language skills and cultural knowledge related to TCM	2.24
10	S4-4: Proficiency in using multimedia tools to present TCM culture in an engaging way	2.14

effects is considered to be of lesser importance. It might be an interesting topic for further focus group discussion.

In addition, participants agree that the following categories of knowledge are vital in understanding TCM culture. This capability encompasses understanding TCM terms in the context of a story, TCM in the traditional Chinese cosmology and philosophy and the mastery of advanced TCM theories. These are highly rated areas with means of 3.42 or greater. These showed that they are perceived to be important. However, ethical and moral dimensions of TCM receive low ratings which means they are less important to be emphasised to pre-service EFL teachers.

Strategies of translation, especially domestication and foreignisation (mean rating = 4.9) are considered important for pre-service EFL teachers. Furthermore, degree of familiarity with translation tools and equipment (mean = 3.54) and the ability to translate metaphors and symbolic language (mean = 3.48) are regarded as significant. This serves as a point for further elaboration in the focus group discussion.

With respect to TCM cultural knowledge, they suggest that a needs analysis that takes into account the diverse range of students, lesson planning that combines the teaching of language with other cultural experiences and the scaffolding of learners are important features of an effective curatorship. Inclusion of TCM teaching content into English language teaching materials is also recommended. Designing assessments which test not only linguistic ability but also TCM cultural knowledge and using multimedia when teaching TCM culture are seen to be less important. In addition, TCM cultural knowledge related content assessment in English is not required for pre-service EFL teachers working in this environment.

As shown in Table 6, the knowledge dimensions that have been most frequently included in the demands of pre-service EFL teachers, teacher educators, medical lecturers and professors are centered on the common knowledge. This converging zone is the core repertoire of knowledge most in demand for pre-service EFL teachers to enable them to identify, comprehend, translate and express TCM knowledge and

Table 6 Knowledge intersections

Dimensions	Item/topic: the need to learn:
1. knowledge needed to identify TCM cultural knowledge	S1-4: Historical and cultural background of TCM S1-7: Basic understanding of TCM practices (e.g., acupuncture, herbal medicine) S1-8 TCM concepts related to health and wellness S1-5: TCM terminology and its English equivalents
2. knowledge needed to understand TCM cultural knowledge	S2-9: Connotations of TCM terms S2-5: Ability to analyze TCM concepts in the context of Journey to the West S2-2 Knowledge of TCM's role in traditional Chinese cosmology and philosophy S2-1: Advanced understanding of TCM theories
3. knowledge needed to translate TCM cultural knowledge	S3-4: Proficiency in using translation strategies such as domestication and foreignisation S3-8: Understanding of the differences between TCM and Western medical concepts to avoid misinterpretation in translation S3-1 Familiarity with TCM-specific terminology and its accurate English translation S3-2: Understanding of translation techniques for specialized fields (e.g., technical vs. literary translation)
4. knowledge needed to convey TCM cultural knowledge	S4-6: Ability to create lesson plans that combine language learning with cultural exploration of TCM S4-7: Knowledge of how to scaffold learning for students who may be unfamiliar with TCM concepts S4-1 Ability to integrate TCM cultural content into English language teaching materials S4-5: Understanding of cross-cultural teaching strategies to explain TCM concepts effectively

culture in English well. The comprehensive history and culture of TCM is the most important knowledge field of the first dimension. The importance of the meanings of TCM terms as the key to grasp TCM concepts is emphasised in the second dimension. Competence in translation strategies including domestication and foreignisation is required in order to successfully transmit TCM knowledge to learners in the third dimension. Top in the fourth dimension for this point is developing a lesson plan to combine language learning and TCM. Such knowledge falls to be the nucleus of what should be learned by the pre-service EFL teachers so that they can well preach the TCM cultural doctrines in an English spoken environment. Focus group discussions help to identify the actual content of this common knowledge intersection.

In the same vein, pre-service EFL teachers also with teacher educators, medical lecturers and professors all agree on the high position of some selected knowledge list for the transferal of TCM. Neither group perceived the precedence to be the creation of lesson plans combining the learning language with the TCM discovery and scaffolding of students' knowledge on students may not so that familiar with TCM concepts with the mean scores of 4.18 and 4.16 respectively. Indeed, some of these training features, such as creating assessments and using in multimedia tools are relatively less considered (mean 2.14 and 2.17 respectively). Research Question 2 has been partially addressed.

Convergence and divergence between Pre-service teachers and academic experts on knowledge domains

This section reports on the results of a focus group discussion conducted with five teacher educators, 2 medical lecturers and 3 medical professors. These results are then compared with Table 5. The aim of this contrast is to determine what critical knowledge that pre-service EFL teachers must understand to be able to decode, translate and communicate TCM cultural elements.

As shown in Table 7, nine types of knowledge essential for pre-service EFL teachers to identify, understand, translate and express TCM were categorised into three tiers (core, secondary, complementary). Based on significance, a classification that implicitly reveals the unresolved tensions between linguistic competence, cultural knowledge and intercultural mediation (three core dimensions of TCM-integrated EFL teaching). Participants emphasised that core knowledge forms the “non-negotiable foundation” for mediating TCM. Yet this tier itself exposes the first layer of tension. While linguistic competence is required to achieve “precise bilingual terminology” (translating “qi” without reducing its cultural connotation), cultural knowledge is indispensable to grasp TCM historical and cultural background and connotations of TCM vocabulary. It is a conflict that places intercultural mediation at the center of resolution. For instance, P5 noted the necessity of mastering TCM terms to quickly identify TCM culture in “*Journey*

Table 7 Thematic analysis

Sub-categories	Descriptions
Core knowledge: Essential and non negotiable knowledge that underpins TCM interpretation and teaching, and is necessary for accurate cultural transmission and sound pedagogical practice	<i>Educators & experts considered core knowledge as:</i> A. Historical and cultural background of TCM B. TCM vocabulary and its English equivalents C. Connotations of TCM vocabulary D. Advanced understanding of TCM theories E. Proficiency in using translation strategies such as domestication and foreignization F. Understanding of the differences between TCM and Western medical concepts G. TCM-specific terminology and its accurate English translation H. Ability to create lesson plans that combine language learning with cultural exploration of TCM I. Ability to integrate TCM cultural content into English language teaching materials
Secondary Knowledge: Extends core competence and enhances understanding and pedagogical flexibility (not essential for basic TCM teaching)	<i>Directors considered core knowledge as:</i> A. Basic understanding of TCM practices B. Knowledge of TCM's role in traditional Chinese cosmology and philosophy C. TCM concepts related to health and wellness D. Ability to analyze TCM concepts in the context of Journey to the West E. Understanding of translation techniques for specialized fields F. Knowledge of how to scaffold learning for students who may be unfamiliar with TCM concepts
Complementary knowledge: Value added knowledge for context specific needs such as teaching non Chinese audiences. It enriches intercultural mediation but is peripheral to core TCM teaching	<i>Directors considered complementary knowledge as:</i> A. Understanding of cross-cultural teaching strategies to explain TCM concepts effectively B. Common TCM herbs and their medicinal properties C. Cross-cultural understanding to explain TCM concepts in a way that is accessible to non-Chinese audiences

to the West.” However, P7 further clarified that vocabulary alone is insufficient. Only by understanding the deep meaning of the terms such as cultural knowledge, and using domestication/foreignisation strategies, intercultural mediation can then better translate and convey TCM cultures. It highlights how linguistic accuracy risks losing cultural depth without mediation strategies that balance target language accessibility and original cultural authenticity.

Core knowledge also underscores the tension between pedagogical content organisation and cultural knowledge transmission. P1 pointed out that “to understand and translate TCM culture-loaded terms is one story, to convey it is another.” It explains that creating lesson plans (core knowledge item I) requires integrating TCM cultural content (cultural knowledge) into English teaching materials, which demands linguistic competence to structure content clearly. Yet, pre-service EFL teachers often struggles to reconcile comprehensive cultural details with classroom teachability. Additionally, P3 noticed that “the kidney in TCM is different from that in Western medicine.” It reveals a critical intersection of cultural knowledge (TCM-Western medical concept differences) and intercultural mediation. Therefore, pre-service EFL teachers must use linguistic competence to articulate these differences. On the other hand, without mediation strategies (analogies for non-Chinese learners), linguistic accuracy may fail to bridge cultural epistemological gaps. The supporting quotations are:

-
- P 2: ... “how about group related knowledge into different categories based on necessities?”
- P 5: “Very good suggestions, let’s first decide on the knowledge that they must learn. I think, they should master TCM terms, so that they can quickly identify TCM culture in the journey to the west. As for how to translate it properly, I think they should also know the English equivalents
- P7: “Yes, terms are important, knowledge of domestication and foreignization strategies may great help in doing translating TCM terms. ...Plus, only understand deep meaning of the terms, they can better translate and convey TCM cultures
- P1: “to understand, to translate TCM culture-loaded words or terms is one story, to convey it is another story. To convey it requires knowledge of course design or lesson plan.”
- P3: “One thing worthy of being mentioned is that the kidney in TCM is different from kidney in west medicine, thus, translators should know the differences...”
-

Secondary knowledge, while non-mandatory, amplifies the tension between cultural knowledge depth and linguistic transmission efficiency. Participants acknowledged that basic understanding of TCM practices (four diagnostic methods) and TCM’s role in traditional cosmology (cultural knowledge) enhance pre-service EFL teachers’ ability to analyse TCM concepts in “*Journey to the West*” (secondary knowledge item D). But P3 cautioned that overemphasising such content risks linguistic overload. TCM philosophy helps translate related contents, but if pre-service EFL teachers cannot simplify its connotations into accessible English, learners will be confused. This reflects how secondary cultural knowledge (Taoism-influenced TCM theories) requires intercultural mediation to scale down cultural complexity into linguistically manageable content. The supporting quotations are:

-
- P 3: ... “some of the knowledges seems not that quite important such as TCM’s role in traditional Chinese cosmology and philosophy. However, CM philosophy may also help to translate related contents in the journey to the west as some contents contains TCM philosophy and the philosophy of Tao”
- P10: “if the pre-service EFL teachers knows more about TCM practice, such as the four diagnostic method
-

P9: "...sure, TCM translation is bit different from regular text translation, it requires more techniques....."

Complementary knowledge directly addresses the long-overlooked tension between the necessity of intercultural mediation and its undervaluation in practice. Participants framed items like cross-cultural teaching strategies and making TCM accessible to non-Chinese audiences as value-added but non-essential. Yet their comments revealed contradictions. P6 admitted that cross-cultural communication skills are an extra bonus. However, P8 countered, "if teaching non-Chinese groups, cross-cultural strategies are useful." It indicates a collective recognition that intercultural mediation is critical for TCM global transmission. Nevertheless, it remains marginalised due to pre-service EFL teachers' overfocus on linguistic accuracy (term translation) and cultural knowledge (herb names) at the expense of mediation.

The inclusion of "common TCM herbs and their properties" in this tier further reflects this tension. P4 suggested herb knowledge aids in identifying TCM elements in *"Journey to the West."* However, P7 argued, "if not becoming a TCM practitioner, no need to know properties." Hence, it shows that cultural knowledge without linguistic competence to simplify it or intercultural mediation to contextualise it for non-experts becomes pedagogically irrelevant. The supporting quotations are:

P6: "Besides, if they know cross-culture communication skills, that would be an extra bonus."

P4: "How about understanding properties of the herbs?"

P7: "Herb names may enough for them, if they do not want to be a TCM practitioner, no need to know the properties, right?"

P8: "all depend on whom are they going to teach? If to non-Chinese group, cross-cultural teaching strategy might be useful."

Compared with the knowledge intersection (see Table 5), this three-tier classification advances the understanding of TCM teaching knowledge by explicitly linking each category to the three core tensions. Specifically, it positions core knowledge as the tension origin for linguistic-cultural conflict), secondary knowledge as the tension mitigator by extending cultural knowledge to reduce linguistic misrepresentation and complementary knowledge as the tension resolver by using intercultural mediation to align linguistic accuracy and cultural authenticity. These refinements grounded in participants' iterative discussions provide a more nuanced framework for identifying the knowledge gaps that hinder pre-service EFL teachers' ability to mediate TCM effectively. Therefore, Research Question Two and Research Question Three have been fully answered.

Discussions

This study identified essential content domains pre-service EFL teachers need to understand and interpret TCM. It aligns with Shulman (1986) distinction between content knowledge and PCK by highlighting the dual importance of deep TCM expertise and high-level pedagogy for mediating culturally complex concepts. Consistent with past research (Zhang et al., 2025), it suggests that EFL curricula integrating cultural and linguistic competencies may enhance cross-cultural teaching efficacy. These findings inform the novel "core-secondary-complementary" knowledge taxonomy proposed in this study. This layered framework positions core knowledge such as TCM macro-historical contexts and precise bilingual terminology as the foundational bedrock for

culturally responsive pedagogy, secondary knowledge, namely basic TCM theories as a targeted extension of this core and complementary knowledge, for instance, intercultural communication strategies as a bridge between content and practice. They may directly address the tension between comprehensive content and pragmatic teaching needs inherent in TCM-integrated EFL instruction. Such tension, as Shi et al. (2025) noted, often intersects with teacher identity construction, where external contextual demands such as curricular expectations for TCM integration, interact with internal emotional states to shape how pre-service EFL teachers prioritise knowledge and practice.

Both groups agreed on the criticality of historical context, precise vocabulary and culturally sensitive translation techniques (domestication/foreignisation). It is a consensus mirroring findings by Almiyrah (2025) on foundational skills for accurate cross-linguistic interpretation. Notably, however, both groups rated cross-cultural communication skills relatively low. It contradicts Kong et al. (2024) and signals a troubling undervaluation that may hinder pre-service EFL teachers' ability to mediate complex cultural knowledge. This gap shows the urgency of foregrounding complementary knowledge in the proposed taxonomy. The layer that addresses the "knowing but not teaching" dilemma equips pre-service EFL teachers with strategies to translate TCM expertise into student-centered instruction. From a learner-centric perspective, this oversight is particularly consequential. Yang et al. (2025) found that EFL learners' CT and engagement form a positive cycle mediated by motivation and pre-service EFL teachers' ability to facilitate cross-cultural communication as a key component of complementary knowledge may directly influence learners' motivation to engage with culturally nuanced content like TCM, thereby shaping their CT development.

The quantitative results showed that cross cultural communication skills received comparatively low mean scores (2.98 for pre service EFL teachers and 3.01 for experts). This informed its classification as complementary knowledge in the qualitative analysis. The comparison indicates that quantitative rankings reflect perceived priority, while the focus group discussions explained the reasoning. Participants viewed these skills as context dependent, important when teaching non Chinese audiences but not essential for basic TCM instruction. This link between numerical results and qualitative explanation shows the value of the mixed methods approach.

Another tension emerged around herbological knowledge. Experts deemed deep medicinal-herb expertise less relevant to EFL contexts, while pre-service EFL teachers prioritised it. It reflects potential confidence gaps or misunderstandings about instructional requirements. This mismatch echoes Han and Zhang (2025) findings on novice teachers and may further relate to deficits in emotion regulation, a domain that remains understudied in L2 teacher education. For pre-service EFL teachers in this study, over-emphasising granular herbological details may stem from anxiety about inadequate content mastery, an effective response that aligns with Shi et al. (2025) observation that emotion acts as a mediating bridge between external contexts and identity formation. They found that negative emotions risk solidifying restrictive teacher identities which may lead pre-service EFL teachers to overcompensate by fixating on peripheral details like herbology. The proposed taxonomy aims to mitigate this by delineating clear and pedagogically adaptive knowledge priorities to reduce anxiety-driven overfocus on non-essential minutiae.

Interestingly, this study identifies threshold concepts in TCM teaching within literary works. It operationalises Shulman (1986) framework for intercultural education. By emphasising pedagogical tensions between comprehensive content knowledge and pragmatic teaching needs, it offers curriculum designers a new angle to advance culturally responsive teaching by addressing specific obstacles in TCM integration, such as the undervaluation of cross-cultural communication and misalignment in herbological knowledge priorities. Findings support the potential of scaffolding (Puntambekar, 2022) and systematic division of complex cultural concepts as embodied in the “core–secondary–complementary” taxonomy to prevent cognitive overload. It may foster sustainable pedagogical approaches that balance cultural authenticity with effective intercultural communication. Moreover, the interconnected insights from Wu et al. (2023), Shi et al. (2025) and Yang et al. (2025) suggest a promising direction for future curriculum design. Pre-service EFL teachers could integrate emotion regulation training to support healthy identity construction and reduce anxiety alongside the knowledge taxonomy and align complementary knowledge, namely cross-cultural communication with strategies to boost learner motivation and engagement. Eventually, it may create a cycle from teacher preparation to pedagogy practice for learner outcomes that advances both TCM cultural mediation and EFL learners’ CT development.

Conclusions

This study contributes to teacher education theory, intercultural competence frameworks, and curriculum design by proposing a novel “core–secondary–complementary” knowledge taxonomy. It is more than a summary of findings. This layered framework attempts to address critical challenges in preparing pre-service EFL teachers to mediate culturally nuanced content like TCM. The three concentric layers, such as core knowledge (macro-historical contexts, precise bilingual terminology) as the foundational bedrock for culturally responsive pedagogy, secondary knowledge (basic TCM theories) extending this core and complementary knowledge (intercultural communication strategies) bridging content and pedagogy, offer a dynamic hierarchy that balances depth with utility. The framework challenges teacher education’s tendency to frame cultural knowledge as either encyclopedic or superficial. Following that, it advocates for pedagogically adaptive preparation to counter pre-service EFL teachers’ overemphasis on minutiae at the expense of transitivity. It also recenters intercultural communication as critical to mediating complexity. Moreover, it expands intercultural literacy models by integrating pedagogical mediation and provides curriculum developers a structured template to move beyond fragmented modules. Furthermore, it may balance authenticity with teachability to reduce anxiety-driven overfocus on detail. While regional sampling and self-report measures limit generalisability, the framework’s heuristic value lies in its theoretical grounding and practical applicability, which may guide future research to test its curricular applications, cross-context generalisability and longitudinal impact on learners’ cultural literacy and language proficiency.

This study has several limitations to acknowledge when interpreting the findings. First, contextual narrowness restricts generalisability. Data were collected solely from Mianyang, Sichuan, a region with strong local TCM cultural salience including regional herbal traditions. Such specificity may have skewed perceptions of essential TCM

knowledge, so findings may not apply to regions with weaker TCM prominence such as coastal China or international EFL contexts. Second, methodological constraints exist. The study relies on self-report surveys and focus groups, which are prone to response bias including overstating TCM familiarity. No classroom observations or objective assessments of actual teaching practice were conducted, so only perceived knowledge needs rather than real-world pedagogical performance are captured. Third, sample composition limitations include a pre-service teacher sample from three local institutions with a higher proportion of fourth-year students at 38.3%, potentially overrepresenting those with more practicum experience. The expert sample selected via purposive sampling may have excluded perspectives from other regions or institutions. Fourth, theoretical and analytical limitations involve a focus on cognitive knowledge domains with less attention to affective and behavioral factors such as willingness to integrate TCM and implementation challenges. The thematic analysis, while systematic, was based on a small focus group sample of 10 participants, which may not capture the full range of expert perspectives.

For further work, researchers could replicate the study across geographically diverse Chinese regions such as Northeast China and Hong Kong and international settings such as Southeast Asian EFL programmes to test cross-context adaptability. Future research could also supplement self-reports with classroom observations and objective assessments to validate practical application of the framework, and conduct longitudinal studies to track long-term impacts on teacher practice and learner outcomes. Expanding the sample to include pre-service teachers from more institutions and experts with diverse backgrounds such as TCM practitioners with EFL experience could enhance comprehensiveness. Finally, exploring affective and behavioral dimensions such as teachers' motivation, self-efficacy and implementation challenges would provide a more holistic understanding of preparation needs.

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Author contributions

Chen wrote the introduction, methodology, and data analysis sections; Wong, as the corresponding author, finalised and refined the manuscript; Warid prepared the discussion and conclusion; and Soo wrote the literature review and conducted data analysis.

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Data availability

The data that support the findings of this study are available on request from the corresponding author, Wong Wei Lun, upon reasonable request.

Declarations

Ethics approval and consent to participate

This study was reviewed and approved by the academic committee of Mianyang Teachers' College, Foreign Language Department. The study period allowed was from 1 January 2025 until 1 April 2025. Informed consent was obtained orally from all pre-service EFL teachers (signed by representatives), teacher educators, medical lecturers and professors prior to their participation to ensure that they were fully aware of the study's purpose, procedures, potential benefits and any associated risks. As this study did not involve minors, parental or guardian consent was not required. Additionally, the academic committee waived the requirement for written informed consent. All data collected during this study were fully anonymised to protect the confidentiality of the participants. Personal identifying information was removed and responses were securely stored to prevent unauthorised access. This study adhered to all relevant ethical guidelines.

and regulations, ensuring that participant information was handled with the utmost care and integrity throughout the research process.

Consent for publication

All authors have read and approved the final manuscript and consent to its publication.

Competing interests

I declare that the authors have no competing interests as defined by Springer, or other interests that might be perceived to influence the results and/or discussion reported in this paper.

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