

Critical thinking in teacher education: where do we stand and where can we go?

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Critical thinking in teacher education: where do we stand and where can we go?

Introduction: rationale for the special issue

In the contemporary world, characterised by technological advancements, the proliferation of information, and fast social changes (along with associated tensions and crises), critical thinking (CT) has been advocated as one of the pivotal educational goals in diverse geographical settings (Paul & Elder, 2019). Frontline teachers, as the designers, implementers, and reformers of education, have naturally been encouraged and/or instructed to engage in CT-oriented teaching in different subject classrooms. The aim is to cultivate a new generation of critical thinkers, who can act responsibly, ethically, and agentively within the complex, shifting, and contested social milieu (Cui & Teo, 2023; Wilson, 2016). However, teaching CT, as documented in previous literature (Li, 2016; Yuan & Stapleton, 2020), turns out to be a cognitively challenging and emotionally intimidating endeavour. To start with, many teachers find the concept of CT abstract and difficult to pin down, and their own CT may also be at a rudimentary level, thus urgently requiring systematic training and further improvement. Even though some teachers are equipped with a basic understanding of CT, they lack awareness of how it relates to the subject matter they teach. This might result in a dichotomised approach to CT instruction, where the teacher treats CT and content knowledge (and its comprehension and application) in a detached and separate manner. Despite teachers' attempts to address CT through generic explanation and tasks, students are deprived of opportunities to immerse themselves in the domain of subject knowledge through personal sense-making and contextualised engagement, which, nevertheless, is considered pivotal to CT development (Yuan, 2023).

Relating to teachers' limited knowledge of CT and its teaching is the entrenched gap between theory and practice in current teacher education. In fact, CT is not new to teacher education, and from either the perspective of teacher learning or classroom pedagogy, there has been a history of ongoing research and dialogue on how to incorporate CT into teachers' cognitions and practices in specific disciplinary and socio-cultural settings (see some recent systematic reviews such as Wang & Jia, 2023; Yuan et al., 2022). The vast body of literature on this topic converges on a common understanding, as encapsulated in Yuan's (2023) tripartite model for conceptualising a CT-oriented teacher, who should possess three essential attributes: 1) a strong CT mindset, 2) a solid understanding of the relationship between CT and the subject matter, and 3) the development of CT-focused pedagogical competence (in terms of teaching knowledge and strategies) to facilitate their students' CT growth in subject classrooms. However, as illustrated in Yuan's (2023) analysis of a Hong Kong-based teacher education curriculum and other relevant studies (Lorencová et al., 2019), current teacher education programmes/initiatives often fall short in developing CT-oriented teachers. This deficiency

arises from various contextual reasons, including the prevalence of conventional classroom practices that prioritise pedagogical knowledge and skills, and a lack of comprehensive and consistent design at the policy and curriculum levels. Considering the profound impact of CT on teachers' classroom practices, social relationships, and continuing development (Liao et al., 2022), there exists an urgent and compelling need for more nuanced and systematic research on this topic within the realm of teacher education to bridge the theory-practice divide and foster CT-oriented teachers.

In response to this imperative, this special issue assembles a cohort of empirical and review studies, which explore, through different research approaches and methods, how CT is conceptualised and operationalised at policy, curriculum, and classroom levels in teacher education. In so doing, we hope to make a knowledge contribution to the expansive and ever-evolving field of teacher education. Our endeavour is rooted in a goal to understand and highlight the immense potential of CT in shaping both the pedagogical practices of teachers and the learning experiences of students. We strive to champion pedagogical methods that are not only grounded in sound educational principles but also aligned with the specific context in which they are employed. Moreover, through this special issue, we seek to invigorate the ongoing dialogue among teacher educators and researchers regarding CT, paving the way for new avenues of innovation and research to further enhance its integration and impact in various educational settings.

CT as skills, dispositions, and action in disciplinary contexts

Over the past decades, the field of CT research has witnessed a heated debate on whether CT is a domain-specific attribute or it encompasses general principles that once learnt can be applied across disciplines (Jones, 2015; Kalman, 2002). While CT in general entails a form of self-directed, self-disciplined, self-monitored, and self-corrective thinking (Paul & Elder, 2019), we advocate that CT should be understood, acquired, and practiced by individuals in specific disciplinary or professional domains (Jones, 2009; McPeck, 1990), since 'a rigorous understanding of a particular body of knowledge can enable thinking' (Jones, 2015, p. 170). Central to the disciplinary approach to CT is the emphasis on the importance of students actively and critically engaging with the knowledge, language, discourses, technical tools, and conventions specific to the field they are studying. This deep engagement forms the basis for their CT, which is rooted in the inherent nature and ideology of the subject matter. For subject teachers, this means that they need to design, adapt, and utilise a repertoire of discipline-specific teaching approaches, strategies, tasks, and materials to facilitate students' CT growth through content-rich and meaning-based learning. For instance, in language education, students are expected to cultivate their critical thinking through activities such as text reading and discourse analysis. They are not only required to deconstruct a text by identifying and determining its content, language, structure, context, audience, and purposes, but they should also develop the skill to 'read between the lines' by analysing the underlying perspectives and potential biases embedded in the text (Zhang & Yuan, 2022). In the subject area of medicine, the situation for CT instruction and application tends to be quite different. CT in a clinical context, also referred to as medical problem solving, involves a rigorous and systematic process of observation, reasoning, analysis, and communication based on a specialised

body of medical knowledge (Jones, 2015). It is thus crucial for medical education to incorporate a process perspective into its instructional design, where students can be guided to foster and integrate different CT skills to tackle practical problems in concrete situations. Despite its evidence-based and process-oriented nature, CT also involves navigating complex and high-stakes ethical issues in the medical field. Therefore, students may need exposure to real-life situations featured by contradictions, ambiguities, and ambivalence. Alongside this exposure, they need follow-up guidance and support to approach and understand these issues objectively, logically, and with an open-minded perspective, ultimately leading to the identification of optimal solutions.

The above illustration speaks to the disciplinary attributes of CT that arise from students' engagement with a relatively distinct system of knowledge, ideologies, values, and discourses. In this way, students not only foster and exercise their CT for knowledge building, but they also develop the capacity to think, feel, and act critically, ethically, and responsibly, which constitutes a solid basis for their professional socialisation and identity construction within the specific field (such as medicine and education) (Golding, 2011; Jones, 2015). Embedded in such a process is a holistic, integrated view of CT as a composite of **skills**, **dispositions**, and **action** (Wilson, 2016; Yuan, 2023). In a specific disciplinary context with concrete content and pedagogical instruction available, students can start with the training of CT skills, such as the evaluation of claims and explanations, the analysis of arguments for clarity and precision, and making reasoned inferences and judgements. Through the process of skill building, CT dispositions, such as open-mindedness, inquisitiveness, orderly thinking, flexibility, and persistence (Facione, 1990), may gradually become ingrained within their minds, transforming into a form of 'intellectual virtue' that continuously guides their sense-making (Byerly, 2019, p. 1). Furthermore, by leveraging the acquired skills and disposition, CT embraces an action orientation with an overriding focus on changes and transformation within individuals' situated realities. CT can therefore empower them to challenge prevailing ideologies and structures, encouraging innovation and driving positive change. This is also coined as 'transformatory critique' (Davies & Barnett, 2015, p. 17), suggesting an active state of living and breathing as a critical thinker in opposition to social conditions that impede and constrain human freedom.

The three crucial dimensions—skill, disposition, and action—constitute an organic and integrated understanding of CT, which can inform classroom teaching in different disciplines. In language education, for instance, CT, as a set of cognitive skills, plays a crucial role in helping students make sense of discrete linguistic knowledge and rules and apply them in new situations for communicative purposes. Additionally, students need to nurture their CT dispositions through immersive language learning and practices, which enable them to reflect on and examine the intricate relationships between the target language, their personal lives, and the broader socio-cultural context. As such, they would be able to cultivate a sense of action as a reflective, agentive, and critical language user, who is capable of leveraging their linguistic practices (together with other forms of social practices) for personal transformation and positive changes within their embedded communities (Yuan, 2023). In history classrooms, students may also need to be equipped with both CT skills (e.g. taking diverse perspectives and evaluating multiple voices) and dispositions (e.g. tolerance of contradictions and uncertainty) through engaging critically with historical artefacts, knowledge, and analysis, thus contributing to their development

as a historian (or at least with a historian mindset), who can act in a thorough, orderly, and informed way (Jones, 2015).

While the enactment of the integrated framework on CT holds significant pedagogical potential and value, it is still fraught with challenges in practice. At the policy level, although CT has been celebrated as a desired outcome of education in different contexts, there generally lacks systematic planning, guidance, training for teachers regarding its teaching, learning, and assessment. At the curriculum level, where a conventional knowledge-oriented mode prevails, CT is often treated as a by-product, receiving disparate (and uneven) input and attention embedded in the teaching of subject knowledge under the influence of the exam-oriented culture. At the classroom level, while recent research (e.g. Zhang et al., 2020; Zou & Lee, 2021) has documented teachers' growing awareness and attempts to teach CT, they may face challenges related to various pedagogical aspects, including material selection, task design, feedback provision, and addressing individual differences among students, linguistically, cognitively, and culturally. Therefore, it is rather fair to conclude that in many classroom settings, CT instruction is still at a rudimentary stage with a primary focus on discrete skills, and the disposition and action dimension may largely remain unexplored.

Teacher education as a powerful mediator in CT instruction

Based on the above review and discussion, we, as teacher educators and CT researchers, hold a firm belief that teacher education can serve as a powerful mediator that can bridge the theory-practice divide and provide a full-fledged CT experience that benefits our students' academic development and life-long learning. In the vast and dynamic realm of teacher education, CT needs to be explicitly instilled into current teacher education policy, curricula, and practices. This relies on the careful negotiation between different important stakeholders, including policy makers, teacher educators, and teachers, who work concertedly to interweave CT within the subject curriculum and teaching through a logical, coherent, and progressive chain of discourses and practices. The term 'discourse' in this context refers to the collective beliefs, norms, and values that are constructed and maintained through specific linguistic practices and products (Van Dijk, 1997). In teacher education, different stakeholders have been partaking in constructive conversations, vigorous debates, and the fruitful exchange of research findings, yielding a large discourse of CT instruction with a wide range of policy/pedagogical recommendations, technical tools, as well as classroom artefacts (e.g. textbooks). Associated with such a vibrant discourse is also the repertoire of practices enacted by teacher educators and teachers in both developing their CT and teaching CT to students within specific disciplinary, institutional, and socio-cultural settings. Acknowledging the richness of such discourses and practices, it becomes imperative for the field to take a nuanced approach to examining the connections and coherence within and across the diverse elements involved. Some key questions include: 'How is CT presented in subject curricula and how are such discourses translated into actual classroom practice?' Relatedly, we can also ask what role(s) teacher educators can play to facilitate the implementation of CT instruction as prescribed by the curriculum and what else they can do to promote more contextually relevant practices and initiatives outside the curriculum purview. The transition between pre- and in-service teacher education is another critical issue that

warrants serious attention. While CT is deemed important by teacher educators in multiple subject domains, how do they perceive and incorporate CT into their classroom discourses and practices in initial teacher education courses and programmes? More importantly, to what extent and how does CT training received by teachers at the pre-service stage support their CT instruction in school contexts? Does the university-based discourse/practice align with or contradict the complex school reality with its distinct norm and culture when CT teaching is concerned?

The questions outlined above only reveal ‘the tip of the iceberg’ regarding the mediating role of teacher education in promoting effective CT instruction. Mediation, as a crucial concept in the socio-cultural theory, refers to the process by which individuals acquire and internalise new concepts, knowledge, and skills through the use of cultural tools, such as language, symbols, and artefacts (Lantolf & Thorne, 2006; Vygotsky, 1978). Conceptualising teacher education as a rich and robust body of discourses and practices, we believe that it can serve as a mediator that can transform teachers’ cognitions, enrich and refine their CT (as skills, dispositions, and action), and hone their pedagogical competence in teaching CT in specific subject classrooms. The mediating power can manifest in various forms and occasions, such as teachers’ engagement with curriculum reforms, reflective dialogues with their mentors and colleagues, as well as participation in practitioner inquiries (e.g. action research and lesson study). Following this line of thinking, this issue curates a collection of scholarly research works that delve into how teacher education mediates pre- and in-service teachers’ CT development and learning to teach CT. The nine papers, derived from diverse geographical settings and informed by different methodological approaches, paint a comparatively comprehensive picture about CT and its unique significance for teaching and teachers from the perspectives of curriculum and practice. In the following section, a synopsis of the articles is provided.

The contents of the special issue

The articles¹ published in this special issue fall under three categories with distinct yet interrelated focuses. The first category adopts a policy/curriculum perspective, examining the conceptualisation of CT in policy guidelines and curriculum standards in teacher education and subject areas. In Carter et al.’s study, a team of researchers analysed U.S. educator preparation standards across multiple disciplines to identify possible elements of teacher knowledge, skills, and dispositions for developing learner CT as well as the gaps in the standards that may impede teachers’ CT instruction. The findings reveal that most of the standards tend to prioritise CT knowledge and performances, which facilitate the effective delivery of CT-based teaching. A disposition dimension, however, is generally absent in the standards. As previously explained, CT encompasses an interconnected system of skills, dispositions, and action, and it is thus crucial to raise teachers’ awareness and prepare them to teach CT in a comprehensive and sophisticated manner. Learner differences, teacher collaboration, and leadership also emerge as crucial themes in the analysis of CT instruction, which deserve further attention in current teacher education research. In Ro’s study situated in the South Korean context, a set of key policy and curriculum documents in public schooling and teacher education were analysed. The findings show that while CT is emphasised in several subject syllabi as an important skill in

attaining the curriculum vision, it is marginalised with a rather low status in teacher education. Such a divide could be attributed to the national curriculum that does not clearly define the meaning of and relationship between different skills (e.g. CT and creativity) in a way that can facilitate teachers' classroom practices. Both studies reveal the powerful impact of educational curriculum and policy on shaping teachers' readiness and engagement in CT teaching, and it is necessary to consider such a mediating influence when designing and delivering CT-oriented teacher education courses and initiatives for subject teachers.

The second category turns attention to teachers' perceptions of and engagement with CT teaching in naturalistic classroom settings. Four studies present empirical evidence from diverse disciplinary backgrounds, such as English-as-a-foreign-language (EFL) education and science education, to shed light on how teachers understand and approach CT teaching in their daily practice. Li's study, which utilised a funnelling approach and gathered data from multiple sources, including questionnaire, interviews, and field observation, confirms the previous literature about the fundamental elements of CT (e.g. analysis, evaluation, and reference) from the perspective of the participating teachers. Remarkably, some disciplinary and contextualised differences were noted regarding EFL education in China. For instance, the skill of synthesis holds great prominence in language classrooms in China, where students receive training in this area through journal writing and composition from primary school. Additionally, owing to the influence of the Chinese culture and philosophy, reflective thinking is highly regarded as a valuable CT disposition by the teachers, who tried to create space for its development among their students. Similar results can be observed in Bucher et al.'s mixed-methods research in the field of science education. The teachers valued CT as an indispensable part of inquiry-based science investigations, and they associated CT with scientific reasoning, such as gathering evidence, analysing data, evaluating ideas, thereby highlighting its disciplinary features. One particular interesting finding is that some teachers exhibited avoidance intentions, which focused on reducing or preventing student errors, struggle, confusion, and uncertainty in the process of CT instruction. Such attempts, nevertheless, might deprive students of the opportunities to experience, navigate, and tackle challenges and struggle, which can serve as a meaningful source of their CT growth.

Also, within the science classroom, a semiotic perspective is adopted by Kirk and her colleagues, who examined how a group of teachers facilitate, monitor, and support CT through different forms of linguistic resources and practices in Australia. The results reveal that CT needs to be nurtured in a collaborative, dialogic space, where students can engage with scientific knowledge through material manipulation, embodied engagement, and sense-making of multimodal resources, including drawings, symbols, annotations, and tables. Science teachers are thus encouraged to explore and utilise different semiotic systems that can provide a focus, stimulus, and tool for CT development. In the study by Kilbane and Clayton, a taxonomy of inquiry outcomes was developed in relation to CT teaching. By conceptualising inquiry outcomes as engagement, as a means to develop content and skills, and as an end in itself, the researchers conducted a close analysis of teachers' written reports about their classroom inquiries in different subject areas, yielding meaningful results about their pedagogical beliefs and practices about CT. Specifically, the study underscores the need for teachers to move beyond an

engagement/means orientation to an inquiry-as-ends stance, which captures the synthesis of concepts, skills, and dispositions in CT instruction and assessment.

The last category adopts an explicit focus on teachers' learning to teach CT at pre- and in-service levels. The systematic review by Huang and Sang provides a window into how CT is currently understood and researched in existing literature about pre-service teacher education. Delving into the research aims, methods, and outcomes of 43 CT-related studies, the review shows that CT remains a vaguely defined notion with diverse orientations, and pre-service teachers often encounter challenges in transferring CT to their classroom teaching and other aspects of their professional work. In particular, there is a pressing need to transform CT into a truly critical practice by fostering pre-service teachers' awareness of subject knowledge construction and its social and ethical consequences, which aligns with the action dimension of CT explained earlier. Linking CT with critical pedagogy, Maddamsetti's qualitative case study gives a detailed portrayal of how six pre-service teachers navigate dilemmatic tensions during their teaching practicum and promote equitable and inclusive education in potentially constraining school contexts. The participants' experiences open up space for teacher educators and school mentors to revisit teaching practicum, not only as a site for skill training and professional socialisation, but also for promoting a critical, humanised, and action-oriented spirit among educational stakeholders, including teachers and students. The special issue concludes with Zhang and He's article, which reports two university EFL teachers' journey of lesson study in developing their pedagogical competence to teach CT. The findings, on the one hand, provide practical insights into the integration of CT into language teaching, while, on the other hand, testify to the meditating role of lesson study, together with other forms of practitioner inquiry (e.g. action research and self-study), in fostering CT-oriented teachers with self-agency and reflectivity.

The way forward

CT, as a habit of mind, serves as the key to unlocking the potential of human beings. It enables us to analyse, evaluate, and make informed decisions so that we can navigate the complexities of life with openness, clarity, and confidence. Contemplating the special issue and its conceptual and practical contribution to the knowledge base of teacher education, we believe there are some important questions that remain to be explored if we aim to maximise the potential of CT for teachers and students.

- Viewed as a form of transformative action, how can CT be incorporated into current teacher education practices, building on other crucial dimensions such as skills and dispositions? In particular, how can teacher educators -- the leading actors in teacher education -- foster pre- and in-service teachers' CT through CT modelling, curriculum development, classroom instruction, and other pedagogical interventions?
- As CT pervades various aspects of teachers' professional work, what are the fundamental and/or unique attributes of teachers' CT? How does teachers' own CT interact with their engagement in CT teaching (or CT knowledge and pedagogy)?
- There has been an emergent understanding of the affective aspect of teacher CT in relation to its disposition and action orientation in the face of complex and

struggling social reality. Thus, what is the relationship between the cognitive and emotional dimension of CT? How can such an affective focus be approached in future teacher education research and practices?

- Several other competencies, such as collaboration, communication, problem-solving, and cultural/global competency, are simultaneously emphasised on the latest education reform agenda at the global scale. Then, how can CT be configured in the larger system of teacher education, teaching, and schooling in ways that it can co-exist with and mutually reinforce other relevant competencies?
- Teaching and teacher education are socio-culturally-embedded practices. Then, how is CT understood, valued, practiced, and studied in different socio-cultural contexts, especially in the underrepresented ones? How can teacher educators and teachers develop socio-culturally responsive approaches to integrating CT into current classroom practices?

The questions listed above are only tentative; together with the nine articles included in the special issue, we hope our reflections and suggestions can serve as a catalyst for fruitful discussion and directions for CT research in the field, where different stakeholders can collaboratively strive to make CT an essential, organic, and constructive component of education at all levels.

Note

1. Due to an oversight by the editorial office, some articles from the special issue have been published in previous issues of the journal. Specifically, Carter et al. (2023), Maddamsetti (2023), and Zhang & He (2023) have been included in issue 4 of volume 29, while Kilbane & Clayton (2023) has appeared in issue 3 of volume 29. We apologise for any confusion caused.

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