A sociocultural approach to researching classroom interactions

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This paper reviews sociocultural theory as a theoretical tool to investigate classroom interactions. Taking cognitive approaches to language learning, vigorous research have shown the relationships between learners' cognitive activity, namely noticing (e.g., Schmidt, 1990) and learning. Tasks for language learning, therefore, are often designed to enhance students' noticing of linguistic forms through communicative interactions. In this vein of research, however, little attention has been paid to socio-cultural and historical aspects in the process of learning language through interactions. In classroom realities, students and teachers' sociocultural and historical backgrounds as well as larger institutional and social contexts where classrooms are situated have strong relations with how interactions and noticing take place. Specifically, oral interactions among students could happen in unexpected ways, leading to the unexpected outcome, and students' noticing may be somewhat different from what is aimed at. Breen (1989) addressed this issue as a gap between the task-as-workplan (what teachers and task designers expect the task to achieve) and the task-in-process (what learners actually seem to get from). In order to fill this gap, I propose a sociocultural approach to investigate the relationship between classroom interactions and language learning (see Mochizuki, 2017, 2018). This paper details the theoretical underpinnings of the application of sociocultural theory as a tool for the investigation of classroom interactions and outlines the use of activity systems as a conceptual guide to the analysis of students' learning through classroom

tasks.

Sociocultural theory: Human mind development through social interaction

Sociocultural theory (Vygotsky, 2012) has provided the theoretical underpinnings for social approaches to SLA for its central notions of social environments as necessary components for the development of human consciousness (e.g., Lantolf, 2000; Lantolf & Thorne, 2006). In response to the growing attention to multilingualism and a diversification of epistemological approaches in the field, a group of applied linguistics scholars interested in SLA have recently proposed a transdisciplinary framework for language teaching and learning (The Douglas Fir Group, 2016). The framework illuminates the inseparability between the micro-, meso-, and macro-levels of learning and teaching and calls for the expansion of analytical perspectives to different dimensions of language learning and teaching at the different levels. Epistemologically, sociocultural theory can provide these expanded analytical lenses (Lantolf, 2014), because its emphasis is on the development of human consciousness in social environments, denying the dualism of mind and world (Lantolf & Poehner, 2014). The denial of dualism, that is, the unification of views of cognitive and social domains of learning, widened the avenue to investigate learning and teaching by encompassing all three levels. Sociocultural theory is compatible with the investigation of language learning through classroom interactions. Classroom interactions are socially situated, and examining them across different levels assists in comprehensive but localized understanding of learning through classroom tasks. This comprehensive examination can also illuminate ways to develop socially and locally contextualized pedagogy.

In the investigation of classroom interactions at a univerity, the micro-level involves individual students' engagement with others through oral interactions; the meso-level

involves various communities to which students belong at a university; and the macro level is the ideological structures of society. By traveling across all three levels, the study can investigate the dynamic processes of learning embodying the unity of human cognition, and social and ideological structures; how oral interactions serve to change learners' thinking in learning a language; and how social and ideological structures are infused into learning through oral interactions.

Tool Mediation

Central to sociocultural theory is Vygotsky's concept of mediated actions (1978). Human minds develop through their interaction with the object of their interest in the environment, and this interaction is mediated by tools and cultural artefacts. These tools and cultural artefacts include psychological tools or signs, and, most importantly, language. This concept is innovative and fundamental to Vygotsky's thought. By this concept of tool mediation, Vygotsky linked social and historical processes and individual's mental processes. Wertsch (2007) explained that the concept of mediation provided the foundation for this link because "humans internalize forms of mediation provided by particular cultural, historical, and institutional forces that their mental functioning sociohistorically situated" (p. 178).

The concept of tool mediation emphasizes the social origins of human mind development. Human mind develops first through social interactions, and then what is experienced through social interactions is internalized in mind. This conceptualization of learning processes has lent support to social approaches to SLA. Vygotsky's idea of the social origin of human development is expressed in the now well-known statement explaining the development of mental functions in the child:

First it [any function in the child's cultural development] appears on the social

plane, and then on the psychological plane. First it appears between people as an interpsychological category, and then within the child as an intrapsychological category. This is equally true with regard to voluntary attention, logical memory, the formation of concepts, and the development of volition. (Vygotsky, 1981, p. 163)

Humans' use of language (a tool) in social interactions not only mediates their association with the object in the world but also leads to the transformation of their mental functioning on their intrapsychological plane. The implications of this understanding support a pedagogical view of social approach to SLA: second language learning through the use of language for communication in a specific community (Pavlenko & Lantolf, 2000).

Vygotsky's view of the processes of human mind development has provided key theoretical and pedagogical concepts which have been widely adopted in educational fields. In the first phase of development, the interpsychological phase, meaningful social interactions create optimal learning conditions by providing assistance (scaffolding) that suits the learner's particular developmental zone, the Zone of Proximal Development (ZPD) (Vygotsky, 2012), in which the learner can accomplish what he or she cannot normally accomplish without such assistance. In the second phase, self-directed speech, referred to as private speech (Lantolf & Thorne, 2006; Vygotsky, 2012), is used to interact with one's inner mind, and this is the process of internalizing what a human learns in the first phase. Following this line of thought, oral interactions in classrooms are conceptualized as mediating artefacts, and learning through them is conceptualized as mediated action.

Oral interactions as mediating tools

Based on Vygotsky's view of social interactions, some features of classroom dialogues and learners' language have been studied to make the most of classroom oral interactions as mediating tools. As mentioned above, assistance from other individuals that creates students' ZPDs mediates their development during social interaction. The term scaffolding was first used as a metaphor for this type of outside assistance by Wood, Bruner, and Ross (1976), and now it is widely used for the consideration of classroom pedagogies. Wood et al. applied the metaphor of scaffolding to examine the role of adults in joint problem solving with children and identified five essential elements of scaffolding: recruitment (capturing the child's attention), reduction of degrees of freedom, directional maintenance, marking critical features, and controlling frustration. Donato (1994, p. 40) provides a definition of scaffolding within the L2 tutorial context focusing on the impact of scaffolding on novices: "social interaction in which a knowledgeable participant can create, by means of speech, supportive conditions in which the novice can participate in, and extend current skills and knowledge to higher levels of competence". In Vygotsky's original ideas, dialogic interaction was assumed to be between an adult (expert) and a child (learner) but more recently, peer interactions in L2 learning have also been studied as a site for the co-construction of a ZPD and the provision of scaffolding. A number of researchers have in fact expanded Vygotsky's ideas to peer interaction, where no obvious experts exist, and reported that even among peers, learning through scaffolding has occurred (e.g., Donato, 1994; Ohta, 1995, 2000; Swain & Lapkin, 1998; Swain, 2000).

In recent years, however, the excessively broad application of scaffolding has often been criticized for losing sight of significant features from Vygotsky's idea of mediation and the ZPD (Stone, 1998a, 1998b). The metaphor of scaffolding is sometimes applied just to refer to its one feature, that is, teacher initiated instructions, without paying

attention to more important features such as mediation and the ZPD. In response to the exclusive focus on teacher initiated instruction, SLA scholars with a sociocultural orientation emphasize students' responsiveness and the view of students as active participants. Taking students' response and participation into account, to achieve mediation through the activity in the ZPD, the assistance (scaffolding) during oral interactions should be provided in a graduated and contingent way over time (Lantolf & Alijaafreh, 1995; Lantolf, 2000; Lantolf & Poehner, 2014; Ohta, 2000).

In sociocultural perspectives, private speech - speech addressed to the self - is considered a cognitive tool to regulate the speaker's own mental activity and internalize what was experienced in the intrapsychological phase (Vygotsky, 2012; Swain, Kinner, & Steinman, 2015). Attention has been paid, therefore, to learners' private speech to better understand their mental development during engagement in classroom dialogues. In collaborative dialogue in classrooms, some utterances and speech, although they are not overtly addressed to oneself, also function as private speech and serve as cognitive tools to mediate students' problem solving and the construction of new knowledge. The distinction between social and private speech is blurred (Swain, Kinnear & Steinman, 2015; Wells, 1999), and speech utterances in collaborative interaction for problem solving have both social and private functions. In such contexts, speech uttered becomes a cognitive tool available for everyone involved (not only for a speaker him/herself) to mediate their own cognitive activity. In Swain, Kinnear, and Steinman (2015), this type of speech (both private and collaborative talk) is termed 'languaging', defining it as "[t]he process of making meaning and shaping knowledge and experience through language. Languaging organizes and controls (mediates) mental processes during the performance of cognitively complex tasks" (p. 149). The role of languaging has been investigated in learning grammatical concepts (e.g., Knouzi, Swain, Lapkin, & Brooks, 2010; Swain, Lapkin, Knouzi, Suzuki, & Brooks, 2009). This line of research has been

calling for more attention to be given to learners' language in classroom dialogues and pedagogical practices that allow languaging to occur. The concept of languaging assist in the analysis of the students' accounts in which they reflect on their thinking and writing in the dialogues of the writing conferences in this study.

In sociocultural theory, what is emphasized as an outcome of classroom dialogues is the development of scientific concepts. Vygotsky (2012) differentiated everyday concepts and scientific concepts. Everyday concepts develop through everyday experience and are unsystematic and situated, while scientific concepts develop through instruction in school and are more abstract and not bound in a context, and include systematic relationships and meanings which can be applied to different contexts. The development of scientific concepts during classroom dialogue is not merely a process of replacement of everyday concepts by scientific concepts. Scientific concepts and everyday concepts are interdependent and are constantly, bi-directionally, influencing each other. Humans develop scientific concepts as they refer to their pre-existing everyday concepts and consciously systematize them. These developed scientific concepts are then applied to the organization of everyday concepts (Vygotsky, 2012). For scientific concepts to develop, the pre-existence of everyday concepts is essential.

Swain et al. (2015) explain ESL classroom settings at universities from this notion of the interaction between everyday and scientific concepts. Students come to class with already-acquired, everyday concepts, and are introduced to new concepts (scientific concepts) in university classroom instructions to gain a new way of conceptualizing the world. This newly-gained conceptualization of the world influences the structure of students' thinking, and their pre-existing everyday concepts are incorporated in the new intellectual operation.

Newly acquired scientific concepts can be applied in different contexts, and thus result in new ways of thinking and the construction of new knowledge. Vygotsky's

conceptualization of classroom talk/dialogues as a site and space for learning scientific concepts and the transformation of thinking have led to pedagogical attention on oral interactions, such as languaging for learning linguistic concepts (Brooks, Swain, Lapkin, & Knouzi, 2010), the patterns of classroom talk to integrate everyday/scientific concepts (Renshaw & Brown, 2007), and dialogic interactions to mediate the mastery of using conceptual tools for L2 learning (Poehner & Infante, 2017) including L2 writing classrooms at universities (Swain, Kinnear, & Steinman, 2015). Taking this view of classroom talk and dialogues, university language classrooms provide opportunities for students to gain not only linguistic concepts but also scientific concepts about writing and speaking in particular academic fields.

Drawing on the concept of mediation, classroom oral interactions can be considered as a tool that becomes available for the members of a group to be utilized for the transformation of thinking and writing. The concepts of scaffolding, languaging, and everyday/scientific concepts assist in examining individual engagement in oral interactions. A more detailed investigation of this tool mediation will become possible in connection with meso-level as well as macro-level learning and teaching by using the lens of activity theory, which is explained in the following sections.

Activity as a unit of analysis

Activity theory

Activity theory guides the study of investigating students' interactions in classrooms in social, cultural and historical contexts. Activity theory has been developed for the purpose of dialectically uniting the individual and the social structure. Its historical origin goes back to classical German philosophy, to the writings of Marx and Engels, and to the Soviet Russian cultural-historical psychology of Vygotsky (Engeström, 1999). Since those early days, activity theory has undergone a number of modifications (Engeström,

2001). The first generation of activity theory centred on Vygotsky's tool-mediated and goal-oriented activity, where the unit of analysis is individually focused, and then the later generations of activity theory further developed to analyse collective activity (Engeström, 2001; Leont'ev, 1981).

The individual-focused unit of analysis is a limitation of the first generation of activity theory in that it was still weak in terms of the investigation of the social and cultural nature of the activity and issues of its historical continuity. This limitation was overcome by the second generation, the work centred around Leont'ev (1981). Leont'ev clarified the differences between individual actions and collective activity, and brought social structural elements in the framework of activity theory such as the division of labour. Engeström (1999, 2001) has proposed a model of a collective activity system which has enabled a graphical representation (see Figure 1) of complex interrelations between an individual subject and his or her community and social structure. Now, a third generation of activity theory is needed to understand the interconnectedness of different human activities in the social structure. The conceptual tools for the third generation need to explain the interconnectedness, multiple perspectives, and networks of interacting activity systems (Engeström, 2001). The approaches in this generation often echo the social perspectives of language learning through interactions, for example, Bakhtin's idea of dialogism (1981, 1986) has been introduced into activity theory (Wertsch, 1991). Activity theory, because of its endeavour to link the individual and the social structure, is well suited to investigate language learning through oral and social interaction in a group, and what it means to participate in such activity in the web of activities in the broader society. The next section explains Engeström's model of a collective activity system and how it guides this study.

The components in the activity system

　　Figure 1 shows a collective activity system proposed by Engeström (1999, 2001). This is also used as a base graphic representation to report the relations between different activity systems. Well's (2002) graphic representation of an activity system for dialogic interaction is also used to report findings focusing on the oral interactions in group discussion (Mochizuki, 2017), which will be explained later in this section, however that model was also developed based on Engeström's model in Figure 1.
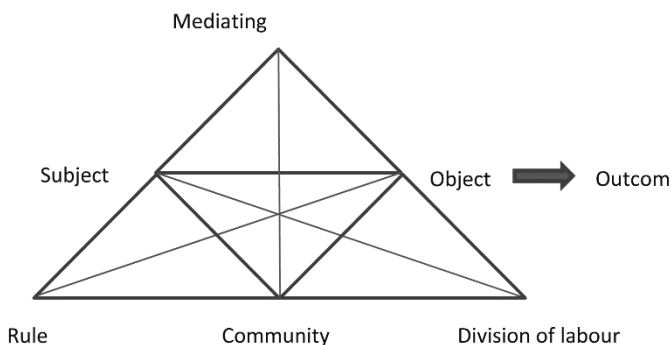

Figure 1 An activity system (adapted from Engeström, 2001)

　　As illustrated in Figure 1, Engeström added the concepts of rules, community, and division of labour to Vygotsky's original mediated action model (subject, object, mediating tool). By doing so, the activity is embedded in a community and society, and the subject, the mediating tool, the object, and the outcome are all viewed in relation to rules and the division of labour in a community or society. Rules refer to any regulation of actions that guides the subject's tool mediated activity. The community is the social group that the subject perceives him/herself to be a member of during participation in the activity. The division of labour refers to how the task is shared in the community,

reflecting not only the divisions based on the horizontal relationships between the members but also their vertical relationship: status differences and power relationships in the community (Lantolf & Thorne, 2006). These rules and the division of labour in the community reflect those in the sociocultural contexts outside the classroom, such as communities, institutions, and ideological structures in a society, because each student brings his or her own experience with rules, practices, and the division of labour to a classroom (Swain, Kinnear, & Steinman, 2015). Therefore, these components (rules and the division of labour) that emerge in a classroom would account for the meso-level and macro-level influences on the role of oral interactions as mediating tools.

The activity system analysis focuses on the contradiction and tensions between and within components of the activity system and human activity's creativity. While people are engaging in classroom activity including interactions, they may experience contradictions and tensions that could hinder the activity. These contradictions and tensions arise within and between components of an activity system, and are considered a source of change and development (Engeström, 2001). This analysis can highlight what relationships in the activity system need to be altered and how, potentially leading to proposals that may improve tasks and pedagogy.

Polycontextuality and boundary crossing which the third generation of activity theory stresses are also essential concepts for the investigation of interactions among students. Humans engage in activity in multiple contexts and these contexts are spatially and temporally inter-connected and influencing each other. Each activity has different activity systems with distinct tools/artefacts mediation in different social relations. This nature of interrelationships between contexts is called 'polycontextuality'. Moving between polycontexts, boundary crossing, is a cognitive process, which requires transporting ideas, concepts and instruments from one activity system to another, and thereby leading to new mediating concepts and development (Engeström, Engeström & Kärkkäinen,

1995). These concepts will guide the investigation of the activity system of classroom interactions, which also resides in a web of multiple contexts.

Activity theory has emphasized not only learners' internalization of what they experience during social interactions, but also their externalization. Activity theory has stressed the importance of human creativity and "its ability to exceed or transcend given constraints and instructions" (Engeström, 1999, pp. 26-27), which could lead to the creation of tools and artefacts, constructions of new social patterns, and transformation of contexts. This emphasis sheds light on how learners may creatively use a new understanding of tools/artefacts that becomes available through classroom interactions in order to manage their own mental activity and learning, thus changing their thinking and behaviour, potentially leading to changes in social patterns and contexts. This lens also assists in examining the outcome of the activity in classrooms.

Activity theory has been adopted to investigate different types of activity in classrooms and other educational settings. These studies have shown that theory can play a role in enhancing pedagogy by identifying contradictions and tensions in the educational activity and the institutions involved (e.g., Fujioka, 2014; Lantolf & Genung, 2002; Lantolf &Thorne, 2006; Lei, 2008; Li, 2013; Nelson & Kim 2001). In Lantolf and Genung (2002), power issues were identified that affected a graduate student's motive and goals, and her learning style in an L2 language classroom. Fujioka (2014) examined the interconnected systems between an L2 student and a professor regarding writing assignments in a disciplinary course, demonstrating how conflicts and changes in the interpersonal relationships affected the changes in each person's activity system. Using a case study of peer revision activity via email in a Spanish foreign-language program, Lantolf and Thorne (2006, p. 260) argue that "the epistemological apparatus of activity theory provides methodologically as well as ethically vigorous tools for use in SLA research and praxis". They demonstrated how activity theory assists in locating

contradictions and tensions in everyday activity and practice in classrooms, and identified what alterations are needed in each element of the activity system (i.e. mediating artefacts, rules, and the division of labour) in order to improve future outcomes of the program.

A model for an activity system with dialogue as tools/artefacts

To investigate the tool/artefacts mediation during classroom activity, I use a modified version of Engeström's model, which was proposed by Wells (2002). While Engeström's model does not show multiple participants in the interactions while Wells' (2002) version does. What differentiates dialogue-mediation from other tool-mediation is summarized by Wells (2002) as (1) the action is performed through meaning, not material, therefore through the semiotic conventions of the community; (2) the object of the utterances is not the person they address, rather the issue, problem, or topic that is the focus of their joint consideration; and (3) the outcome is an enriched understanding of the object, both individually and collectively (Wells, 2002, p. 50). In order to include these features in a diagram, Wells (2002) modified the upper part of Engeström's model (Figure 2), thereby including another subject in the activity system. Wells' model can therefore represent patterns of dialogic interactions among the participants in the activity and enable the investigation of the relations between different interaction patterns, and the contradictions and tensions that emerge in the system.

Figure 2 is based on Wells' model and represents the dialogue as a tool between two people. By adding triangles to represent the activities of other individuals, the model becomes applicable to a classroom discussion. The object of this activity is a common issue that the subjects are jointly engaged in, namely a goal of a task. Each person contributes to this problem-solving activity by means of his/her own tool/artefacts such as using language and other resources available to each person, including knowledge,

experiences, and perspectives.

Each shaded triangle in Figure 2 represents an individual's tool/artefact mediated activity, and the size of these triangles refers to the degree of his/her contribution to this joint activity in terms of his/her use of tools/artefacts. In Figure 2, the identical size of the two shaded triangles represents the joint activity between the two people whose degree of contributions to problem solving is approximately equivalent. The outcome of this activity is an idea or a solution for, or an enriched understanding of a problem (see also Haneda & Wells's (2008) study on dialogic interactions). However, an individual's ways of engaging in oral interactions, and the degree to which they contribute their knowledge, experience, and perspectives through interactions interact with the influence of other components (rules, community, and the division of labour).
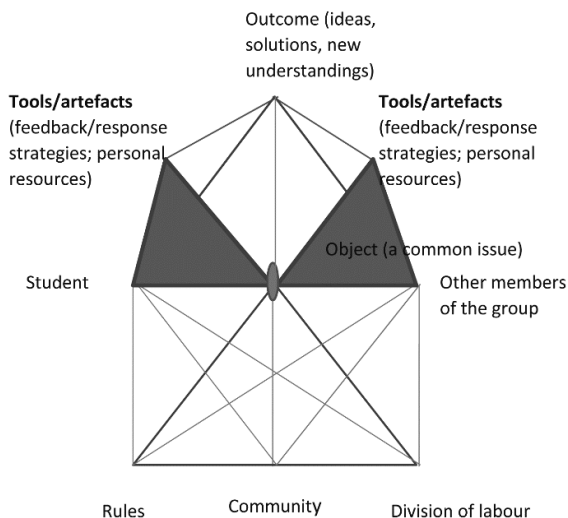

Figure 2 A model for an activity system of dialogue as tools/artefacts in writing conferences (adapted from Wells, 2002)

Wells's diagram shows graphically that the mechanisms of social rules, roles, and values or ideological structures are carried by language in dialogues and come into play in the activity. Bakhtin's (1981, 1986) views of dialogue and speech can explain further details of these relations in terms of their effects on learning. Dialogue is the juxtaposition and interanimation of different voices, and this multivoicedness is a driving force of learning through dialogic interaction. Each participant in the dialogue has his/her own point of view, values and conceptual systems, which has been shaped by his/her sociocultural and historical backgrounds, therefore, the dialogue is a site of interaction among these different systems. During these interactions, the speaker reflects on his/her own words in reference to others', and struggles to negotiate with different conceptual systems. It is this tension among diverse voices that triggers new understanding and learning. When discussing in classrooms, different people bring in different voices about genre, shaped in different rules, roles, values and ideological structures. By interacting with different voices, a person may gain new ways of thinking, being and doing. Bakhtin's (1986) concept of utterances explains the micro-level of this facilitative function of the dialogue, shaped by social rules, roles and ideological structure. The utterance is not a unit of language, but it marks a speaking subject. Each utterance reflects the speaker's subjectivity in goal-oriented activity in a context. Because of this subjectivity, utterances take on the characteristic of responsivity. In speech, utterances reflect responses to previous utterances or the anticipation of the response from the addressees. And this responsivity is governed by a person's perceived rules and the conventions of communities, in which he/she previously engaged or is currently engaging in. So when people are discussing something, the origin of each voice in discussion can be traced back temporally and spatially to the voices in other contexts and communities.

Examining dialogic interaction in the classroom discourse of EAL students in elementary classrooms, Haneda and Wells (2008) summarize the benefit of dialogic

349

interactions to language learning as (1) opportunities to understand how to engage in the genres of the different academic disciplines; (2) opportunities to use language resources and to lean the social and communicative strategies that are needed to gain an access to the academic context; and (3) opportunities to engage in the construction of knowledge and to encounter alternative perspectives on the topic under discussion (Haneda & Wells, 2008).

The conceptualization of dialogue as a tool and how it leads to learning and development provides a lens to investigate the intersection of and the interactions between social rules, roles, and ideological structures carried by the language use of each member of a classroom. Sociocultural theory as a theoretical framework and activity systems as analytical tool enable the research into classroom interactions to illuminate ways to fill the gap between task-as-workplan and the task-in-process.

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