

How do English-as-a-foreign-language (EFL) teachers perceive and engage with critical thinking: A systematic review from 2010 to 2020

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ABSTRACT

This article presents a critical review of 25 empirical studies on English-as-a-foreign-language (EFL) teachers' perceptions of and engagement with critical thinking (CT) in a wide range of educational contexts from 2010 to 2020. Through a systematic process of paper selection and review, three central themes were identified, namely, 1) EFL teachers' understanding of CT and CT instruction; 2) EFL teachers' CT instructional models and strategies; and 3) the impacts of EFL teachers' CT instruction on students and themselves with various influencing factors at individual, interpersonal, and environmental levels. The review sheds light on the gap between the curriculum rhetoric and classroom reality due to the lack of attention to CT in current language teacher education. It also provides a critical analysis of the research methodologies adopted in the existing literature and outlines new directions for interested researchers in the fields of language teaching and teacher education.

1. Introduction

According to many scholars (Espey, 2018; Wilson, 2016), to be critical means to be discerning in recognizing faulty arguments, hasty generalizations, and ambiguous concepts. More importantly, it means to be self-reflexive and self-regulated so as to act responsibly, truthfully, and ethically in the complex and rapidly shifting world. Recognizing the vitality of CT, this paper offers a critical review on English-as-a-foreign-language (EFL) teachers' engagement with CT from 2010 to 2020. A myriad of contextual influences, including the continued trend of globalization, the colonial nature of the English language, and the growing emphasis on CT and other core competencies in education, jointly render this study timely and important. First, CT is not an innate ability but needs to be fostered through individuals' educational experiences to support their full and constructive participation in academic, individual and social lives (Lun, Fischer & Ward, 2010; Tan, 2020). Thus, in many educational systems across the world, critical thinking (CT) has been highlighted as one of the 21st core competencies that students should develop through various subject curriculums in primary, secondary, and tertiary education. In particular, considering the intimate relationship between language, culture, and thinking, there has been a clarion call to infuse CT with English language education (Li, 2016; Luk & Lin, 2015; Yuan, Yang & Lee, 2021). This can be seen in English language curriculum guidelines and textbooks used in EFL contexts, which place a premium on cultivating students' CT in facilitating their decision making, interpersonal communication, and problem solving in real-life situations.

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Second, given the continuing consolidation of globalization, the history of English as a colonizing language, as well as its current status as a lingua franca for international trade and intercultural communication, English language education has become a complex and power-laden enterprise, which requires students to learn how to examine diverse sources of information and foster an open, inquiring and critical mind (Wilson, 2016). Furthermore, when implementing CT-oriented pedagogies in language classrooms, students are often guided to discuss and evaluate real life topics and materials, as well as engage in collaborative learning activities, which can expand their exposure to authentic language use and promote their language proficiency (Li, 2016; Stapleton, 2011). In this sense, language learning and CT development can move forward hand in hand as students develop their CT through the process of acquiring English as well as its distinctive culture, customs and values (Tian & Low, 2011). On the other hand, students' CT does not develop automatically as a by-product of language learning, and instead they need explicit instruction and scaffolding to experience and foster CT incrementally in language classrooms (An Le & Hockey, 2022; Yuan et al., 2021). This thus requires special attention and efforts from English language teachers who need to develop both a CT mindset and CT-oriented pedagogies in their daily practice.

Against this background, this paper provides a critical review of existing studies on ELF teachers' perceptions of and engagement with CT teaching from 2010 to 2020. Despite some previous review articles which summarize the available empirical evidence on the impacts of CT instruction on students' academic achievement (e.g., Abrami et al., 2008) or on teachers' own CT development through initial teacher education programs (e.g., Lorencová, Jarošová, Avgitidou & Dimitriadou, 2019), the literature reveals no systematic review of current research on how teachers develop their CT-oriented pedagogies and engage with CT teaching in either general education or EFL education. The present review was thus conducted as an attempt to fill the void by gathering, analyzing, and synthesizing research insights from empirical studies on EFL teachers' engagement with CT. Theoretically, the review can shed light on how CT is perceived and operationalized by ELF teachers in a wide range of institutional and socio-cultural settings with the aim of generating theoretical insights into the complex, dynamic, and situated process of learning to teach CT. Such an understanding can offer practical implications for pre- and in-service teacher education programs about how to develop competent language teachers who can effectively teach CT in potentially complex and challenging contexts. Further, by comparing and contrasting the available studies in terms of their research focuses and methodologies, the review can help identify the gaps in current CT research and point out new directions for interested researchers in the fields of language teaching and teacher education.

2. What is CT?

As one of the most notoriously vague concepts in education, CT has been defined by many scholars in various ways. Some researchers (e.g., Bailin, Case, Coombs & Daniels, 1999; Mulcahy, 2008) have endeavored to explicate the nature and components of CT. For instance, Halpern, (1993) defines CT as a set of cognitive skills or strategies involved in solving problems, formulating inferences, calculating likelihoods, and making decisions. Similarly, Mulcahy (2008) conceptualizes CT as an important ability "to rationalize one's inner dialog and thought process with the goal of being able to evaluate thinking, feelings, and actions in a disciplined manner" (p. 18). Other researchers have employed a different approach, shifting attention to critical thinkers and their cognitive and behavior attributes when exercising CT in daily life. For instance, Lipman, (1988) argues that CT should be defined "functionally rather than teleologically" (p. 5). Thus, differing from the compositional view of CT mentioned above, he characterizes CT as a type of thinking that is self-corrective, sensitive to context, and must be exercised with reference to formal or informal criteria. Lipman's definition highlights the functionality and practicality of CT in educational settings. He also points out the interconnecting and mutually-advancing relationship between critical thinking and other types of thinking increasingly valued and pursued in education, such as creative thinking and caring thinking (Lipman, 2003). Lipman's work on CT stresses the values and importance of cultivating students' CT in education. Paul and Elder (2019) also adopted a practice-oriented approach to understanding the notion of CT. They outlined a series of practices that a well-cultivated critical thinker should present. The CT practices include:

- raising vital questions and problems, formulating them clearly and precisely;
- gathering and assessing relevant information, using abstract ideas to interpret it effectively;
- coming to well-reasoned conclusions and solutions, testing them against relevant criteria and standards;
- thinking open-mindedly within alternative systems of thought, recognizing and assessing, as need be, their assumptions, implications, and practical consequences;
- communicating effectively with others in figuring out solutions to complex problems;
- and being scrupulously careful not to misrepresent or distort information in developing an argument or position, and seeing through false information and fake news (p. 9).

Whether focusing on the components of CT or the attributes of critical thinkers, existing definitions tend to converge on a general trend emphasizing the dual dimensionality of CT, involving both a set of complex cognitive skills, such as interpretation, analysis, inference, and explanation, as well as important personal dispositions including inquisitiveness, open-mindedness, truth-seeking, as well as flexibility and willingness to consider different perspectives (Facione, 1990; Stapleton, 2011). Worthy of note is the symbiotic relationship between CT skills and dispositions, which tend to interact with and support each other in individuals' learning experiences and social practice (Hashemi & Ghanizadeh, 2012). As shown by Cruz, Payan-Carreira, Dominguez, Silva and Morais (2021), engaging students in critical reflection of their own learning performance creates a space for them to build up CT skills such as comparison and evaluation, which further contributes to their CT dispositions such as curiosity towards new knowledge and self-confidence to embrace challenges in their individual learning. In light of the many definitions reviewed above, critical thinking can be conceptualized as a series of interconnected dispositions, skills, and practices entailed for engaging with learning, work, and life agentially, rationally,

and ethically. This is also the definition of CT used in this study.

3. CT in language teaching and teacher education

In the field of language teaching, there is no shortage of research on students' development of CT through various forms of learning experiences in language classrooms. Hashemi and Ghanizadeh (2012), for instance, showed that EFL students' engagement in critical discourse analysis of news stories with follow-up presentations contributed to their CT, particularly their ability to recognize unstated assumptions and make unbiased interpretations. Luk and Lin (2015) explored how a group of low-proficiency students conducted critical literate talk in a Hong Kong secondary school. The findings speak to the value of L1 in helping students critically engage with the texts, through which they displayed evidence of CT (e.g., resisting dominant ideologies and making reasoned judgements).

More recently, Wale and Bishaw (2020) reported an intervention study in which students received inquiry-based argumentative essay writing instruction with an aim to promote their CT. Specifically, under the guidance of the course instructor, the students discovered their own writing topics, brainstormed ideas and gathered information from different sources, wrote up drafts with supporting evidence, discussed with peers and subject area experts for feedback, and finally completed essays to address real-life problems. Such a continuous and collaborative process proved to be highly effective in fostering students' CT skills (e.g., explanation, inference and evaluation) and strengthening their CT dispositions (e.g., a questioning mindset and reflective awareness). From this line of research, it is evident that the cultivation of CT can occur in the teaching and learning of different language skills (reading, writing, speaking and listening) in daily classrooms. Effective CT instruction often entails a combination of both individual practice (e.g., self-evaluation) and collaborative engagement (e.g., critical dialog and discussion). More importantly, CT teaching needs to be content based (i.e., drawing on concrete and meaningful materials) in relation to students' personal life experiences and their social and cultural backgrounds (Bağ & Gürsoy, 2021; Li & Wegerif, 2014).

In addition to the ample research evidence about the positive relationship between language learning and CT, scholars have noted an inadequacy in many language teacher education programs which tend to pay lip service to CT by acknowledging its importance without systemically conceptualizing and actualizing it in teacher education practice (Yuan et al., 2021). This limitation has impeded EFL teachers' learning to teach CT, thus exacerbating the gap between the ongoing curriculum reform which advocates the integration between CT and language teaching and the classroom reality dominated by the traditional teaching approach (i.e., focusing on linguistic knowledge through memorization and mechanic drills) and exam-oriented culture in many EFL contexts. To address these problems, the past years have witnessed a growing body of research examining how CT is taken up by pre- and in-service language teachers in their professional learning and practice. The present review takes stock of this bulk of studies on EFL teachers' understanding of and engagement with CT. A critical synthesis and analysis of the state of research not only can help language teachers become critical in thought and action, but also help them build up practical knowledge and competence to develop language learners' CT skills and dispositions and enlarge the scope of possibilities for their personal and academic development. Two questions inform the present review: 1) What are the main themes of existing studies on EFL teachers' engagement with CT? 2) What research methodologies have been used by previous researchers and what are their strengths and limitations?

4. Research methodology

4.1. The review process

A systematic review usually follows five steps: (1) framing questions for a review; (2) identifying relevant studies; (3) assessing the quality of studies; (4) summarizing the evidence; (5) interpreting the findings (Khan, Kunz, Kleijnen & Antes, 2003). Guided by the research questions, we established a set of selection criteria when searching relevant literature for the review.

First, research topics were required to be relevant and focused on EFL teachers' perceptions of and engagement with CT instruction. Studies focusing on language learners' and/or teachers' CT development were excluded. Second, the studies must be empirical and published between 2010 and 2020. We chose to focus on the time window from 2010 to 2020 for two main reasons. Through our literature search, we managed to identify several review articles (Lai, 2011; Tian & Low, 2011) published around 10 years ago, which focused on CT in language education. Building on their results which were mainly concerned with EFL students' learning experiences and efficacy, the present review makes a continued effort at synthesizing the empirical studies with a shifted focus on EFL teachers. Furthermore, using the past decade as the time frame for literature reviews has been a common practice in social sciences as it can help cover sufficient up-to-date studies while at the same time keeping the number of reviewed studies reasonable and manageable for in-depth analysis (Petticrew & Roberts, 2008). Thirdly, as most journal articles underwent a rigorous peer review process for quality assurance, we only included journal articles in this review. Viewpoint papers, book chapters, conference proceedings and dissertations were excluded. We believe such a scope can allow us to identify a representative and reasonable sample of studies for a systematic and critical review to answer the proposed research questions.

Using the above criteria and following the Preferred Reporting Items for Systematic Review and Meta-Analyses (PRISMA) procedures (Moher, Liberati, Tetzlaff, Altman & Group, 2009), we searched Google Scholar, ERIC, Scopus, JSTOR, ProQuest and the first author's university library for relevant literature. The searches yielded a total of 973 entries of peer-reviewed English journal articles. Then, we conducted the first round of screening and 806 studies that were duplicates, non-empirical studies, or not focused on the EFL context were excluded. The second-round of screening further excluded 370 studies that were not related to teachers' engagement with CT (i.e., perceptions and teaching) or just focused on students' CT only. As a result, 25 studies were left and they formed the pool of literature for review in this study. See Fig. 1, Table 1 for details about the searches and screenings of the literature.

These 25 studies came from different EFL settings, including Mainland China ($n = 4$), Hong Kong ($n = 1$), Taiwan ($n = 2$), Malaysia ($n = 3$), Iran ($n = 5$), Latin America¹ ($n = 1$), Colombia ($n = 1$), Brazil ($n = 1$), Chile ($n = 1$), Turkey ($n = 1$), Libya ($n = 1$), the Netherlands ($n = 1$), Uzbekistan ($n = 1$), Portugal ($n = 1$), and Cambodia ($n = 1$). Therefore, although the review incorporated a relatively small sample, the wide range of geographical settings covered in the review can to some extent provide a holistic profile of EFL teachers' perceptions of and engagement with CT.

Regarding data analysis, the research findings of each study were treated as raw data for critical review. Specifically, the research findings reported in the studies were carefully reviewed and analyzed by the authors to ascertain the major themes in relation to EFL teachers' understandings of and engagement with CT instruction (i.e., the first research question). For instance, through iteratively reading the findings presented in [Zhang, Yuan and He \(2020\)](#) study, the authors found that the teachers did not have a comprehensive understanding of CT as manifested in the way they defined CT by using fragmented terms and phrases such as "open-minded," "having logical and reasonable thinking," and "be good at analysis." Additionally, their insufficient understanding of CT could be attributed to the shortage of pedagogical training in relation to CT instruction in their situated work environment. The codes derived from each study were integrated into different categories, which were further compared, contrasted and synthesized, leading to three central themes that represent the general trend of the reviewed literature, namely, 1) EFL teachers' understanding of CT and CT instruction, 2) their CT instructional models and strategies, as well as 3) the impacts of EFL teachers' CT instruction on students and themselves with the influencing factors at individual, interpersonal, and environmental levels.

In light of the second research question, we also paid attention to the research methodologies adopted by previous research in the review. Specifically, we catalogued the educational levels, participants, as well as the data collection and analytic methods, and further analyzed the strengths and limitations of the research methods in order to outline possible directions for future research. To enhance the validity of the review, the first three authors did the analysis separately, following which, they engaged in rounds of discussion to reach a consensus about the scope and results of the review.

4.2. Limitations

How we conducted the review, as reported above, might have caused several limitations to this study. The first one is the relatively small number ($n = 25$) of the studies we reviewed as other possibly relevant research works, such as the unpublished dissertations, book chapters, and the literature published outside of our focused time window, were excluded. Second, the review only selected studies that focused on EFL teachers while teachers in other disciplines such as Mathematics and Social Studies were not considered. Third, this review excluded research papers published in other languages (e.g., Chinese) that might be related to the review scope. Thus, we suggest that future review studies expand their scopes to include research works in more diverse formats and languages, about different educational contexts, and were published in longer time windows to address the above limitations.

4.3. Findings

In this section, we present the synthesis and analysis of the 25 studies in light of the two research questions. First, three major themes that represent the general trend of existing literature on EFL teachers' CT-related beliefs and engagement are illustrated. Then, a methodological review is provided to analyze different research approaches adopted by previous researchers with suggestions for future inquiries.

5. EFL teachers' understanding of ct and ct instruction

First of all, the reviewed studies defined CT in different manners (see [Table 2](#)). 15 studies drew on existing definitions in the literature to analyze EFL teachers' engagement with CT. Commonly referenced definitions included the ones proposed by [Bassham, Irwin, Nardone and Wallace \(2007\)](#), [Ennis \(1987\)](#), [Facione \(1990\)](#), and [Paul and Elder \(2008\)](#). In contrast, three studies (i.e., [Dwee, Anthony, Salleh, Kamarulzaman & Abd Kadir, 2016](#); [Janssen et al., 2019](#); [Toshpulatova & Kinjemuratova, 2020](#)) provided their own definitions of CT based on their critical syntheses of the existing literature. In the seven other studies, the author(s) treated CT as a self-evident concept and thus did not give an explicit definition of it. The variation of how CT was defined confirmed its abstract and elusive nature. It also shows that while some early and influential definitions of CT (e.g., [Ennis, 1987](#); [Facione, 1990](#); [Paul & Elder, 2008](#)) have advanced the consensual understandings of CT, new definitions (e.g., [Dwee et al., 2016](#)) with new ways of expression and nuanced ideas are being proposed to attend to specific research contexts, features, and needs.

Regardless of how CT was defined in the reviewed studies, we found that the contents of the definitions mainly revolve around the following four aspects of the concept: "nature" (i.e., CT is a type of thinking and a cognitive process), "function and value" (i.e., CT can broaden perspectives, deepen understanding, and improve decision-making), "dimensions and components" (i.e., CT encompasses a set of skills and dispositions), and "features" (i.e., CT is complex, dynamic, and socio-culturally situated). These definitions represented scholarly understandings of CT that were comprehensive, deep, and systemic ([Facione, 1990](#); [Paul & Elder, 2019](#)).

As for the EFL teachers surveyed in these studies, many of them presented partial or misconceived understanding of CT. For example, drawing on [Thomas and Lok's \(2015\)](#) work, [Zhang et al. \(2020\)](#) study defined CT as a repertoire of knowledge, skills, and

¹ This is a cross-regional study with data collected from participants in over 10 countries in Latin America.

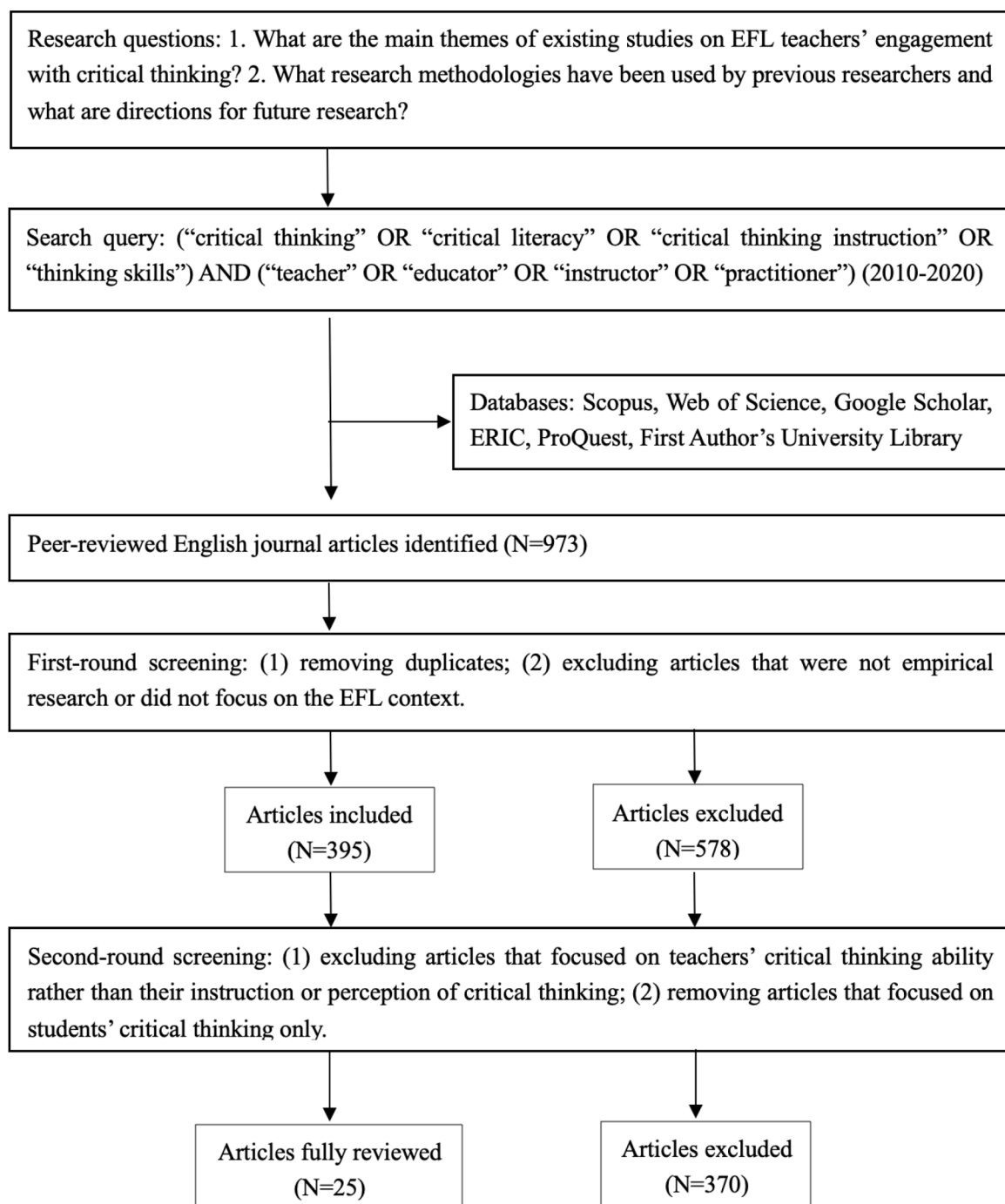


Fig. 1. PRISMA flow diagram.

disposition. However, many EFL teachers surveyed in this study could only refer to one or two of those dimensions (Zhang et al., 2020). Similarly, Marin and Pava (2017) and Ketabi et al. (2015) found that EFL teachers had deficient understanding of CT.

Regardless of their understanding of CT, the majority of EFL teachers possessed a positive attitude towards CT instruction and thought EFL teachers were responsible for teaching CT (Asgharheidari & Tahriri, 2015; Ketabi, Zabihi & Ghadiri, 2012). They considered that CT was highly relevant to students' academic performance (Veliz & Veliz-Campos, 2019), preparation for work (Jafarigohar, Hemmati, Rouhi & Divsar, 2016), and citizenship education (Piedade, Malafaia, Neves, Loff & Menezes, 2020). This group of teachers thus believed that EFL classrooms had the potentiality of fostering students' CT. For example, Pessoa and Freitas (2012) pointed out that EFL teachers need to transform their language classrooms into a counter-hegemonic place where students'

Table 1

The overview of research on how EFL teachers perceive and engage with CT.

Author(s) & Year	Settings
1. Aliakbari and Sadeghdaghighi (2013)	Iran
2. Asgharheidari and Tahriri (2015)	Iran
3. Cáceres et al. (2020)	Latin America
4. Dwee et al. (2016)	Malaysia
5. Jafarigohar et al. (2016)	Iran
6. Janssen et al. (2019)	the Netherlands
7. Ketabi et al. (2012)	Iran
8. Ko (2013)	Taiwan (China)
9. Li (2016)	Mainland China
10. Lim et al. (2019)	Malaysia
11. Marin and de la Pava (2017)	Colombia
12. Mok (2010)	Hong Kong (China)
13. Omar and Albakri (2016)	Malaysia
14. Pessoa and de Urzêda Freitas (2012)	Brazil
15. Petek and Bedir (2018)	Turkey
16. Piedade et al. (2020)	Portugal
17. Sadeghi et al. (2020)	Iran
18. Saleh (2019)	Libya
19. Sun (2019)	Mainland China
20. Toshpulatova and Kinjemuratova (2020)	Uzbekistan
21. Veliz and Veliz-Campos (2019)	Chile
22. Vong and Kaewurai (2017)	Cambodia
23. Yang (2012)	Taiwan (China)
24. Yuan and Stapleton (2020)	Mainland China
25. Zhang et al. (2020)	Mainland China

Table 2

Definitions of CT in the reviewed studies.

Ways of defining CT	Number of studies using this way	Exemplary definitions of CT
1. Using definitions of CT in the existing literature	15 (Asgharheidari & Tahriri, 2015; Cáceres et al., 2020; Jafarigohar et al., 2016; Lim et al., 2019; Marin & de la Pava, 2017; Mok, 2010; Omar & Albakri, 2016; Piedade et al., 2020; Sadeghi et al., 2020; Saleh, 2019; Veliz & Veliz-Campos, 2019; Vong & Kaewurai, 2017; Yang, 2012; Yuan & Stapleton, 2020; Zhang et al., 2020)	Ennis (1987): "...reasonable, reflective thinking that is focused on deciding what to believe or do" (p. 10). Facione (1990): "...a purposeful, self-regulatory judgment which results in interpretation, analysis, evaluation, and inference, as well as explanation of the evidential, and conceptual, methodological, criteriological, or contextual considerations upon which that judgment is based" (p. 2). Bassham et al. (2007): "...critical thinking is the general term given to a wide range of cognitive skills and intellectual dispositions needed to effectively identify, analyze, and evaluate arguments and truth claims, to discover and overcome personal prejudices and biases, to formulate decisions" (p. 58). Paul and Elder (2008): "In general, CT has a twofold nature related to cognitive skills, such as interpreting, analysing, and evaluating, and disposition, e.g., inquisitiveness, open-mindedness, and autonomy (Paul & Elder, 2008)" (p. 41). Dwee et al. (2016): "Of the many definitions found on critical thinking, critical thinking can be summarised as a skill to assist learners in achieving better understanding by actively thinking about their own learning process and discovering how to solve problems by evaluating different perspectives" (p. 633) Janssen et al. (2019): "Critical thinking means that one engages in reflective reasoning before deciding what to believe or what to do, and that one can explain what those beliefs or decisions are based on" (p. 142).
2. Defining CT in its own way	3 (Dwee et al., 2016; Janssen et al., 2019; Toshpulatova & Kinjemuratova, 2020)	N/A
3. Not giving an explicit definition of CT	7 (Aliakbari & Sadeghdaghighi, 2013; Ketabi et al., 2012; Ko, 2013; Li, 2016; Pessoa & de Urzêda Freitas, 2012; Petek & Bedir, 2018; Sun, 2019)	N/A

critical awareness and thinking can rise and grow. However, a few EFL teachers doubted the need to teach CT in English classrooms. For instance, the participants in Li's (2016) study argued that some subjects such as science and math were more related to CT than English. Saleh (2019) also reported that EFL teachers questioned the effectiveness of teaching and learning CT in language education because the teachers believed that English language teaching should focus on developing children's linguistic knowledge and communication skills.

The reviewed studies also identified various challenges that EFL teachers faced in teaching CT. The first challenge was that students

often experienced language anxiety (Dwee et al., 2016), which made it difficult for teachers to organize interactive learning activities and develop CT. Owing to such a reason, the EFL teachers in Zhang et al. (2020) study pointed out that it was challenging to develop students' language abilities and CT skills simultaneously. The second challenge was that many EFL teachers lacked the pedagogical competence to incorporate CT in their language teaching (Peteka & Beadier, 2018; Yuan & Stapleton, 2019) and the related training resources were also scarce in their daily work (Asgharheidari & Tahriri, 2015; Piedade et al., 2020). Third, certain context-specific conditions, such as exam-oriented system (Dwee et al., 2016) and lecture-based learning culture (Sun, 2019) also posed impediments to EFL teachers with a CT orientation in classroom teaching.

6. EFL teachers' ct instructional models and strategies

The reviewed studies have reported a wide range of instructional models and strategies for fostering students' CT dispositions and abilities. While some studies have brought up instructional models as practical guidelines for CT teaching, many others focused on one or several specific instructional strategies that we have categorized into four groups as elaborated below.

6.1. Three models of ct instruction

Three models of CT instruction, namely the Created-Creator Model (Lim, Othman & Lo, 2019), the CTIMPT Model (Yang, 2012), and the Eight-Step Model (Vong & Kaewurai, 2017), have emerged from the reviewed studies. In particular, Lim et al. (2019) study proposed a model titled "Created-Creator" for facilitating discipline-specific CT. The model contends that leading students to explore 1) personal experiences, 2) author intention, and 3) personal response to texts can enhance students' CT and understanding of the target texts in a critical and in-depth manner. Yang (2012) introduced another model targeted at preservice teachers—Critical Thinking Instructional Model for Pre-Service Teachers (CTIMPT). CTIMPT consists of eight instructional steps, including 1) identification of instructional goals, 2) instructional analysis, 3) analyzing learner characteristics, 4) critical thinking instruction, 5) micro-teaching, 6) completion of teaching plans, 7) revision of instruction, and 8) summative evaluation. The fourth step (i.e., critical thinking instruction) is the core of this model in which teacher educators directly lecture, model, and conduct case analysis of CT strategies to foster pre-service teachers' CT skills and dispositions. The third model was contributed by Vong and Kaewurai's (2017) study. The model encompasses eight steps that teachers can follow to nurture CT in students. These include 1) triggering activity, 2) identifying problem, 3) investigating related data, 4) discussing findings, 5) evaluating findings, 6) creating solutions, 7) presenting solutions, and 8) reflecting on learning outcomes. As the authors stressed, this model was cognitively fashioned because the eight steps reflected a process of problem-solving-oriented, evidence-based, and reflection-driven inquiry that could engage students in various higher-order cognitive activities.

While these models would be practically helpful in guiding teachers' CT instruction, they all seem to suggest that CT instruction is a linear and technical process—once teachers enact the instructional steps one after another, students' CT dispositions and abilities will naturally be developed. Nevertheless, a robust line of studies (e.g., McKendree, Small, Stenning & Conlon, 2002; Tan, 2017) has concluded that the teaching and learning of CT is a complex and situational process, which entails teachers constantly and iteratively organizing and monitoring student engagement, representing teaching materials, and adjusting instructional activities and their

Table 3

CT instructional strategies and methods.

Strategy type	Meaning	Specific methods
Triggering	Triggering students' motivation for addressing critical issues	<ul style="list-style-type: none"> • Selecting meaningful topics (Cáceres et al., 2020; Dwee et al., 2016; Sadeghi et al., 2020) • Focusing on subject "cores" (Cáceres et al., 2020; Marin & Pava, 2017; Pessoa & Freitas, 2012)
Exposing	Exposing students to educatively "messy" information, experiences, and perspectives	<ul style="list-style-type: none"> • Questioning (Dwee et al., 2016) • Organizing extensive reading (Sadeghi et al., 2020) • Using various forms and scales of discussion (Dwee et al., 2016; Sadeghi et al., 2020; Sun, 2019; Toshpulatova & Kinjemuratova, 2020)
Guiding	Guiding students to form and defend justifiable stances	<ul style="list-style-type: none"> • Allowing students to recognize the space for personal stance-taking (Toshpulatova & Kinjemuratova, 2020) • Asking students to survey the existing stances (Aliakbari & Sadeghdaghghi, 2013; Omar & Albakri, 2016; Sadeghi et al., 2020) • Pushing students to take and defend their own stances (Sun, 2019; Toshpulatova & Kinjemuratova, 2020)
Extending	Extending students to think beyond contextualized experiences	<ul style="list-style-type: none"> • Having students reflect on learning (Dwee et al., 2016; Toshpulatova & Kinjemuratova, 2020) • Leading students to take actions to address critical issues in the real world (Cáceres et al., 2020; Sun, 2019) • Creative writing (Sadeghi et al., 2020) • Modeling of CT (Aliakbari & Sadeghdaghghi, 2013; Sun, 2019)

sequences. Therefore, the tension between the linearity and technicality of the above CT instructional models and the fluidity and complexity of classroom realities would pose a challenge for users of those models. Further, Lim et al. (2019) Created-Creator Model highlights certain specific features of teaching CT in EFL education (e.g., examining author intention and developing critical responses to learning texts). But in contrast, Yang's (2017) CTIMPT model and Vong and Kaewurai's (2017) Eight-Step model seem too generic to reflect discipline-specific features of CT instruction, which have limited their fitness and practicality in guiding teachers to teach CT in EFL classrooms.

6.2. Four types of ct instructional strategies

Differing from the previous three studies, most of the reviewed studies investigated one or several specific instructional strategies for fostering students' CT in language classrooms. Our inductive analysis has categorized this rich set of CT instructional strategies into four types: 1) *triggering* students' motivation for addressing critical issues; 2) *exposing* students to educatively "messy" information, experiences, and perspectives; 3) *guiding* students to take justifiable stances; and 4) *extending* students to think beyond contextualized experiences. See Table 3 for specific methods in each type and the mapping of relevant studies on the typology.

6.2.1. Triggering

The first type of CT instructional strategy centers around how to trigger students' curiosity, interest, and motivation for addressing critical issues in language classrooms. First, several studies (e.g., Cáceres, Nussbaum & Ortiz, 2020; Dwee et al., 2016; Sadeghi, Adel, Zareian & Davoudi, 2020) highlighted the importance of selecting learning topics. For instance, Cáceres et al. (2020) argued that the topics that addressed core disciplinary concepts, connected to real-world issues, and attended to students' personal interests were effective in triggering students' motivation because students could easily see meanings in those topics. Then, students were more likely to actively engage with CT-related learning. As a participating teacher in Dwee et al. (2016) study shared, "At the beginning, I've asked them [students] to look for issues" (p.635). By guiding students to select topics that were related to their personal lives, a teacher could prepare students to be motivationally ready for learning to think critically.

Some other studies (e.g., Cáceres et al., 2020; Marin et al., 2017; Pessoa et al., 2012) contended that teachers should leverage the "core" issues of the English subject to trigger students' motivation towards CT development. Pessoa et al. (2012) purposefully focused on five critical themes in EFL education to teach students how to think critically. The themes were "English in the age of globalization," "The power of the body," "Race and racism," "Culture and identity," and "Gender and sexuality."

The participating students in this study reported that engaging with these critical themes in a dialogic and reflective process had enhanced their CT abilities. Cáceres et al. (2020) study compared how teachers in different subject areas drew on different core concepts to trigger students' interest. While many natural sciences teachers surveyed in this study used "inquiry"—a core concept valued and practiced in natural sciences—to engage students to think critically, their social sciences counterparts, including EFL teachers, mainly relied on the core concepts of "analyze" (i.e., analyzing texts and socio-cultural objects) and "create" (i.e., bringing up solutions to real-world problems) in their efforts at developing students' CT.

6.2.2. Exposing

The second type is to expose students to the "messiness" of real-life situations in constructing their own knowledge system about language and the world. Based on student motivation resulting from "triggering" strategies, the EFL teachers in some of the reviewed studies used different methods to purposively "mess up" students' existing knowledge and assumptions. First, some teachers used questionings to create an experience of intellectual "messiness" for students. In Dwee et al. (2016) study on university EFL teachers' CT instruction, for instance, all five participants asked questions that required students to make judgments or evaluate possible alternatives. But perhaps due to students' low English proficiency, some teachers also had to ask low-order questions (e.g., "what" questions that required factual answers) to reduce learners' anxiety and enhance their participation.

The second method of "exposing" is extensive reading, through which students develop comprehensive, in-depth understanding of a topic while fostering their CT (Sadeghi et al., 2020). By leading students to read more broadly and deeply, teachers could create a larger intellectual space for students to explore, enquire, and develop CT. Students who try to push the boundary of their existing knowledge base may experience a sense of uncertainty, discomfort, or sometimes even messiness as they integrate the newly received information into their existing knowledge structure. This, however, seemed to be an indispensable process that people need to go through for developing their CT (Dwee et al., 2016).

Group discussion serves as another commonly used method for exposing students to "messiness" (Sadeghi et al., 2020; Sun, 2019; Toshpulatova & Kinjemuratova, 2020). The EFL teachers organized various forms of group discussion to foster students' CT, such as brainstorming and debate. For instance, Dwee et al. (2016) study found that having students brainstorm in small groups (e.g., five to six students a group) could create and sustain a relaxed, comfortable, and easy-to-participating environment, where students could openly present and analyze a rich and diverse set of perspectives as part of their CT building (Horwitz, 2001). Similarly, Toshpulatova and Kinjemuratova's (2020) study stressed the usefulness of debates in exposing students to different or even competing views. As students chose or were "forced" to choose a side and defend it with supporting evidence, they were likely to identify the hidden and inevitable "messiness" associated with those topics and engage in critical analysis and thinking. Furthermore, Sadeghi et al. (2020) study suggested that the whole-class discussion was another effective method in exposing students to differing ideas and perspectives. Just like Ali, a student participant in the study, reflected, "through discussion, we are able to interact with our classmates as well as with our teachers, interpret a subject matter, and express our thoughts and ideas" (p. 76).

6.2.3. Guiding

Guiding students to make justifiable stances towards critical issues is the third type of CT instructional strategy. Some studies described how EFL teachers guided their students to recognize the necessity and possibility of forming their own viewpoints on critical issues. For instance, in [Toshpulatova and Kinjemuratova's \(2020\)](#) study, about half of the seventeen participating EFL teachers considered “distinguishing facts and opinions” an effective method of fostering students' CT. [Sun's \(2019\)](#) study found that asking students to consider the purpose of the learning materials and the author's motive enabled them to recognize the hidden contextuality and subjectivity of the learning materials. In other words, the EFL teachers guided the students to grasp that the information presented in traditionally authoritative sources (e.g., newspapers, textbooks) was contextual and subjective to certain extents. By so doing, the teachers successfully helped students foster a sensitive and open mind and see the need to find their own voice by exercising CT.

Another guiding method is asking students to evaluate existing stances towards critical issues. This strategy took several forms, such as the “Reader-Response” task ([Omar & Albakri, 2016](#)) and student-led research project ([Sadeghi et al., 2020](#)). For instance, [Omar and Albakri's \(2016\)](#) study showed that using the “Reader-Response” task, which focused on individual students' response to and meaning-making of English literature, enabled the students to clarify, analyze, deconstruct, and reconstruct the author's stance in EFL classes. Having students conduct small research projects could also expand their understanding of a critical issue through learning about various existing stances and the supporting evidence. Meanwhile, students could improve their CT through completing a series of authentic managerial tasks in their research projects, such as allocating time, breaking down tasks, grouping, and handling unexpected problems ([Aliakbari & Sadeghdaghighi, 2013](#)). Furthermore, both [Sadeghi et al. \(2020\)](#) study and [Omar and Albakri's \(2016\)](#) study found that visual aids (e.g., thinking map, graphic organizers) could help students effectively process and present their synthesis of the existing facts, opinions, and debates around the focal issue.

The third guiding method is having students form and defend their own voices on critical issues. This method was practiced in two main forms—asking students to write argumentative essays and to make stance-taking presentations ([Sun, 2019](#); [Toshpulatova & Kinjemuratova, 2020](#)). For instance, the academic English lecturers surveyed in [Toshpulatova and Kinjemuratova's \(2020\)](#) study considered that writing argumentative essays was highly effective in developing students' CT because this activity could push students to use higher-order thinking skills and sources of evidence to establish an argument. Similarly, about two-thirds of the same group of teachers viewed that individual and group oral presentations coupled with peer evaluations effectively guided students to clarify, consolidate, and justify their stances towards a critical issue in EFL classrooms.

6.2.4. Extending

The fourth type of CT instructional strategy is extending students' thinking based on teachers' inputs and contextualized experiences. This entails having students reflect on their learning ([Dwee et al., 2016](#); [Toshpulatova & Kinjemuratova, 2020](#)), encouraging students to take actions in the real world ([Cáceres et al., 2020](#); [Sun, 2019](#)), creative writing ([Sadeghi et al., 2020](#)), and modeling of CT practices ([Aliakbari & Sadeghdaghighi, 2013](#); [Sun, 2019](#)).

First, some EFL teachers used reflection as a vehicle to push students to think beyond situated contexts. [Dwee et al. \(2016\)](#) study found that by deliberately asking students to reflect on their learning process, teachers could effectively stretch students' thinking. For instance, one participating teacher shared that it was helpful to ask students to constantly revisit the focal question they were working on and consciously monitor their thinking and progress throughout the learning process.

Second, some ELF teachers strived to transform their students' CT into concrete actions to address critical issues in the real world. For instance, [Cáceres et al. \(2020\)](#) study pointed out that “create” and “apply” were some of the higher-order cognitive skills that should be emphasized in CT instruction, through which students learned to apply knowledge into their daily life and find solutions to address real-world problems. [Sun's \(2019\)](#) study also underscored the importance of teachers leading their students to examine the practical implications of different world views, values, beliefs, and attitudes for changes in their social life.

Another extending method is creative writing. In [Sadeghi et al. \(2020\)](#) study, the teachers presented an unfinished story and then asked the students to finish it based on their imagination. This task mobilized students' existing language repertoire and provided opportunities for students to expand their thinking beyond the current text and context.

The last but not least method of extending students' CT is teachers' directly modeling of CT practices. For instance, [Sun's \(2019\)](#) study showed that teachers articulating, clarifying, or even changing their own values could not only engage students in CT practices but also help them internalize such practices to foster a long-lasting CT disposition that could be transferred to new situations. However, [Aliakbari et al.'s \(2013\)](#) study found that many EFL teachers surveyed did not know how to model CT in their instruction, which called for professional training and resources to develop EFL teachers' awareness, knowledge, and abilities for modeling CT in language classrooms.

7. Impacts and influencing factors of EFL teachers' CT instruction

7.1. Impacts

The reviewed studies identified various types of impact that CT instruction could bring to EFL teachers and their students. First of all, enacting CT rewarded EFL teachers with deepened understanding of the English content knowledge ([Sun, 2019](#)), enhanced teaching competencies ([Ko, 2013](#)), and developed professional identities ([Ko, 2013](#)). Through teaching CT in their classrooms, many EFL changed their teaching approach from banking pedagogy to empowering pedagogy and developed their professional identity from an information giver to a critical facilitator ([Ko, 2013](#); [Sun, 2019](#)). Some other teachers also deepened their content knowledge (e.g., English language) and enhanced their critical literacy senses and skills ([Sun, 2019](#)).

Some studies in our review also showed positive impacts of CT instruction on students. Due to CT instruction in EFL learning, students became confident to develop personal views and express themselves (Omar & Albakri, 2016; Pessoa & Freitas, 2012). CT instruction also enabled students to build up concrete CT skills and other related abilities, such as creativity, reasoning, and willingness to communicate, which further added vitality to their continuous academic learning (Yang, 2012). Sadeghi et al. (2020) also found that CT instruction cultivated students' CT dispositions (i.e., open-mindedness and preciseness), contributing to their academic competence in identifying questions, evaluating evidence, making inferences, and solving problems. Similarly, Omar and Albakri (2016) found that CT instruction had improved students' comprehension of literary texts, English language skills, and academic performance.

7.2. Influencing factors

The reviewed studies also identified student-, teacher-, and context-related factors that were impactful on EFL teachers' CT instruction. At the student level, studies (e.g., Aliakbari & Sadeghdaghighi, 2013) found that students' individual characteristics, such as attitudes, expectation, self-efficacy, and existing cognitive structure were highly related to the enactment and impacts of EFL teachers' CT instruction. As for teacher-related factors, EFL teachers' educational level, teaching experience, attitude, knowledge of CT, and instructional strategies played significant roles in shaping their CT instruction. In particular, EFL teachers' level of education was significantly positively related to their CT performance. That is, teachers with a higher academic degree tend to present better CT skills than their less educated counterparts would do (Jafarigohar et al., 2016; Janssen et al., 2019). Teaching experience was another important factor. In general, EFL teachers with richer teaching experience would be more familiar with CT, value CT more in their instruction, and enact CT practices more frequently in their classrooms than teachers with less experiences would do (Jafarigohar et al., 2016). Further, teachers' dispositional attributes also mattered (Sun, 2019). As Saleh's (2019) study revealed, EFL teachers with positive attitudes towards CT would be prone to integrating CT into their classroom instruction. Last, EFL teachers' knowledge of CT and techniques to teach CT was another crucial factor. Teachers would teach CT more effectively if they had better understandings of the concept of CT or related methods and techniques (Aliakbari & Sadeghdaghighi, 2013; Li, 2016; Mok, 2010).

The reviewed studies also found that contextual factors, such as institutional conditions and cultural traditions, were influential to EFL teachers' CT instruction. The reviewed studies showed that certain school conditions, such as a lack of time, compulsory curriculums, and fixed textbooks, made it difficult for EFL teachers to perform CT teaching (Li, 2016; Mok, 2010). In addition, some institutional barriers interfered CT instruction. Some EFL teachers thought their schools did not prioritize CT, and the administrators did not support their endeavors to promote CT (Aliakbari & Sadeghdaghighi, 2013). Another obstacle was the examination-oriented and spoon-feeding culture. Such a culture challenged EFL teachers to implement CT in language classrooms in many educational contexts, such as Libya (Saleh, 2019), Malaysia (Dwee et al., 2016), the Chinese mainland (Li, 2016) and Hong Kong (Mok, 2010). For example, Dwee et al. (2016) study found that students were used to waiting for teachers' guidance and they were not ready to think critically when they came to university classrooms. Therefore, their passive learning habit derived from the entrenched teaching culture put pressure on teachers' implementation of CT. Lastly, opportunities and resources for professional development could influence EFL teachers' CT instruction. As illustrated in the reviewed studies (Lim et al., 2019; Peteka & Bedir, 2018; Vong & Kaewuraj, 2017), there generally lacked explicit and well-designed CT training courses or programs that could scaffold EFL teachers to embed CT into their daily teaching.

It is likely that the multiple levels and kinds of influencing factors listed above are interrelated and constantly interact with each other. However, none of the studies in this review has provided a comprehensive and in-depth analysis of the interplay among these factors in shaping ELF teachers' perceptions and practices of CT instruction, which thus calls for more research attention on this matter.

Table 4
Key methodological information of the reviewed studies.

Educational level	Participants	Research approaches and methods		
		Overarching design	Data collection	Data analysis
Higher education: 15 (60%) K-12 education: 7 (28%) Higher & K-12 education: 2 (8%) Not specified: 1 (4%)	In-service: 19 (76%) Preservice: 4 (16%) Both: 2 (8%)	Qualitative: 12 (48%) Quantitative: 6 (24%) Mixed methods: 4 (16%) Action research: 3 (12%)	Interviews: 15 (60%) Questionnaire survey: 14 (56%) Observations: 7 (28%) Teaching artifacts: 6 (24%) Tests: 2 (8%)	Quantitative Descriptive: 13 (52%) Predictive: 2 (8%) Qualitative: Content analysis: 10 (40%) Thematical analysis: 4 (16%) Discourse analysis: 2 (8%) Not specified: 1 (4%)

Notes: 1. In the column of "Data collection," "Interviews" include both formal interviews and informal conversations with individual or a group of participants; "Observations" include observing a lesson in real time or a video-recorded lesson; "Teaching artifacts" include syllabi, lesson plans, reflection journals, and other artifacts produced during teaching; "Tests" refer to the use of standardized instruments and procedures to measure and evaluate participants' performance on interested aspects. 2. An integer in the Table means the count of the studies coded under the corresponding category. A percentage indicates the proportion of the number of studies in a category to the total number of the studies reviewed (i.e., 25). 3. Because some studies use multiple methods to collect and/or analyze data, the sums of the counts in "Data collection" and "Data analysis" are greater than 25.

8. A methodological review

Our review has detected variations in research methodology in terms of research sampling and data collection and analysis among the identified studies. Table 4 shows the distributions of the 25 studies on each of these aspects.

In terms of the educational level, 15 studies (or 60% of the total studies) focused on contexts at the higher education level, including English language courses (e.g., Zhang et al., 2020) and pre-service language teacher education programs based in universities (e.g., Pessoa & Freitas, 2012). Seven studies (28%) investigated EFL teachers' perceptions of and strategies for integrating CT into teaching in K-12 education. Two studies (8%) investigated EFL teachers in both higher education and K-12 education. Traditionally, CT tends to be emphasized more in higher education for adult students (Wilson, 2016), whereas several studies in our review have shown that children can develop CT when they are young. However, this is far from sufficient and more studies should be initiated to continue exploring and strengthening this line of inquiry to shed light on the complexities of teach CT to young learners in language classrooms.

As for the participants, 19 studies (76%) focused on in-service EFL teachers, four (16%) on pre-service teachers, and two (8%) on teachers at both the pre- and in-service stage. Such a distribution indicates that limited attention has been paid to pre-service EFL teachers' learning to teach CT. A robust line of research concludes that teacher learning is a long, complex, and challenging process. Given the difficulty of teaching CT revealed in EFL teachers' experiences, systematic support should be in place at the pre-service teacher education stage to prepare them to face the difficult situation in their future practice (Yuan & Stapleton, 2020). Thus, more future studies should be devoted to understanding pre-service EFL teachers' understanding of CT and CT instruction and exploring effective ways of enhancing their awareness and abilities of enacting CT teaching in the process of learning to teach.

Third, in terms of the research approach, most studies ($n = 12$; 48%) adopted the qualitative approach. Some studies used both formal interviews and informal conversations with a small number of teachers. The researchers also collected other sources of data, such as observation and teaching artifacts, to validate the views of EFL teachers. In terms of the qualitative data analysis, content analysis was the dominant analytical technique, and the approach of discourse analysis was also applied. In addition, a few studies ($n = 6$; 24%) adopted the quantitative approach. The number of participating teachers in these quantitative studies ranged from 17 to 319. The predominant data collection and analysis method was respectively self-reported questionnaire survey and descriptive statistics (e.g., frequency, mean, percentage). Other studies ($n = 4$; 16%) adopted a mixed-method research design to capitalize on both qualitative and quantitative data generated through various methods and analyzed them using a combination of inductive and inductive pathways.

It is interesting to note that a limited number of studies ($n = 3$; 12%) used the action research approach, through which the researchers explored how to improve CT instruction in their own classrooms. These practice-based, action-oriented, development-driven studies generated various forms of data within their situated contexts and analyzed the data with the primary focus on identifying practically effective ways of teaching CT to students in EFL classrooms.

Our analysis of the reviewed studies shows that small-scale, qualitatively-oriented, and interpretive research design was the dominant choice of the existing research on EFL teachers' engagement with CT teaching. While such a methodological choice has generated rich and diverse understandings (mainly from teachers' own perspectives) of how EFL teachers engaged with CT instruction in differing contexts, the significantly skewed distribution of methodological approaches and methods towards qualitative research has limited the existing research in offering statistical evidence and policy recommendations for improving CT instruction in EFL settings at a larger scale. Therefore, it is imperative for future studies to pluralize the methodological approaches and methods in studying EFL teachers' engagement with CT instruction. In particular, future scholars could purposively take the advantages of quantitative methodological approaches to further strengthen the knowledge bases of CT instruction in EFL settings. Given the small number of action research studies identified in the review, we also believe that EFL teachers should be encouraged and supported to investigate and reform their own classroom teaching in order to develop practical strategies that promote students' CT with research evidence about the impacts of their classroom-based interventions.

9. Discussion and future directions

In this systematic review, we have analyzed and synthesized research insights from the existing literature that have examined EFL teachers' understanding of and engagement with CT instruction from 2010 to 2020. Our review has generated a "glass half full" picture, showing that many EFL teachers have developed a strong awareness about the symbiotic relationship between language teaching and CT development (Asgharheidari & Tahriri, 2015; Ketabi et al., 2012). Based on such an awareness, they have also made active attempts to integrate CT into their classroom practice (e.g., Cáceres et al., 2020; Dwee et al., 2016; Sun, 2019). This result speaks to some recent studies (e.g., Le et al., 2022) in general education, which show that teachers are able to make use of their autonomy to rearrange and/or modify syllabi to make CT accessible to all students. Specifically, as illustrated in our review, four pedagogical strategies, i.e., triggering, exposing, guiding, and extending, were identified, which could be used in combination to open up students' minds and engage them in CT-focused activities including analysis, comparison, and critique. The four strategies synthesized in the review can therefore make a valuable contribution to current CT research by highlighting and explicating the integrative relationship between content learning and CT development. Specifically, as shown in Sadeghi et al. (2020) and Zhang et al. (2020), students need to be exposed to meaningful topics and content and guided to engage with them through individual and collaborative tasks conducted in English, which can extend their language acquisition, content comprehension, and CT growth.

Despite the positive findings, the review, informed by an integrated view on CT as a composite of diverse skills and dispositions (Facione, 1990; Stapleton, 2011), suggests that some EFL teachers hold a limited, deficient understanding of CT. Given the powerful role of teachers' cognitions in mediating and shaping their daily practice and interactions, it is likely that the teachers without

sufficient understanding of CT might be practicing at the surface in their CT instruction (Vong & Kaewurai, 2016). In some extreme cases, they might give up CT teaching due to the lack of pedagogical knowledge and self-efficacy (Yuan & Stapleton, 2020). This problem points to the need for professional training and support available at both pre- and in-service levels to help EFL teachers form a robust, comprehensive understanding of CT and foster CT-oriented pedagogies. Such learning opportunities and support, however, are to a large extent absent, thus constituting another major obstacle for EFL teachers. This reveals a gap between the rhetoric of curriculum reform that advocates the cultivation of CT as an essential skill for students in the 21st century and the classroom and socio-cultural reality where EFL teachers are ill-prepared and under-resourced in CT instruction (Tan, 2017).

From the research perspective, such a gap has not received much attention in the last decade. As illustrated above, while previous researchers (e.g., Aliakbari & Sadeghdaghighi, 2013; Li, 2016; Mok, 2010) should be applauded for their efforts to unveil a range of personal and micro-political factors (e.g., students' proficiency level, school policy and textbooks) that mediate CT teaching, a further step needs to be taken to examine how EFL teachers can be supported to navigate the myriad of influencing forces and close the curriculum-practice divide with a view to promoting the integration between CT and language teaching. To be more specific, in line with Yuan and Stapleton (2020), CT needs to be fully and systematically integrated into current pre-service teacher education programs, particularly their language pedagogy courses, through which student teachers can experience how CT should be taught (e.g., via teacher educators' modeling practice) and acquire relevant CT-oriented teaching strategies and techniques through practice-based tasks. This may require language teacher educators to systematically reflect on and inquire into their own teaching, e.g., through action research and self-studies (Peercy & Sharkey, 2020). In this way, not only can they generate research-informed insights to improve their practice of educating prospective teachers in CT teaching, but they can also enrich and expand the knowledge base of language teacher education pedagogy with a focus on CT.

Equally, for in-service language teachers, they also need scaffolding and support through school-based initiatives to enhance their understanding of and skills about CT instruction (Le et al., 2022; Zhang et al., 2020). As noted by Zou and Lee (2021), ongoing, context-sensitive teaching training is essential to empower teachers to teach CT in EFL classrooms. It is indeed encouraging to witness the emergence of action research (Lim et al., 2019; Peteka & Bedir, 2018; Vong & Kaewurai, 2017), in which some language teachers tried to investigate and improve their own practice of teaching CT. Such results indicate that language teachers can consider taking up the role of classroom-based researchers in order to seek their professional learning as CT-focused practitioners. Nevertheless, considering the potential cognitive (e.g., limited research competence) and social (e.g., a lack of collegial support) challenges embedded in teacher research (Borg, 2010), a more collaborative approach may need to be promoted to facilitate teachers' active engagement in CT innovations and research within and across their situated communities of practice. For instance, university-school partnerships can go a long way towards helping language teachers approach the notion of CT and its teaching in a systematic and rigorous manner with the sustained input and support from university-based language teacher educators. Such collaborative initiatives, which may involve joint lesson planning, observation, and reflections (Yuan & Lee, 2015), can in turn provide meaningful opportunities for teacher educators to explore and understand how to teach and learn CT in naturalistic EFL classroom settings, thus contributing new knowledge to the field of language education.

Another interesting finding that emanates from the review is the positive impacts of CT instruction on language teachers' professional development. While the field is ripe for relevant literature reporting students' positive gains (e.g., language acquisition and content understanding) from their engagement with CT (e.g., Tian & Low, 2011), it is worth noting that language teachers can also benefit from their CT teaching in terms of enriched pedagogical knowledge and sharpened reflective abilities, as suggested by previous studies (Ko, 2013; Sun, 2019; Yang, 2012). This can possibly be attributed to the unique nature of CT that needs to be manifested and acquired through meaningful, concrete content (Bağ & Gürsoy, 2021; Li & Wegerif, 2014). In other words, when EFL teachers actively try to find ways to teach CT in language classrooms, they may form a better understanding of CT and its multiple dimensions and associated practice, which consequently added to their own CT skills and dispositions. Further, equipped with heightened CT, they may become analytical and reflective in their daily practice, which can facilitate their knowledge building and teaching improvement as language teachers. In this sense, the processes of EFL teachers' CT development and their learning to teach CT became deeply intertwined with one supporting the other. A high level of CT can help language teachers design, organize, and deliver their CT teaching through a systematic, content-based, and collaborative process, whereas a teacher with a low level of CT may not be able to effectively integrate CT with his/her classroom practice.

Following this line of thinking and building on some recent CT research (e.g., Tan, 2017; Zou & Lee, 2021), our review proposes a comprehensive, holistic view to incorporating CT into language teacher education practice and research. Practically, it is important to turn current teacher education programs into a meaningful site for language teachers' CT development. While they are presented with meaningful topics and content about language policy, curriculums, and culture as knowledge input, they can be guided to engage in CT-focused tasks to develop a critical lens to analyze and process such information (Yuan & Stapleton, 2020). Such a lens can be further brought to help them critically engage with pedagogical issues in language education. In many EFL contexts where English is perceived as a form of social, economic, and political capital, language teachers may need to examine the ideological underpinnings and practical implications behind the teaching and learning of English. By fostering and exercising their CT, language teachers can learn to recognize and decipher how different socio-political issues (e.g., race, ethnicity, and gender) are represented and reproduced in language teaching materials (e.g., textbooks) and classroom interactions, based on which they can brainstorm and explore how to promote equitable teaching in their future classrooms (Petek & Bedir, 2018). In this way, CT becomes ubiquitous in teacher education practice, which cuts across various components and topics in order to help language teachers simultaneously develop CT and CT-focused pedagogies.

In terms of research, this holistic perspective calls for ongoing investigations to tap the intertwined relationships between language teachers' CT cultivation and their learning to teach CT. As opposed to previous (e.g., Lorencová et al., 2019; Mok, 2010; Stapleton,

2011), it is meaningful to look into how teachers foster their CT skills and dispositions through their engagement in CT teaching, and how their enhanced CT pedagogical practice may in turn expand and deepen their CT. Admittedly, such an interactive relationship tends to be subtle in practice and may not manifest in a short duration. Therefore, more longitudinal inquiries are needed to collect multiple sources of data through qualitative interviews, classroom observation, and journal writing in authentic classroom settings. Additionally, quantitative research can also be conducted to identify and ascertain the critical components of language teachers' CT-pedagogical competence, its correlation with their CT levels, as well as the influencing factors that mediate their perceptions towards and engagement in CT teaching.

10. Conclusion

This systematic review makes a critical appraisal of current research on EFL teachers' understanding of and engagement with CT. By reviewing and analyzing the findings of the identified literature, the review demonstrates the incomplete understanding of CT held by many ELF teachers and outlines the key strategies for CT teaching adopted in their daily practice. The review also points to the gap between the curriculum rhetoric and classroom reality due to the lack of attention to CT in current language teacher education and other contextual obstacles embedded in institutional and socio-cultural settings. In addition, a methodological review was conducted in the study, which reveals the dominance of the qualitatively-oriented research design in the current studies and offers suggestions (e.g., the adoption of action research approach) for future research endeavors. In light of the findings, the review further proposes a holistic perspective, which integrates language teachers' CT development and CT instruction with directions for future practice and research. We believe that research on CT teaching is a vibrant area that continues to attract attention in both language education and teacher education. It is hoped that our review can be of use to researchers who are interested in this meaningful topic in EFL and other educational settings.

Author statement

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All persons who meet authorship criteria are listed as authors, and all authors certify that they have participated sufficiently in the work to take public responsibility for the content, including participation in the concept, design, analysis, writing, or revision of the manuscript. Furthermore, each author certifies that this material or similar material has not been and will not be submitted to or published in any other publication before its appearance in the *Thinking Skills and Creativity*.

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