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Mediation, emotion, and agency from an activity theoretical perspective as potential analytical tools for inquiry into language teacher cognition: clarifications and implications

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Abstract

Drawing inspiration from the sociocultural turn in language teacher cognition research, this conceptual article argues for the utilisation of cultural-historical activity theory (CHAT) as a theoretical framework for researching and understanding teacher cognition as a social phenomenon. In this article, three CHAT-related concepts, namely *mediation*, including *contradictions*; *emotion*; and *agency* are expounded, drawn together, and proven as pertinent and useful analytical tools for the study of the complexity of teacher cognition. Its central thesis posits that CHAT accommodates teachers' sociocultural activity systems whose mechanism is characterised by mediation that stimulates their emotional responses and agency for taking actions—a process through which teacher cognition unfolds in dynamic, developmental manners. By mapping these concepts, the article contributes to the extant scholarship by highlighting language teacher cognition as a mediated, emotional, and agentic process of transformation and providing critical epistemological implications for prospective empirical attempts in this line of research.

Keywords: Language teacher cognition, Cultural-historical activity theory, Mediation, Contradictions, Emotion, Agency

Introduction

In the field of language teacher education (LTE), there is a great deal of scholarly interest in language teacher cognition (LTC), widely known as “a tacit, personal-held, practical system of mental constructs” such as knowledge, beliefs, and thoughts (Borg, 2015, p. 40). This interest in teachers' *mental lives* (Walberg, 1972) dates back to the mid-1990s (Johnson, 2018; Lee, 2018), when it was situated within the active atmosphere of research focusing on various aspects of LTC such as teachers' knowledge and learning to teach, beliefs, subject-specific cognition, and conceptions of knowledge (Borg, 2015). This tradition has been followed by the proliferation of theoretical and empirical reports

on LTC over the past three decades, boosting the acknowledgement of LTC as a “subdiscipline of applied linguistics” (Kubanyiova & Feryok, 2015, p. 435), as “an international phenomenon” (Borg, 2015, p. 52), and also as “an important agenda” in LTE (Li, 2020, p. 19). Research in this subfield is essential for capturing the intricacy of teachers’ mental lives; their positioning of themselves and learners; their pedagogical orientation, implementation, and innovation; and their learning and professional development in diverse contexts (Johnson, 2018; Li, 2020).

LTC research has been underpinned by various theoretical foundations. A substantial body of literature views teacher cognition as “static and discrete entities” that can be elicited by self-report instruments such as questionnaires (Kubanyiova & Feryok, 2015, p. 437) and described as “specific mental constructs in an abstract or unsituated manner” (Borg, 2019, p. 6). The aim of research adopting this cognitivist perspective is to descriptively map out teachers’ knowledge and beliefs about a particular instructional issue and their cognition-practice (mis)alignments (Borg, 2015, 2019). LTC research has also been done through the lens of discursive psychology, which frames teacher cognition in interactions in micro-level contexts such as classrooms or professional talk spaces and emphasises teachers’ social actions carried out through interactional talk (Li, 2020). Seen together, these perspectives limit understandings of how teachers’ cognition develops in context and how it interplays with their practice since they overlook “the larger vision of language teacher cognition” (Kubanyiova & Feryok, 2015, p. 437), or put differently, “the broader context (historical, social, professional) of teachers’ work” (Borg, 2019, p. 5). Additionally, they do not consider the evolving view of research into teachers’ mental lives as the study of how the unity of cognition and emotion (Amory & Johnson, 2023; Borg, 2019; Golombek & Doran, 2014) as well as that of emotion and agency (Cong-Lem & Nguyen, 2024; Nguyen & Ngo, 2023) contributes to teachers’ professional learning and growth. These limitations present the need for a different epistemological approach that takes into account the importance of context, emotion, and agency in understanding teacher cognition.

In response, this conceptual article discusses a cultural-historical activity theory (CHAT) perspective (Engeström, 2001; Engeström & Sannino, 2021) on LTC and argues for its potential contributions to research in this subfield. The paper aims to provide clarifications on how teacher cognition (re)forms in context whilst mediated by a range of sociocultural resources embedded in teachers’ socio-professional activities. It will demonstrate how CHAT can be employed to look into the socially mediated process of intellectual development of the teacher’s mind. Also brought into sharp focus is how mediation, teacher emotion, and teacher agency situated in CHAT can serve as analytical tools for inquiry into teacher cognition. By bringing together scattered links between theoretical perspectives on mediation, emotion, and agency and surveying the empirical literature in LTE, the article supports its arguments with relevant evidence.

This conceptual piece is significant in several ways. Firstly, it is expected to reawaken the subfield’s recognition of Cross’s (2010) endorsement of CHAT, particularly its sociocultural view of teacher cognition and its emphasis on historicity and contradictions, as a unifying framework for LTC research. In this respect, the paper underscores CHAT’s relevance to a recent perspective on teacher cognition and its related concepts such as knowledge and beliefs as a social phenomenon characterised by situatedness,

participation, and emotion (Borg, 2019; Kubanyiova & Feryok, 2015). This would also help to integrate the “descriptive mapping” of teacher cognition (Borg, 2019, p. 441) into its sociocultural orientation by showing how specific knowledge and beliefs are (re)constructed in social activities (Peng, 2024). Secondly, by placing mediation, emotion, and agency into CHAT, the article presents a holistic conceptual framework on which LTC research in different contexts can be premised in order to contribute more local accounts of teacher cognition and its development to the international literature. Thirdly, the paper contributes to promoting a shift from focusing on teachers’ knowledge, beliefs, and skills to examining the dynamics of their learning and development in the interconnected activity systems of their socio-professional lives (Seloni, 2022). Finally, the paper offers epistemological implications for future studies and identifies areas of LTC research that can tap into the mapping of mediation, emotion, and agency in activity to widen the window into teachers’ mental lives and teaching practices.

A CHAT perspective on language teacher cognition

The sociocultural turn in LTC (Johnson, 2006) has brought researchers’ attention back to Wertsch’s (1995) claim that the role of research is to explore how human mental processes interact with institutional, cultural, and historical contexts. This turn emphasises the significance of social relations, interactions, and accumulated learning experiences in shaping teachers’ (re)conceptualisation of teaching whilst presenting the need to discover how their knowledge co-construction and instructional decisions are impacted by social contexts, encompassing classrooms, teacher education, professional development, and educational ideologies (Johnson, 2009; Johnson & Golombek, 2020; Kubanyiova & Feryok, 2015). Li (2020) also concurs with the potential of a sociocultural lens to illuminate “the ‘social’ nature of teacher cognition, shared and co-constructed between individuals” (p. 32). This notion is consistent with a recent view that:

individual teacher cognition does not originate or operate in a vacuum and it is influenced in powerful ways by a range of personal, physical, sociocultural, and historical milieus which interact, in both remote and immediate ways, to shape who teachers are and what they do. (Borg, 2019, p. 6)

This view highlights the socially situated nature of teacher cognition, which lends itself to a sociocultural perspective in specific connection with Vygotsky’s cultural-historical theory (VCHT) (Vygotsky, 1986, 1987). As “a theory of mind” that acknowledges the pivotal role of social relations and cultural artefacts in the organisation of uniquely human cognitive processes (Lantolf, 2004, p. 31), VCHT serves as a framework for systematically exploring human cognition through its integration with social contexts (Lantolf & Thorne, 2006). The theory, according to Lantolf (2004), dismisses the view that human thinking is solely an internal mental phenomenon, instead recognising it as a cognitive process co-constructed in social spaces rich in interaction. It also accentuates the impacts of cultural mediation (i.e., socialisation and artefacts) on the (re)construction of human higher mental functioning (Johnson & Golombek, 2020; Lantolf & Beckett, 2009).

Adhering to VCHT in the field of LTE, teacher cognition can be conceptualised as “a *social* phenomenon” (Li, 2020, p. 31, original emphasis) for various reasons. Firstly,

as learners of teaching, teachers' learning is a long-term, intricate, and developmental journey occurring alongside their engagement in socio-professional contexts (Freeman & Johnson, 1998). Typical contexts are teacher education (Johnson & Golombek, 2016), the school community (Nguyen, 2018), rules and policies (Cross, 2009; Gao & Benson, 2012), or curriculum reforms (Ahn, 2011; Kim, 2011; Le & Barnard, 2009). This makes it necessary to understand their cognition within the contexts of their learning, their students, and the way they perceive and perform their instructional roles in relation to their socio-professional practices and environments (Johnson & Golombek, 2020; Kubanyiova, 2018; Li, 2020). It is in this situated learning process that "they define who they are and what they are" (Li, 2020, p. 43). Secondly, teachers' personal agenda (i.e., personal histories / values / beliefs, prior experiences, current practices, and future aspirations) is of capital importance to understanding their situated professional learning and cognitive development (Johnson, 2009; Johnson & Golombek, 2020; Nguyen, 2019). This agenda interacts dynamically with the social contexts of their work in ways that impact their cognitive development. Furthermore, teachers' cognition is characterised by its "emergent sense making in action" (Kubanyiova & Feryok, 2015, p. 437)—the way they "participate in and constitute their professional worlds" (Johnson, 2009, p. 9). In these worlds, their learning experiences and cognitive development are mediated by sociocultural artefacts, relations, and practices situated in social activities in which they participate (Johnson, 2009; Nguyen, 2019). Their cognition should therefore be interpreted through their interactions with other activity participants and stakeholders and also through the way they appropriate cultural mediation embedded in the activities (Johnson & Golombek, 2011, 2016; Kubanyiova & Feryok, 2015; Lantolf & Beckett, 2009; Li, 2020).

The observations above are useful for understanding how teachers' cognition develops longitudinally whilst influenced by sociocultural factors (Burri & Baker, 2021; Saeli & Rahmati, 2022), especially those arising from social activities. Linking teacher cognition with activity, Johnson and Golombek (2011) unequivocally assert that:

from a sociocultural perspective, human cognition is understood as originating in and fundamentally shaped by engagement in social activities and, therefore, it follows that what is taught, is fundamentally shaped by how it is taught, and vice versa... Cognition cannot be removed from activity since it originates in and is framed by the very nature of that activity. (p. 3)

This assertion should be the premise for the utilisation of Engeström's (1999, 2001) CHAT, a descendant of VCHT, as an analytical framework for studies on LTC. CHAT, as Johnson and Golombek (2011) put it, "maps the social influences and relationships involved in networks of human activity... and attempts to construct a holistic view of human activities as well as human agency within these activities" (p. 9). That being so, CHAT is useful for explicating the complexity of "the dialectic between thinking and doing" (Cross, 2010, p. 438) that unfolds in a multitude of teachers' interlinked social activities. In addition, CHAT is an epitome of the Vygotskian notion of *internalisation*. This concept can be used to explain how teachers' cognition develops through mediation on the interpsychological plane (i.e., between activity participants) before it does on the intrapsychological plane (i.e., within an individual participant) (Johnson & Golombek, 2011; Vygotsky, 1978, 1986). Therefore, as social activities change, teachers' cognition

adapts accordingly (Johnson, 2015). These characteristics of CHAT make it a functional framework for the study of teachers’ cognition and cognitive development situated in social activities in which they partake throughout their socio-professional lives.

An overview of CHAT

VCHT and CHAT are similar in their emphasis on the Vygotskian concept of *mediation*, where a stimulus-response link is mediated by artefacts. This concept is generally viewed as first-generation CHAT, which has an individualistic orientation. This generation was expanded upon by Leont’ev (1981), who embedded the individual into a world of social relations and communities. Leont’ev’s CHAT, however, does not “address the multi-voiced and multilayered nature of activity as a source of compartmentalisation, conflict, and contradiction” (Yan & Yang, 2019, p. 499). Adapting Leont’ev’s conceptualisation, Engeström diagrammatised the second-generation CHAT (Fig. 1) as a collective activity system (Engeström, 1987, 1999, 2001).

Engeström’s CHAT is an interconnected system comprising *subject, object, mediating artefacts, community, rules, and division of labour* (Engeström, 1999). The *subject* is defined as the individual or (sub)groups that conducts the activity, whilst the *object* is “the raw material or problem space at which the activity is directed” (Engeström & San-nino, 2021, p. 8). The object represents the subject’s motive or goal and thus drives their motivation to get involved in and sustain the activity. It is also “continuously moulded and transformed into an *outcome* that is shaped by a host of *mediating artefacts*” (Johnson & Golombek, 2011, p. 10, original emphasis). If the object is reimagined, then the activity system has to alter, partially or completely, which may culminate in transformative development (Engeström, 2001). *Mediating artefacts* comprise “tools and signs, both external implements and internal representations such as mental models” (Engeström, 1999, p. 381). Put differently, artefacts are physical/material and symbolic/cultural tools (Greeno, 2012; Johnson & Golombek, 2011). Wartofsky (1979) classified artefacts into primary (e.g., language, physical instruments for writing), secondary (e.g., semiotic resources, normative beliefs), and tertiary artefacts defined as “the forms of representation” that “constitute a world (or worlds) of imaginative praxis” (p. 207). By appropriating and applying artefacts, the object-oriented subject conducts the activity to achieve its desired outcome; thus, these artefacts play a crucial role in drawing the link between the subject and the object.

Three remaining components of CHAT transcend the individualistic boundary to address issues of contextuality and collectivity. In an activity system, the *community*,

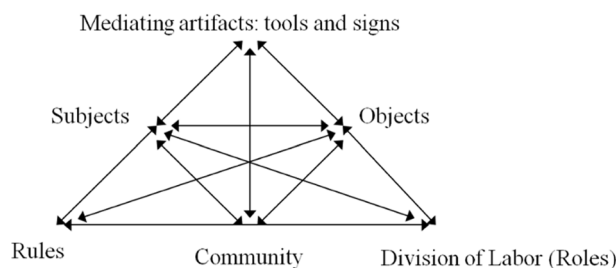


Fig. 1 CHAT (Engeström, 1999)

often deemed as individuals or sociocultural (sub)groups to which the subject belongs (Engeström & Sannino, 2010; Yan & Yang, 2019), constitutes the context where the subject’s trajectory of acquiring the object can be traced. For Dang and Cross (2022), the community also includes “those not necessarily present in the immediate “production” of the activity, but with a stake or interest in terms of influence” (p. 10). The stakeholders of this community “share the same general object and position themselves as distinct from other communities” (Johnson & Golombek, 2011, p. 10). *Rules* of the activity cover normative and conventional standards, both implicit and explicit, that regulate all the interactions in the activity (Dang & Cross, 2022; Johnson & Golombek, 2011). *Division of labour* exists to determine the distribution of roles, responsibilities, and by extension, of power in the conduction of the activity (Cole & Engeström, 1993; Dang, 2013; Dang & Cross, 2022; Engeström, 2001; Johnson & Golombek, 2011). *Community*, *rules*, and *division of labour* are the materials for installing the historical, social, and cultural walls of the activity.

The widespread application of CHAT across various fields of study and (inter)national contexts prompted concerns as to its capacity to accommodate diverse modes of thinking (Engeström, 2001). This set the stage for the evolution of CHAT into a third generation characterised by “conceptual tools to understand dialogue, multiple perspectives, and networks of interacting activity systems” (Engeström, 2001, p. 135). This generation features “a constellation of two or more activity systems” (Engeström & Sannino, 2021, p. 5) embedded in the social-cultural-historical context. These co-existing systems are connected by a potential shared object emerging from the coalescence of activity-specific objects and interact with one another through patterns of “multi-activity collaboration” (Engeström & Sannino, 2021, p. 5). To function as an analytical framework, CHAT must have minimally two interacting activities, with the joint activity system serving as a unit of analysis (Fig. 2).

CHAT mediation as an analytical tool for LTC research

Deeply rooted in VCHT, CHAT premises itself on the notion that human interaction with the external world is mediated by sociocultural resources (Engeström, 2001; Johnson & Golombek, 2011; Prenkert, 2010; Vygotsky, 1978, 1997) and that mediation guides humans toward a particular behavioural pattern that diverges from biological evolution, giving rise to novel forms of “culturally-based psychological processes” (Vygotsky, 1978, p. 40). In a social activity system, the subject-object relation is subject to the mediation

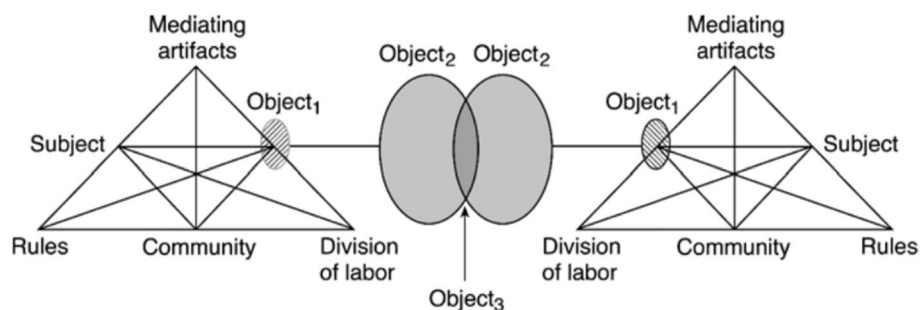


Fig. 2 CHAT (Engeström, 2001)

of not only artefacts but also rules, division of labour, human members and stakeholders, and the interrelations among all the components of the activity. The subsections below will discuss CHAT mediation in detail.

Mediation by artefacts

In a social activity system, artefacts function as mediators. As mentioned earlier, CHAT's *mediating artefacts* cover tools and signs, both physical (e.g., objects) and symbolic (e.g., language). The subject of the activity performs numerous actions, mediated by artefacts, to procure the target object (Lantolf & Thorne, 2006) and turn it into an outcome (Dang & Cross, 2022; Engeström & Sannino, 2021). The subject's appropriation and application of artefacts is flexible, allowing the subject to decide which artifacts to use and how to use them to accomplish the desired outcome (Prenkert, 2010). When orienting their actions towards the object, the subject might achieve the object or even a higher-quality, emergent object, potentially leading to a new cognitive level (Cole & Engeström, 1993). This indicates the pivotal roles of artefacts and artefact-mediated actions in yielding enhanced outcomes, such as acquisition of new knowledge or higher levels of cognitive development.

Concerning how different types of artefacts act as mediators, Vygotsky (1981a, b) notes that technical tools (physical artefacts) modify the natural adaptation process by shaping the forms labour operations take; by comparison, psychological signs (symbolic artefacts) radically change the structural mechanism of mental functions. This implies that symbolic/psychological artefacts might mediate relationships and actions in an activity system at a structurally deeper level than physical/technical artefacts. Representative of such psychological artefacts are socially constructed mental concepts, both everyday and scientific. As personal, intuitive, and tacit views of reality, *everyday concepts* indirectly form one's superficial spontaneous knowledge during their socialisation into a community, whilst *scientific concepts*, intentionally brought forth by external agents in instructed settings, support the acquisition of explicit, domain-specific scientific knowledge (Wertsch, 2007). Spontaneous knowledge lends experiential validity to the formation of scientific knowledge, which then serves as a means of structuring and organising spontaneous knowledge in a systematic manner (Vygotsky, 1966, 1986, 1987). This explains the mediating role of scientific concepts in human cognitive development—a trajectory of an individual being able to “transform the raw material of experience into a coherent system of concepts” (Howe, 1996, p. 39) via instructional support and guidance.

In LTE, according to Dang (2017), mediating artefacts are material (e.g., books), practical (e.g., concrete classroom strategies), and conceptual in nature. Conceptual artefacts include both everyday experiences and academic/scientific concepts such as theories, models, and guidelines for instruction. Teachers' everyday concepts are synonymous with their “deeply rooted tacit notions about language and language learning and teaching” that stem from their instructional experiences and histories (Johnson & Golombek, 2018, p. 444). Then, by engaging in, for instance, specialised training, teaching, or concept-rich interactions, teachers are introduced to academic/scientific concepts that are formally documented in textbooks and widely accepted as a systematic method for understanding an academic community's phenomena (Johnson, 2009). Also through

such engagement, they are able to make sense of “the dialectic between academic and everyday concepts”, a precondition for their understanding of true concepts and their enhanced conceptual reasoning (Johnson & Golombek, 2018, p. 444). This ability allows teachers to unshackle their spontaneous knowledge from the *apprenticeship of observation* (Lortie, 1975) and reformulate it to function better in different contexts of professional discourse where disciplinary knowledge is key to ensuring mutual understanding (Johnson, 2009; Johnson & Golombek, 2011). It can therefore be argued that exposure to scientific concepts has the potential to reshape teachers’ experiential knowledge, thus restructuring their cognition.

The transmutation of everyday concepts into scientific concepts, as Johnson and Golombek (2011) note, allows true concepts to form and become psychological artefacts, aka *pedagogical tools*. By appropriating them, teachers can internally acquire “the ways of thinking endemic to specific cultural practices” (Grossman et al., 1999, p. 15). These tools have been proven to play a mediating role in second language (L2) teacher learning (Johnson & Arshavskaya, 2011; Johnson & Dellagnelo, 2013; Tajeddin & Aryaean, 2017; Wu & You, 2019). The teacher in Ahn (2011), for instance, acquired and acted out curricular reform concepts introduced through her practicum (e.g., extensive use of English in the classroom) but she also adapted these concepts to suit her students’ socialisation pattern of learning English through their first language (Korean). Pedagogical tools are utilised and modified by teachers in accordance with their instructional purposes and the contextual realities of their teaching (Johnson & Golombek, 2020). Teachers are not passive receivers and users; instead, they actively manipulate pedagogical tools, and in so doing, they can develop context-specific patterns of thinking and intellectual development.

Mediation by rules

As implicit and explicit normative values that keep actions and interactions within limits (Engeström, 2008), *rules* mediate the subject’s course of action in a social activity system. By orienting themselves towards rules, the subject, for example, creates and modifies the initial mechanism of their actions. At a local level, rules can be cultural values and professional beliefs that pervade a community of practice and have a direct influence on its members’ ways of thinking and doing. Rules can also extend themselves to the larger sociopolitical and sociocultural norms that also play a mediating part in the members’ cognitive changes. For instance, a social norm that spreads at the (inter)national level may create an affordance for or interfere with relevant stakeholders’ decision-making. It is important to note here that this norm acts as a mediator only when the stakeholders use it to navigate ways of achieving an intended objective.

Copious evidence in the LTE field supports the idea that rules governing language education in particular contexts mediate the way teachers perform their work (e.g., Cross, 2009; Gao & Benson, 2012). Typical of such rules are curricular reforms which dramatically impact L2 teachers’ cognition (Ahn, 2011; Kim, 2011; Le & Barnard, 2009; J. C. K. Lee et al., 2013). Ahn (2011) and Kim (2011) specifically point to the *hidden curriculum* (Denscombe, 1982), aka *schooling norms* (Johnson & Golombek, 2011), as having a decisive effect on teachers’ and students’ perception of what classroom practices are (ab)normal and (un)acceptable. In L2 writing teacher education, policies such as national

guidelines on language education and university entrance examinations (Hirose & Harwood, 2019), pervasive overemphasis on speaking instruction (Saenkhum, 2019), and top-down mandates on professional development (S. H. Lee & Pandey, 2019) have led teachers to experience difficulties in using formal L2 writing pedagogies in their English as a foreign language (EFL) writing instruction. Dissecting rule-based mediators at the micro level (classroom or professional coursework), the meso level (institution), and the macro level (society) can open a window into the socially extended ecologies of teachers' mental lives (Kubanyiova, 2012; Kubanyiova & Feryok, 2015).

Mediation by division of labour

In an activity system, *division of labour* works as mediators by specifying the distribution of responsibilities among participants (Engeström, 1987, 1999, 2001). Division of labour refers to not only work relationships but also the complexity of power relations within a community (Dang, 2013; Golombek, 2011). Power dynamics significantly affect teachers' proximal learning and development, but these may also be used to manipulate the assignment of responsibilities in their activity systems. Responsibility sharing and power relations, if properly organised, can advance the activity and facilitate teachers' development; otherwise, these may pose an impediment.

In addition, division of labour lays a basis on which action and activity are distinguished (Leont'ev, 1978, 1981). The subject and other participants can carry out several different actions out of their assumed responsibilities in the collective activity to promote their ownership of the object. These actions, according to Leont'ev, are ephemeral—having a definite start and an end. By contrast, the collective activity is highly reproductive in the sense that it is (re)constructed over time to accommodate newly generated actions. As actions are manifold, complex, and at times unpredictable, the activity may undergo (dis)continuous changes. These changes manifest themselves as the movement from finite actions to regenerative activity (Engeström & Sannino, 2010), which is the basis for learning. This is believed by Engeström (1987) to be the case as he notes, “learning activity is mastery of expansion from actions to a new activity... [and] an activity-producing activity” (p. 125). It can hence be argued that the responsibility the individual subject (e.g., the teacher) assumes and the actions this subject takes to perform such responsibility account for the reproduction of their activities (e.g., teaching) from which their learning ensues.

Mediation by community

According to Prenkert (2010), the subject-object relation is “always situated in a social context of human practice” (p. 654), pointing to the collectivity of a social activity system. Engeström's (1987, 1999, 2001) addition of *community* to CHAT indeed entails *social relations* (Johnson, 2009) that “genetically underlie all higher functions and their relationships” (Vygotsky, 1981b, p. 163). In these relations, *human mediation* takes shape (Johnson & Golombek, 2011). This is crucial for understanding the mediating effect of external social interactions on internalisation (Johnson & Golombek, 2011). For Li (2020), “interaction is not the channel of cognition but the action of cognition” (p. 44). The ways in which the human subject interacts with their social connections determines how they internalise novel concepts, indicating their learning and development.

This notion resonates with Rogoff's (1995) concepts of *guided participation* and *participatory appropriation*. Guided participation features interpersonal activities in a particular community in which the participants actively participate and endeavour to construct common knowledge by drawing on the skilled actions taken together towards an intended outcome. Participatory appropriation holds that "... through participation, people change and in the process become prepared to engage in subsequent similar activities", meaning that their knowledge is created through social interactions and transferred across different activities (Rogoff, 1995, p. 150). Human mediation derived from individuals' participation in a community allows them to appropriate the beliefs and values from others and reinterpret their approach to handling their current realities or future situations.

In LTE, social relations mediate teachers' learning and cognitive development when they enter into interactions with others in their socio-professional community. Such mediation occurs through their collaboration with their educators, fellows, and students that contains oral and written interactions and exposure to culturally constructed artefacts such as academic/scientific concepts (Johnson et al., 2020; Nguyen, 2019). An instance of such human mediation is given in Johnson and Arshavskaya (2011), a case study in which the team-teaching project rich in interaction served as a site of strategic mediation that enabled the participating teacher candidates' internalisation of the concept of orienting (i.e., helping students to master the teaching content in concrete or personally relevant ways) to materialise. Likewise, collaborating with their professional community resulted in L2 writing teachers' heightened self-efficacy and agency (Christiansen et al., 2018). Human mediation has also been realised through direct personal interaction (Smolcic, 2011), dialogic blogs and online asynchronous discussion forum (Reis, 2011), mentoring (Hudson et al., 2009; Newell & Connors, 2011), peer feedback during the practicum (Dang, 2013), and emotion-based strategies for mediating teacher learning (Golombek & Doran, 2014). Social relations frame a setting where human mediation comes into existence and shapes teacher learning through the appropriation of sociocultural artefacts.

As social relations are situated in the community of an activity system, it is important to elaborate on the mechanism of community-based human mediation. In the realm of LTE, this mediation can take place in a *community of practice* (CoP) (Wenger, 1998), "a well-defined, identifiable groups [in which] members have different interests, make diverse contributions to activity, and hold varied viewpoints" (Lave & Wenger, 1991, p. 97). CoP has been used to reconceptualise teachers' knowledge development, with the key concern being how they acquire and use knowledge and skills via socialisation (Herold, 2019; Shulman & Shulman, 2004). This development, as Swain et al. (2010) observe, is "a gradual and deepening process of participation... in the cultural, historical, and political life of the community" (p. 27). During this process, human mediation is activated in interactions between teachers and others over an extended period of time, which expedites their socialisation into the community and their resultant internalisation of its system of knowledge, beliefs, and values.

In a CoP, there exist power differentials such as a disparity between teachers with different levels of, for example, knowledgeability and/or seniority. Yet, by engaging in repeated interaction and collaboration in the community, less experienced teachers'

can shorten the gap between what they know and what their experienced counterparts know, which likely results in their acquisition or advancement of knowledge (Lave & Wenger, 1991). This is a CoP-based learning process Lave and Wenger (1991) coined as *legitimate peripheral participation* (LPP). LPP elucidates how teachers seek psychological and professional assistance (Hobson, 2010) and embrace the core values and practices of the CoP into which they socialise themselves (Christensen, 2013). This endeavour plays a substantial role in their knowledge building and cognitive development.

In addressing unequal power relations through CoP-mediated learning, teachers may need to ruminate about when they need expert-other support and when they do not. This awareness can be represented as their *zone of proximal development* (ZPD), a CoP-related concept rooted in VCHT (Vygotsky, 1978). ZPD refers to the gap between the current level of development and the potential level that can be achieved with guidance and mediation from more knowledgeable individuals (Golombek & Doran, 2014). It creates a proximal space for teachers to learn and develop cognitively when they solve problems through mediated dialogue with and specialist support from expert others. The idea that learning has its grounds in collaborative problem solving extends ZPD's individually focused development to collectively focused development, a phenomenon labelled as *zone of collaborative development* (ZCD) (Balakrishnan & Claiborne, 2012). At the core of ZCD is problem-solving collaboration, which is the mainspring of both individual and collective growth. With their collaboration-oriented nature, ZPD and ZCD can be used to explore how exposure to expert-other resources contributes to reconfiguring teachers' existing knowledge and belief systems.

Transplanting ZPD and ZCD in teacher learning, Warford (2011) brought forth the concept of *zone of proximal teacher development* (ZPTD), which describes teacher learning as going through four stages. The first stage (self-assistance) commences with the teacher supporting themselves based on their prior learning experiences and tacit conceptions about teaching and learning. This is followed by the second stage (teacher-assistance), when they get exposed to expert interventions that help them compare their conceptions with established pedagogical constructs and draw conclusions for themselves. In the next stage (internalisation), the teacher internalises these constructs and integrates their learning experiences into "the larger ontogenetic framework of professional growth" (Warford, 2011, p. 255). The last stage (recursion) occurs when the teacher repeatedly translates their internalised knowledge into practice and reflects on the theory-practice dialectics, which may then result in change to their own knowledge and belief system. ZPTD depicts in a more practical way than ZPD and ZCD how the process of teacher learning is mediated from an interventionist perspective.

CoP and its related concepts discussed above, when used to study teachers' cognitive processes from a mediational perspective, can enrich understanding of how teachers' knowledge (re)construction is mediated by power differentials inherent in social relations as well as how individual and collective efforts mitigate or eliminate novice-expert discrepancies for the sake of development. These concepts reflect Kubanyiova and Feryok's (2015) assertive argument for looking into "the contexts of

[teachers'] participation in practice" (p. 438) to interpret their cognition. By participating in a CoP, teachers are, through their social relations, likely to take their knowledge to increasingly higher levels, a nonlinear transformative pathway that exposes them to human mediation they appropriate or negotiate in order to achieve their intended development.

Systemic contradictions as a source of mediation

From a CHAT perspective, all the components in an activity system are related to one another, forming their dialectic synergy (Cole, 1996). These components are constantly in flux; any change introduced to each individual component comes with the likelihood of altering its relationship with other components in the system, the other components themselves, and even the whole system. There might also be an in-activity phenomenon where one component acts in conceptual contrast to another component (Kuutti, 1996). In addition, despite being a bounded system, an activity is, at its core, liable to disequilibrium, as it constantly witnesses the impacts of external forces that cause disparities (Sagre et al., 2022). It is the dialectic changes, the opposing principles and acts of individual components, and the volatility of the activity that are the roots of contradictions in the activity system.

Contradictions, as defined by Engeström and his associates, are "historically accumulating structural tensions" (Engeström, 2001, p. 37) or "historically evolving tensions" (Engeström & Sannino, 2010, p. 4). These tensions, which arise and progress within and between activity systems, require the subject to settle them before moving forward and also to re-envision their approach to navigating the activities. Four levels of contradictions are inherent in CHAT. *Primary* contradictions occur within each and any component of an activity system, especially when the subject holds conflicting values (Yamagata-Lynch & Haudenschild, 2009). *Secondary* contradictions arise between two or more components (e.g., between an old artefact and a new object). *Tertiary* contradictions transpire between a newly generated mode and the existing or previous mode of the activity, or put differently, between different ways of pursuing the object. *Quaternary* contradictions take place between one activity system and its neighbouring systems, as a consequence of participants experiencing changes in one activity that cause tensions with adjacent activities (Yamagata-Lynch & Haudenschild, 2009, p. 509). Kuutti (1996) succinctly describes these types of contradictions as "the misfit within elements, between them, between different activities, or between developmental phases of a single activity" (p. 34). Inherent in these misfits is, again, the dialectic synergy between all the parties involved (Cole, 1996); thus, troubleshooting them might require concerted efforts.

No matter what type they fall under, contradictions are believed to have the power to mediate human activity (Engeström, 1987). Engeström (2001) asserts that "contradictions generate disturbances and conflicts, but also innovative attempts to change the activity" (p. 137) and that "learning needs to occur in a changing mosaic of *inter-connected activity systems* which are energised by their own inner contradictions" (p. 140, original emphasis). Amidst contradictions, an activity's subject might be motivated to exert efforts to formulate resolutions, a move that necessitates their critical reflection on their existing perception of the contradictions as well as on their

actions (Engeström, 1987, 2014). Attempts at working out contradictions, as noted by Yamagata-Lynch (2010), may urge the subject to reidentify the object or even reconfigure the entire activity system, although certain contradictions might be settled without having to do so. Yan and Yang (2019) adds that determined efforts to tackle contradictions, if sustained, can stimulate the emergence of new knowledge and even new forms of activity. Contradictions in activity are not dialectic clashes merely causing disturbances; rather, with their transformative power, they are drivers, first of change, and subsequently, of development.

A caveat here is nevertheless that change and development might not materialise, despite the subject's heightened consciousness of contradictions and endeavour to sort them out. This is especially the case if such an endeavour is made without drawing deliberately upon the perspectives of other members of the activity system, welcoming their collaboration, and seeking for their acceptance (Engeström, 2001; Murphy & Rodriguez-Manzanares, 2008). Perspectives of socially situated learning (Lave & Wenger, 1991; Warford, 2011) also suggest that development cannot be accomplished without connection with others in a CoP. Collaboration and mutual support are key to resolving contradictions as they promote the formation of higher levels of knowledge to reframe individual as well as collective thinking and actions aimed at an expected or better outcome. This collaborative condition mirrors social collectivity as a built-in attribute of CHAT.

In LTE, contradictions have been considered as a representation of the mediating role of social relations in teachers' CoP (Dang, 2013; Nguyen, 2017; Yan & Yang, 2019). The literature has demonstrated that contradictions not only cause tensions that may hamper teachers' development (Nguyen, 2019) but also spark their motivation to resolve the tensions, which would potentially induce transformations (Dang, 2013; Nguyen, 2017; Nguyen & Ngo, 2023; Yamagata-Lynch & Haudenschild, 2009). Nguyen (2019) documented a case where unresolved tensions in mentoring relationships left undesirable emotional impacts on teachers' cognition and overall professional experience. However, in other cases, contradictions created opportunities for teachers' learning through negotiating multiple identities (Dang, 2013) and emotionally inspired their resolution efforts to realise their professional aspirations (Nguyen & Ngo, 2023). The scrutiny of contradictions has also shed light on how teachers internalised curricular reform concepts (Ahn, 2011), negotiated tensions between their perspectives and higher levels of management in terms of professional development (Yamagata-Lynch & Haudenschild, 2009), progressed in their professional growth amidst national English education ideologies (Kim, 2011) and integrated into their school's technology policy (Marwan & Sweeney, 2019). These instances amplify the mediating role of inner contradictions in the emergence and evolution of teachers' cognition.

In relation to CHAT and sociocultural mediation, the subsequent sections will discuss teacher emotion and teacher agency associated with VCHT and situated in social activities as well as the connection between them and teacher cognition from a CHAT perspective.

Teacher emotion

Teacher emotion in connection with teacher cognition

Teaching is an emotional practice (Hargreaves, 2001), but given the intricate and elusive nature of emotion (Chen, 2021; Frenzel et al., 2021), the conceptualisation of teacher emotion has exhibited variability. From a cognitivist perspective, teacher emotion is construed as passive conditions “confined to intrapersonal experiences” (Han et al., 2023, p. 2). This perspective stands in contrast to a socio-constructivist standpoint, which views emotion as emerging in interactions with the school community (Nguyen, 2018), and to an interactionist perspective, which posits that it is determined by corporeal and culturally learned practices (Zembylas, 2007). Despite the socio-constructivist and interactionist perspectives featuring a person-environment relation, they account inadequately for the socioculturalism and sociohistoricity of teacher emotion and should therefore be amalgamated into an integrative view of emotion as “an integral part of social-cognitive developmental processes” (Han et al., 2023, p. 2). Teacher emotion, as such, points to “socially constructed, personally enacted ways of being that emerge from conscious and/or unconscious judgments regarding perceived successes at attaining goals or maintaining standards or beliefs during transactions as part of social-historical contexts” (Schutz et al., 2006, p. 344). Sharing this perspective, Prior (2019) claims that individuals express themselves emotionally via various multi-semiotic means, actively control and regulate their emotional responses, as well as link these with situated contexts. In these contexts, they undergo, identify, assess, convey, exchange, transmit, or oppose their emotions at particular instances and throughout different temporal phases.

The social-cultural-historical nature of teacher emotion finds resonance in VCHT, wherein it is posited that emotions stem from individuals’ distinctive experiences within the social environment and that their learning and development are intermeshed within and mediated by environmental factors (Amory & Johnson, 2023). Teacher emotion can be considered as “the last ‘why’ in the analysis of thinking” (Vygotsky, 1986, p. 252). There accordingly exist “a unity of person and environment” (Golombek & Doran, 2014, p. 104) and “the dialectical unity of cognition-and-emotion” (Amory & Johnson, 2023, p. 3), both embedded in the Vygotskian concept of *perezhivanie* (Lantolf & Swain, 2019; Veresov, 2020). Originally employed to research child development and its environment, this concept highlights that:

the essential factors which explain the influence of environment on the psychological development of children are made up of their emotional experiences. The emotional experience arising from any situation or from any aspect of his environment determines what kind of influence this situation or this environment will have on the child. (Vygotsky, 1994, pp. 339–340)

Viewed through this lens, teachers’ emotional experiences (*perezhivaniya*), situated in interaction with “the social situation of development” (Veresov, 2017, p. 52) housed in the social environment possess the capacity to engender the development of their cognition. Indeed, individual teachers’ interpretation of their lived experiences is accomplished by “interdependent emotional and cognitive means, which in turn are related to the setting of new experiences” (Smagorinsky, 2011, p. 337). Their experiences, as Dang (2013) observes, are influenced by various emotional encounters, and in turn,

are connected to the cognitive interpretation they derive from the situation. The emotional aspect of teachers' *perezhivanie* thus involves their affective responses shaped by a person-environment interplay, whilst its cognitive aspect pertains to the evaluation of such responses (Lantolf & Swain, 2019). This dialectical relationship is established in the “dynamic system of relations and interactions” between teachers and the social environment refracted through their different existing psychologies (Veresov, 2017, p. 52). Should individual teachers exhibit different levels of consciousness, the identical occurrence will hold distinct significance for each of them (Amory & Johnson, 2023; Vygotsky, 1994). In this prism, the same social environment affects different individuals not only in different manners but also at distinct phases of their development (Amory & Johnson, 2023).

Featuring socially situated cognition-emotion dialectics, *perezhivanie* can be utilised as an analytical tool for analysing “the influence of the sociocultural environment not on the individual per se, but on the process of development of the individual through the individual's *perezhivanie* of the environment” (Vygotsky, 1994, p. 294). As “intensely-emotional-lived-through-experience” (Ferholt, 2010, p. 194), *perezhivanie* proves itself as a potent means of understanding how teachers' emotions interact with sociocultural factors in situated contexts in ways that create mediational conditions for the development of their cognition.

Teacher emotion situated in CHAT as an analytical tool for LTC research

As expounded above, *perezhivanie* unites teachers' cognition and emotion in their dynamic interplay with the social, cultural, and historical environment. This person-environment interconnectedness tallies with the notion of social activity as encapsulated in the nature of CHAT. Situating emotion within CHAT, Burkitt (2021) duly observes that:

feelings and emotions – as we refer to them today in western culture—are every bit as much a cultural and historical product as our forms of cognition and social concepts. They are created in the history of the social relations of a society and are a product of its cultural heritage, forming in symbolically mediated activities and through cultural artefacts. (p. 788)

Under this interpretation, emotion, akin to cognition, can be posited as the cultural-historical outgrowths of teachers' engagement in social activities constituted by social relations and interactions (Burkitt, 2021; Nazari & Karimpour, 2022; Roth, 2007). Burkitt (2021) outlines certain characteristics of activity-situated emotions. Firstly, an individual's emotions intricately function in social interactions; they serve as internal cues for the individual and also convey signals to others, oftentimes expressed spontaneously without complete awareness of their intention. Secondly, the individual's emotions are intertwined with their social relationships, grounded in everyday cultural concepts, symbols, and signs that inform their perception of others (e.g., what it means to be a mentor). These are subsequently filtered through the prism of their lived experiences (e.g., how the mentor is felt in real-life situations) and incarnated in their cognitive and affective evaluation of others. Emotion thus assumes an evaluative dimension. Thirdly, in joint activities and interactions, the individual is “both the object and the subject of

emotional evaluation” (Burkitt, 2021, p. 814). As the object, they receive others’ emotional evaluation, whilst as the subject, they experience emotions in their personal sense and form emotional-evaluative judgements of others. Their emotional experiences, therefore, shape not only their object-oriented social activities and social relations but also their internal self-dialogue and personal sense of the social world. Teacher emotion in activity, therefore, can be considered as “a product of symbolic and linguistic meaning that, as such, has both a social and historical existence and a private sense” (Burkitt, 2021, p. 814).

Given emotion embedded within social activities, teacher emotion from a CHAT perspective is mediated by sociocultural resources, especially contextual challenges that often elicit intense emotional experiences and cognitive reconfiguration. The contradictions between instructional idealism and realism as well as between old and new conceptions of teaching, for example, cause cognitive and emotional dissonances whose resolution generates emotional content indexing cognitive development (Golombek & Doran, 2014). In mentoring relationships, contradictions engender teachers’ heightened conviction about their teaching preferences, but concurrently, unresolved contradictions provoke feelings of frustration and disappointment that hinder their professional learning (Nguyen, 2019). Another instance shows that contradictions within and between teachers’ activity systems incite both positive (e.g., determination) and negative (e.g., concern and boredom) emotions that drive their resolution attempts and actions (Nguyen & Ngo, 2023). Evidently, systemic contradictions mediate the emergence of positive and negative emotions that have implications for teachers’ professional becoming.

Also contextualising emotion within CHAT, Roth (2007) amplifies the relationship between emotion, activity, and action—“conscious cultural-historical and nonconscious, materially embodied features of human cognition” (p. 45), claiming that:

emotions, practical actions, and reasoning are integral to the unit (of activity) and therefore are dialectically related: They presuppose and influence one another... There are inner relations between emotion and practical activity that make the former a constitutive element of the latter. (pp. 44–45)

Actually, in social activities, goal-oriented actions are concretised by operations, and together, these actions and operations concretise the activities. Emotion is constitutive of social activities as it “shapes practical reasoning and practical actions” that realise the activities; indeed, tacit emotional states “condition operations and therefore the concrete ways actions take shape” (Roth, 2007, pp. 45–46). These states themselves, as Roth further explains, are also the results of practical actions and are therefore perpetually (re) produced in social activities. Action and emotion thus have a reciprocal relationship, and as Richards (2022) contends, emotion is “not merely something that we ‘have’ but something that we ‘do’” (p. 226).

This relationship is conditioned by *emotional valence*, including aspects of an object, event, or situation perceived as positive/pleasant or negative/unpleasant (Frenzel et al., 2021). Roth (2007) claims that positive emotional valence instigates practical actions, as “people consciously participate in certain activity systems over others and frame goals that have a higher probability of success, and therefore a higher emotional valence” (p.

45). The inclination towards or attainment of positive valence, as Roth (2007) also postulates, comes before any human consciousness and the accompanying categories stemming from it. In contrast, negative emotional valence, such as losses, causes avoidance and a resultant lack of practical actions.

This claim is in tune with the notion of *valence-congruence*, which means that positive and negative emotions exert pleasant and unpleasant effects respectively (Frenzel et al., 2021). The LTE literature has shown that positive emotions result in growth such as better problem-solving competencies (Sutton & Wheatley, 2003), yet negative emotions compromise teachers' professional experiences (Nguyen, 2019). Nevertheless, Frenzel et al. (2021) recognise *valence incongruence*, where negative emotions have favourable impacts, as also documented in the LTE scholarship (Golombek & Doran, 2014; Nguyen & Ngo, 2023); conversely, positive ones such as sympathy might give rise to teachers' unfavourable competence beliefs (Frenzel et al., 2021). Emotions, both positive or negative, have the potential to spark and uphold goal-oriented actions (Frijda, 2013), depending on particular situations and teachers' personal sense of the situations (Frenzel et al., 2021).

Overall, anchored in CHAT, teacher emotion is entrenched in socio-professional relations and interactions, intricately mediated by sociocultural resources, and closely associated with action in particular contexts. This interplay offers a way to understand teachers' cognition in relation to emotion and action, or put differently, agency, a concept which will be introduced in the subsequent section.

Teacher agency

An overview of teacher agency

Albeit universally known as teachers' determination and capacity for making choices and decisions as well as initiating and advancing change (Tao & Gao, 2017), *teacher agency* is a contested construct in teacher education research at large and in LTE in particular. From a social cognitive perspective, agency is associated with individuals' intentional agentive actions to effect change—gaining control over and manipulating external behaviours and situations (Duranti, 2006) and taking action to ensure their influences result in the accomplishment of desired outcomes (Bandura, 2001). Teachers are considered as change makers with an active role in (re)structuring realities, such as educational policies and reforms (Kayi-Aydar, 2019b), by capitalising on their internal resources—competence, autonomy, forethought, intentionality, self-efficacy, self-reactiveness, self-reflectiveness, and self-reflexivity (see Bandura, 2001, 2006; Edwards, 2005; Pantić, 2017) and on “the broad network of sociocultural influences” (Kayi-Aydar, 2019a, p. 12). By comparison, situating teacher agency within the ecology of their work (Priestley et al., 2015), an ecological perspective views agency as an emergent phenomenon that transcends temporal boundaries of the ecology, including teachers' past, present, and future (Charteris & Smardon, 2015; Kayi-Aydar, 2019a; Priestley et al., 2015). Teacher agency is therefore intimately associated with teachers' “attempt to exert influence in order to shape [their] life trajectory in the long term within the extended temporal horizon” (Eteläpelto et al., 2013, p. 58).

Heightened awareness of contextual factors has resulted in teacher agency experiencing a perspectival transition from its focus on individual capacity to its close relationship

with the social contexts wherein teachers operate professionally. As context is used for making sense of teacher agency, individual teachers and their ways of being and becoming are positioned as an entity situated in a social world (Edwards, 2005). Couched from a sociocultural perspective, agency is viewed as “the socially mediated capacity to act” (Ahearn, 2001, p. 112) and also as “a temporally constructed engagement in different situational contexts” (Wang & Lam, 2022, p. 2). This capacity cannot be isolated from the influence that mediational systems exert in shaping the teacher (Lasky, 2005, p. 902). These systems include historical, social, and cultural structures manifested as mediational tools (Wertsch et al., 1993), such as policy mandates, curricular prescriptions, school norms, or external normative standards at a higher level (Lasky, 2005). This sense of agency adheres to the notion that individuals can influence or change their social environments by capitalising on historically, socially, and culturally developed resources, whilst what they do is simultaneously shaped by these factors (Giddens, 1984; Lasky, 2005). In formulating agentive decisions, teachers need to navigate the affordances and hindrances of their social world in comparison with their accumulated capacity to act (Feryok, 2012; van Lier, 2008) before implementing actions. The agentive actions they enact are conditioned by their interaction with mediational resources in sociocultural structures and systems.

Despite varied perspectives, a common thread is that agency helps teachers to confront their learning-to-teach challenges, navigate their emotional experiences, respond to and implement educational policies, advocate social justice, and especially develop professionally (Tao & Gao, 2021). In what follows, the potential role of agency in such development will be introduced from a CHAT perspective.

Teacher agency situated in CHAT as an analytical tool for LTC research

The relevance of teacher agency to CHAT mediation can be anchored in Cole et al.'s (2019) conception that the roots of CHAT are in dialectical relations involving individual and institutional actions, and the opportunities for adaptation and innovation humans agentively generate through “*agentive projects with each other and the natural world*” (p. 283, original emphasis). This echoes Edwards' (2017) cultural-historical view of agency as “a crucial element in the dialectic of person and practice and that it may, in some circumstances, unfold when actions are taken in activities” (p. 273). According to Edwards, one's agency in activity involves deliberate choices and actions, responsibility for their actions and evaluations about these, and engagement and commitment—the ability to interpret realities more insightfully and to respond to them effectively. Thus, in their appropriation of mediational resources, activity participants need to enact their agency by (re)imagining their course of actions, taking responsibility, and remaining engaged and committed during the process. This agency is key to ensuring their success in harnessing CHAT mediation, especially contradictions. Without such agency, the mediation becomes meaningless and the contradictions remain a barricade rather than catalyse transformations.

When activity systems and socially conditioned teacher agency are coalesced, a relationship emerges, where the former serves as sociocultural contexts in which the latter unfolds. Teacher agency, indeed, has been linked to activity systems in the LTE literature (Cong-Lem & Nguyen, 2024; Dang et al., 2023; Feryok, 2012; Nguyen & Ngo, 2023). This

CHAT-agency mapping rests on the notion that, because of the dialectic core of CHAT, human agency in social activity systems is seen as emergent and situated in material and social interactions (Roth et al., 2004) and also as facilitated and constrained by material and social structures in the world where it exists (Roth et al., 2009). Social activities give context to individual actions, thus making them meaningful, and at the same time, these actions have the potential to transform the social activities (Stetsenko & Arieivitch, 2004). This transformative process is possible as “individuals gain agency and power by joining their efforts and constructing... “motive-goals” – a fusion of conscious goals of individual actions and the motive of the entire collective activity” (Engeström & Sannino, 2021, p. 11). Feryok’s (2012) case study provides supporting evidence for this claim by showing that teachers have the capacity to spearhead emerging activities at the local level (e.g., school settings). They achieve this by converting institutional hindrances into opportunities for instructional change, all within the backdrop of social activities against which they exercise such agency. The study also demonstrates that the scrutiny of how teachers appropriate sociocultural resources for their cognitive development should be informed by how they make capital out of “their ability and will to shape their activity systems” (Engeström & Sannino, 2010, p. 20) and also by how they take specific agentic actions towards this goal.

The LTE literature has documented the relationship between teacher agency, teacher emotion, and systemic contradictions in and between teachers’ activity systems that mediate their professional experience. Teacher agency is driven by ongoing disruptions and challenges arising from contradictions, but it also represents an effective response to contradictions (Engeström & Sannino, 2021). The tensions in joint activity systems experienced by teachers in some studies (e.g., Dang, 2013; Nguyen, 2019; Nguyen & Ngo, 2023), for instance, triggered their emotional and agentic responses that shaped their cognition, self-understanding, and pursuit of professional aspirations. What holds importance here is the agency teachers perform in the midst of their emotional experiences, both positive and negative, to put contradictions under control and leverage them as a springboard for positive change. Contradictions and the emotional content they generate can be the driving force of teachers’ cognitive development under certain sociocultural conditions. Notwithstanding this potential, the likelihood of change and development depends on whether and how strategic actions, the manifestations of agency, are carried out actually. Vygotsky (1997), whilst describing development as a complex dialectical process, also sees it as “a complex process of overcoming difficulties and adapting” (p. 99). As such, the agency teachers exercise and the strategic actions they take to handle tensions can widen the window into how their contradiction-driven cognitive development unfolds in their social activities.

Conclusion and implications

In this article, the argument for the deployment of CHAT for LTC research is predicated on its compatibility with Borg’s (2019) refined view of teacher cognition as

understanding, with reference to the personal, professional, sociocultural, and historical dimensions of teachers’ lives, how becoming, being, and developing as a teacher is shaped by (and in turns shapes) what teachers (individually and collectively) think and feel about all aspects of their work. (p. 4)

This sense of teacher cognition corresponds to Cross's (2010) accentuation of the effects of historicity, a foundational tenet of CHAT, on teachers' thought and practice. It also corresponds appropriately to Vygotsky's (1978, 1981b) emphasis on the role that the sociocultural context of human activity and personal histories play in discerning how human beings' higher mental functioning has evolved into its current configuration. This Vygotskian notion of human thinking is subtly reflected in CHAT, thus justifying its feasibility for studies on teacher's mental lives and the many facets of their socially situated and mediated profession.

The coalescence of the concepts of *mediation*, including *contradictions*, *teacher emotion*, and *teacher agency* as analytical tools reflects a stance that LTC is a social entity which engages in social activities across times and spaces. Hypothetically, through its socioculturally *mediated*, *emotional*, and *agentive* engagement, this entity constantly shifts into different or higher states of being. This shifting is a dynamic process, occurring "not in a circle but in a spiral, passing through the same point at each new revolution whilst advancing to a higher level" (Vygotsky, 1978, p. 56) and thus involving "non-linearity and complex qualitative reorganisations of the existing psychological system" (Cong-Lem, 2022, p. 1097). Through mediation emotionally responded to and agentively negotiated, teachers' cognition comes into being at the interpsychological level, that is, in their interactions in social activities, before it enters into the intrapsychological plane on which their internalisation materialises (Johnson, 2015). This phenomenon is reflected in Vygotsky's (1987) resolute assertion that "all higher mental functions are internalised social relationships" (p. 164).

Accordingly, LTC studies should trace teachers' cognitive dynamics by looking closely at the mediated transition from external-social interactions to internal-psychological control in activity, which leads to transformations both in the individual and in the activity (Johnson, 2006). By engaging in social interactions, teachers experience new ways of thinking and doing, internalise new knowledge and experience, and use these to remould their existing cognitive structure, which is subsequently externalised to act as a guide for their practice (Johnson, 2009; Johnson & Golombek, 2011; also see Vygotsky, 1981b). The psychological tools (e.g., novel knowledge and experience) that teachers internalise can inform their thinking and guide pedagogically effective practices tailored to specific learners and contexts (Nguyen, 2019). This internalising process illustrates how teachers' learning is tightly associated with social activities, relations, and interactions whose changes may trigger alterations to their cognition (Johnson, 2015).

In the subfield of LTC, a substantial body of research, both on pre-service and in-service teachers, has investigated generic processes (e.g., planning, interactive decision-making, instructional concerns) and domain-specific processes (e.g., grammar, speaking, listening, and reading) (see Borg, 2015; Burns et al., 2015; Zheng et al., 2022 for a comprehensive review). However, only a limited number of studies in this area have employed CHAT as an analytical tool for examining how CHAT mediation influences teachers' cognition (e.g., Peng, 2024; Soleimani & Rahimi, 2021) and how it triggers the teachers' emotions and agency for professional learning, practice, and development (e.g., Cong-Lem & Nguyen, 2024; Dang, 2013; Nguyen, 2019; Nguyen & Ngo, 2023). None of these has combined these concepts together to study the cognition-emotion-agency interplay in the socio-professional lives of domain-specific language teachers. This

paucity opens up an interesting avenue for future empirical research to incorporate the combined lens of mediation, including contradictions, emotion, and agency, into exploring the cognitive dynamics of language teachers, especially those who teach specific language components and skills. Additionally, drawing together cognition, emotion, agency from a CHAT perspective can cast more light on how their interplay relates to teachers' identity (re)construction in activity, a lightly travelled area of research in LTE.

Importantly, what epistemically underpins future studies should be the notion that teachers' cognition, given its socially situated and mediated nature and association with emotion and agency, interacts dynamically with social forces before being crystallised in their heads. For this reason, cognition cannot be observed easily. Therefore, future research should refrain from looking at teachers' cognition as simply knowledge stored in the teachers' minds and owned by the teachers as their mental property (Sfard, 2008). Rather, it should be treated as a social entity characterised by higher mental functioning and a high degree of dynamics in its (re)formation in sociocultural contexts (see Feryok, 2010; Johnson, 2006, 2009; Kubanyiova & Feryok, 2015; Li, 2020). Therefore, cross-sectionally elicited evidence obtained merely from a cognitivist approach that regards cognition as "static and discrete entities" (Kubanyiova & Feryok, 2015, p. 437), as mentioned in the introduction, is not sufficient for understanding its transformations in relation to sociocultural mediation, emotion, and agency. LTC studies guided by CHAT need to collect multiple sources of data related to teachers' mental lives and social activities and analyse the data against mediation, emotion, and agency, which can potentially unpack the complexity of their cognition in a thorough manner.

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