LANGUAGE
TEACHING
RESEARCH

Language Teaching Research
15(1) 11–33
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DOI: 10.1177/1362168810383328
http://ltr.sagepub.com

Dynamic assessment in the classroom: Vygotskian praxis for second language development

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Abstract

This article reports the efforts of an elementary school teacher of Spanish as a second language to implement principles of dynamic assessment (DA) in her daily interactions with learners. DA is neither an assessment instrument nor a method of assessing but a framework for conceptualizing teaching and assessment as an integrated activity of understanding learner abilities by actively supporting their development (Poehner, 2008). DA is based on Vygotsky's (1987) proposal of the zone of proximal development (ZPD), which underscores the developmental importance of providing appropriate support to learners to help them stretch beyond their independent performance. The particular approach to DA that the teacher followed reflected her interpretation of the ZPD as well as her knowledge of her instructional context and was arrived at through consultation with the present authors. In other words, her use of DA represents a unification of theory and practice, as advocated by Vygotsky, whereby theory offers a basis to guide practice but at the same time practice functions to refine and extend theory. Examples of the teacher's interactions with learners in her classroom are discussed with regard to the opportunities for development they create.

Keywords

praxis, mediation, zone of proximal development, classroom dynamic assessment

I Introduction

As a discipline, the field of second language acquisition (SLA) has reached a point where university departments, professional organizations, and scholarly journals devoted to supporting and disseminating research relevant to its aims have recently celebrated a number of milestones and anniversaries. Despite this indicator of maturity,

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the field continues to witness debates over fundamental ontological and epistemological assumptions that undergird research questions and methodologies; see, for example, the debate sparked by Firth and Wagner (1997) as well as the recent *Modern Language Journal* special issue (Lafford, 2007) marking the 10th anniversary of the original publication. The discipline's contested theoretical foundations may also explain in part the reluctance of many SLA researchers to articulate implications of their work for second language (L2) teaching. As Lantolf (2010) has commented, there is a widespread sentiment among those conducting theoretically informed SLA research that connections to teaching practice is premature (e.g. Lightbown, 2000; Gass & Mackey, 2007). The premise underlying this perspective seems to be that there is a necessary progression whereby the processes of L2 acquisition must be very well understood before firm connections to pedagogical practice can be established. Put another way, theory and research are independent of practice (and vice versa), and connections must be postponed to a later time, i.e. a time when we will supposedly have more confidence in the findings of our basic research.

The Russian psychologist L.S. Vygotsky – whose sociocultural theory of mind (SCT) continues to draw attention from L2 researchers – confronted a similar set of questions as he endeavored to articulate a scientific psychology that offered a coherent perspective on human consciousness while also providing concrete proposals for education. However, as Lantolf (2010) argues, Vygotsky's dialectical perspective on human beings and their relation to the world led him to view these not as separate aspects of his professional work but as complements of one another. Vygotsky insisted that the true test of theory is not in its explanatory power but in its potential to bring about change in the world (Vygotsky, 1997). As he explained, his interest was in a psychological theory 'which attempts not so much to explain the mind but to understand and master it' (p. 305), noting also that such a theory 'gives the practical disciplines a fundamentally different place in the whole structure of the science' (p. 305). That is, Vygotsky's scientific enterprise was concerned with much more than a description of human psychology because the kind of understanding he sought was one that illuminated the processes of the mind's development, specifically the social and cultural means through which individuals come to master thought. For Vygotsky this orientation held direct and immediate implications for intervention in development, that is, for engineering activities to support development. The position he argued for was the integration of theory with practice, a 'praxis' whereby theory provides a basis to guide practical activity, but at the same time practice informs and shapes theory.

Vygotsky's commitment to praxis runs through every aspect of his work, but perhaps its most well known expression comes in his formulation of the zone of proximal development (ZPD). Much has been written about the ZPD as a lens through which to view development. Indeed, the ZPD represents a powerful way of thinking about both the products of past development – the development that has been completed at the present and that can be inferred from an individual's independent performance – as well as cognitive functions that have not yet fully developed but are still in the process of forming (Vygotsky, 1978, p. 86). However, Vygotsky assigned a far more important role to the ZPD than simply a theoretical lens, locating it at the center of developmental pedagogy. The significance of the ZPD is that it provides a framework for the diagnosis of learner

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abilities and an orienting basis for intervention to support their development. In other words, it is a means of accessing and at the same time promoting the process of development rather than focusing on its product, as happens in more conventional approaches to assessment.

In the decades following Vygotsky's death, use of the ZPD for diagnosis and intervention inspired a number of pedagogical reforms within Russia and internationally (Kozulin & Gindis, 2007). One line of research that has been particularly fruitful is dynamic assessment (henceforth, DA). DA has been pursued by school and clinical psychologists as a way of more accurately assessing an individual's potential for future development by embedding instruction in the assessment process itself (Sternberg & Grigorenko, 2002). Echoing Vygotsky's sentiments about the value of theory, Reuven Feuerstein – a leading proponent of DA – explains that in DA 'what is at stake is not theoretical elegance, but issues that affect the lives and destinies of real people' (Feuerstein et al., 1981, p. 218).

According to Haywood and Lidz (2007) most current approaches to DA are comprised of three stages: a conventional assessment of the abilities in question, an intervention targeting problematic aspects of learner performance, and a final assessment that parallels the initial one. Pre- and post-intervention levels are compared, and the difference is taken as an indicator of whether the abilities being assessed lay within the individual's ZPD. Often these insights then lead to more long-term instructional plans. The problem with this approach, however, is that it is more biased toward product than process. Research on L2 DA, in contrast, has focused more directly on the classroom and how mediator–learner interactions can function simultaneously to understand and promote learner development (e.g. Poehner, 2007, 2008). In other words, assessment and instruction exist in a dialectical relation as the provision of mediation attuned to the ZPD allows for the identification of emergent abilities and at the same time supports their development. To date, L2 DA research has not focused on implementation of the procedure during regular classroom instruction but has instead occurred in one-to-one sessions outside the classroom and has been implemented by a teacher/researcher with expertise in applied linguistics. Moreover, this research has been conducted in university settings (e.g. Ableeva, 2008).

The present article is a significant departure from previous L2 DA research. Most notable is that the DA model employed was designed and implemented by a classroom L2 teacher and was undertaken not as a research project but was instead intended as a change in instructional orientation motivated by the teacher's commitment to enhancing/improving her students' ability in the new language, which is Spanish. The teacher, Tracy (a pseudonym), had worked through a teacher's guide to L2 DA written by the present authors (Lantolf & Poehner, 2006) and was interested in its potential relevance to her own practice as a teacher of Spanish in an elementary school setting. The guide, however, does not advocate a specific set of techniques to follow for implementing DA. Rather, it explains the theoretical basis of the concept and provides examples and case studies for teachers to be able to understand the potential DA has as a powerful diagnostic tool and as a process for promoting development. Thus, Tracy's application of DA was for her an opportunity to positively impact on her own classroom practice; for the researchers it presented an opportunity to observe how a teacher would integrate DA in

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her own instructional context. Tracy's experience, part of which we document in the present article, resulted in a deeper understanding on our part of how DA functions in a real-world classroom. The knowledge we gained from this experience will be incorporated into the teacher's guide, which we anticipate will be useful for other teachers interested in a DA-based approach to instruction and assessment. As will be explained, Tracy's situation represented a unique set of challenges, and her own expertise and understanding of her learners were critical to the design of the DA model she employed. The effects of this initiative for Tracy's practice and for her learners – as well as for our understanding of DA's relevance to classroom activity – are elaborated in what follows.

II Dynamic assessment and the praxis of developmental pedagogy

For Vygotsky, the notion of praxis was not an ideological position in academic debates but was a powerful orienting basis for his empirical research and clinical work with individuals experiencing learning difficulties and an array of mental disorders (see Vygotsky, 1993). As Kinard & Kozulin (2008) explain, education plays a crucial role in Vygotsky's theory of development because formal schooling offers the possibility to integrate abstract, theoretical knowledge with everyday experience leading to full conceptual understanding of the world. According to these authors, this development occurs through mediation in the form of cultural artifacts, interaction with others, and participation in socially organized activities. However, Vygotsky himself did not articulate or endorse sets of teaching and assessment methods or techniques to be followed in a specified way. Rather, his educational contributions may be described as helping teachers to reorient their practice to the goal of supporting learners' development of conceptual understanding of the world so that they may position themselves to act in the world in more agentive ways.

Given his commitment to praxis, Vygotsky understood that the particular ways in which curricula could be organized to foster development could not be prescribed beforehand but needed to emerge as the theory was brought into classrooms. He also understood that this process was necessary for further elaboration of the theory itself, a point exemplified by the evolution of the ZPD concept in his own writings. Initially proposed as an alternative to conventional IQ tests, the ZPD was first framed relative to the school curriculum, with development understood as the difference between learners' current performance and the level demanded by the school. In this way, the ZPD provided an indication of time and resources that might be needed to move individuals toward set curricular standards. However, it also defined development in teleological terms, as the curriculum could be viewed as an endpoint, at least at a given grade level. In this regard, Vygotsky (1933, p. 53, cited in van der Veer & Valsiner, 1991, p. 341) found that some learners were able to 'run through' their ZPD before others, effectively meeting the school's performance goals more quickly than other learners. In other words, the ZPD was construed as a way of understanding learner progression from one curriculum-defined point to another. This, however, poses the logical question of how to responsibly support learners who reach the standard ahead of others. In subsequent discussions of the

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ZPD, Vygotsky's statements of its 'great practical significance' to education are decidedly non-teleological, as he explains that the ZPD serves to orient instruction to have an optimal role in guiding development (Vygotsky, 1998, p. 204) and points out that there is no endpoint to development through cultural means (Gindis, 2003, p. 204).

Praxis is also a strong current running through much of the pedagogical work pursued by Vygotsky's colleagues and students, most notably Piotr Gal'perin (1989) and Vasily Davydov (2004). These scholars designed educational approaches based on Vygotsky's theory that have led to advances in understanding of concept formation and internalization. With regard to the ZPD, Valsiner and van der Veer (1993) enumerate several strands of Vygotsky-inspired work that have led to developments in the concept itself, including DA. They point out, however, that there is a good deal of variability among approaches to DA, with some maintaining a stronger connection to Vygotsky than others. As we have argued elsewhere (Lantolf & Poehner, 2004, 2007), all DA proponents share a conviction that independent performance is insufficient to fully understand abilities and that important insights into development are gained when mediation is offered as performance begins to break down. Nevertheless, DA practices differ widely with regard to the quality of mediation they propose as well as how DA sessions relate to ongoing instruction.

To understand the ways in which mediation might be approached in DA, we have proposed the terms 'interventionist' and 'interactionist' DA (Lantolf & Poehner, 2004). The contrast between these two conceptualizations of DA can be understood with regard to the relative freedom mediators have to respond to learners' difficulties and to pursue concerns as they emerge during the interaction. In interventionist approaches, tasks and materials are selected and analysed with the goal of predicting the kinds of problems learners are likely to encounter. Mediation is then scripted as hints, prompts, and leading questions that vary in their degree of explicitness. Mediation is arranged along a scale of most implicit to most explicit, and during DA the mediator follows the scale precisely, moving from hint to hint until the learner either responds correctly or until the final hint is reached and the solution is revealed and explained. Interactionist DA, on the other hand, places no restrictions on mediation but instead demands that the mediator do everything possible to help the learner stretch beyond his/her current independent performance, short of giving the answer, although even this might promote development if it occurs at a propitious point in the interaction.

According to Feuerstein, a staunch advocate of interactionist DA, cooperative and dialogic mediation is essential to accurately determine learners' responsivity and to help them ultimately take over responsibility for performance (Feuerstein et al., 2003). In his review of DA, Minick (1987) notes that approaches in which mediation is standardized offer the advantage of more easily interpretable outcomes, often based on the number of hints an individual requires. Feuerstein's dialogic mediation, he concludes, is better situated to impact development although the results cannot be quantified and drawing comparisons among learners is more complex. To this we would add that open-ended mediation is also more labor intensive in that it places greater demands on the mediator to detect learner difficulties and formulate appropriate responses in the moment-to-moment dynamics of interaction.

While several DA approaches have been proposed that posit a connection to the classroom (e.g. Greenberg, 2000; Jensen, 2000), Lidz and Elliott (2000) explain that this work

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has been concerned primarily with providing teachers with diagnostic information about learners. A sharp division of labor is observed whereby a professionally trained psychologist or school psychologist conducts a formal DA with a low-performing learner and then shares the outcomes of the procedure with the classroom teacher and other stakeholders. In this respect, the use of DA in educational contexts is not unlike other forms of school-based psychological assessment, particularly those intended to identify special needs learners. Greenberg's (2000) Cognitive Enrichment Advantage (CEA) approach to DA, for instance, proposes a 'collaborative' team-based approach to linking DA with instruction. The results of CEA are discussed by a group of school professionals, including classroom teachers, to arrive at recommendations for placing students in remedial programs or for outlining pedagogical recommendations that might be useful in the classroom. In this case, DA is connected to classroom activity but only indirectly and the teacher is free to follow the psychologist's suggestions or not.

In our view, this work has been critical to identifying learners in need of various forms of support but it by no means exhausts DA's relevance to education. In fact, a Vygotskian conceptualization of praxis does not position classroom teachers merely as consumers of research – and here we might add consumers of test scores and other outcomes from formal assessment procedures – but recognizes their expertise as central to the iterative development of theory and practice.

III DA and corrective feedback

There is an extensive research literature on the effects of feedback on L2 learning. A thorough review of this research is well beyond the scope of the present article (for excellent reviews, see Ellis, 2008; Ellis et al., 2009). However, it is useful to relate mediator–learner interaction during DA with the findings and assumptions on feedback as reflected in SLA research. The focus of most SLA research on feedback has been on whether implicit or explicit feedback is more effective in stimulating L2 development.

According to Ellis (2008, p. 804) the research shows that teachers use different types (i.e. direct or indirect) and frequency of feedback, depending on such factors as context, personal preference, and recommendations made in their teacher education courses. Research has documented, for instance, that teachers frequently use recasts to provide learners with indirect correction (Ellis, 2008). One of the uncertainties associated with recasts is whether or not they result in acquisition. While researchers report frequent learner uptake of teacher recasts (most often as repetition of the corrected form), this in itself does not necessarily confirm acquisition. One would want to document appropriate use of the corrected form in future independent performance (Ellis, 2008, p. 256). The evidence we present below documents such performance.

Researchers have also tried to determine whether corrective feedback better serves acquisition if it is delivered implicitly, as with recasts, or explicitly as when overtly pointing to an error, correcting it, and perhaps offering a metalinguistic explanation as well. Ellis et al. (2009) surveyed 11 studies that directly compare implicit to explicit corrective feedback and conclude that the latter is more advantageous, at least as far as production is concerned (p. 314). On the other hand, these same authors note that some

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studies report no advantage for either type of feedback. They also point to research findings that support positive effects for implicit correction when compared to learners who received no feedback at all (p. 315).

Ellis et al. (2009) suggest that it is difficult to arrive at unequivocal conclusions with regard to feedback type because the studies they surveyed were in most cases not directly comparable. For one thing, some of the studies are experimental, while others are observational; for another, measures of learning ranged from mechanical to communicative activities and varied with regard to whether focus was on input or output processing. Above all, the studies did not often jibe with respect to what constituted implicit or explicit feedback. In most, though not all cases, the former comprised recasts, although requests for repetition were also used and at times recasts were combined with rejections or repetitions (p. 313). Explicit feedback also varied, ranging from a simple indication that an error occurred to specifying the error accompanied by extensive metalinguistic explanation.

Ellis et al. (2009) carried out their own study with groups of low-intermediate proficiency ESL learners where they compared the effects of implicit (recasts) with explicit (repetition of error followed by metalinguistic information) feedback on learning the past tense *-ed* marker in English. Without going into detail, and despite self-admitted limitations, the results of post-tests and delayed post-tests showed a distinct advantage for the group receiving explicit feedback (p. 327). The authors hypothesize that 'explicit feedback seems more likely to promote the cognitive comparison that aids learning' (p. 330). In an earlier study comparing implicit and explicit feedback, Carroll and Swain (1993) speculated that explicit correction aids learning by identifying the site and nature of the learning problem whereas implicit feedback expects learners to infer both of these important aspects of learning.

Based on such findings, one might indeed conclude that explicit corrective feedback is more effective and therefore should be the preferred approach to dealing with learner errors. From a perspective that looks more at the product rather than the process of learning, this makes sense. For instance, if the instructional aim is simply to help learners arrive at a correct response, then explicit feedback is certainly an efficient means. However, as Aljaafreh and Lantolf (1994) argued, if the intention is to promote development then process must be foregrounded, as in the ZPD. This is because development is not only about appropriate performance but it is equally about where responsibility and control for the performance resides. Development moves from other-regulation – where one's performance is primarily controlled by someone else – to self-regulation, where one establishes control over one's own performance. From a Vygotskian perspective, this is what learner agency and autonomy are about. By providing uniform explicit corrective feedback all learners are treated in the same way regardless of the level of control they may have achieved over a particular language feature. Consequently, it is difficult to determine how much regulation a learner is gaining over her or his performance and thus much of the process of development not only remains hidden but it may very well be inhibited. Learners may come to rely on others rather than on themselves, or at least may do so for a longer time period than necessary.

As Aljaafreh and Lantolf (1994) argued, the ZPD requires use of both implicit and explicit mediation for effective development. Which type of mediation is offered at a

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given moment depends on a learner's (or group's) ZPD and this in turn entails co-regulation whereby a learner's responsiveness to teacher mediation also regulates the teacher and her subsequent attempts at assisting the learner. This is an extremely important point, because it is in this process of co-regulation that learner agency and autonomy emerge. A simple, but we think effective, illustration of this point is provided by Fogel's (1991, p. 55) discussion of the 'interactional synchrony' (i.e. co-regulation) that takes place between a mother and a young child as the mother attempts to move the child from a prone to a sitting position. Fogel points out that the mother has at least two options for achieving the goal. One would be to treat the child as an object and simply place it in a sitting position. The end product is efficiently attained. Another option would be for the mother to have the child take hold of her hands (assuming the child is sufficiently physically developed to carry out this action) and begin to exert some force in one direction while simultaneously coaxing the child to exert force in the opposite direction. Eventually, the same goal is attained, although in a less efficient way. The difference, however, is that the child participates actively in the lifting process and begins to experience itself as an agent. In implementing DA procedures with her students, Tracy was attempting to achieve something similar to what the mother was attempting to achieve with her child – the simultaneous development of an appropriate product and a sense of agency and eventually autonomy in using the language. There is thus an important distinction between corrective feedback as it has been operationalized in the SLA literature and mediation as it is defined in SCT.

IV DA in an elementary school foreign language program

Christian et al. (2005) cite the remarkably low rate of US adults proficient in a second language compared to other parts of the world as evidence of the need for greater investment in L2 education in US public schools. Heining-Boynton and Haitema (2007, p. 165) argue forcefully that 'ensuring that students commit to a long sequence of language study is paramount [to the goal of developing L2 proficiency], and beginning language study at the elementary school is one way of doing so.' For these authors, Foreign Language in the Elementary Schools (FLES) programs not only increase the number of hours learners are exposed to the L2 but they introduce them to the language when their attitude toward language learning and toward school in general is relatively positive (Heining-Boynton & Haitema, 2007). As they note, a growing number of school districts in the USA are implementing some form of FLES program, although these vary from full and partial immersion programs to those that place a greater role on introducing learners to world cultures.

Tracy is a full-time L2 Spanish teacher employed by a lab school affiliated with a major research university in the northeastern part of the USA. Lab, or laboratory, schools in the USA originated with the work of John Dewey, who established a school for progressive education linked to the University of Chicago. Lab schools typically follow instructional practices inspired by Dewey and other progressive thinkers and are affiliated with a university, for which they often serve as a practice site for pedagogical innovations and research. In this particular lab school, Spanish was the sole L2 offered, a

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decision that reflected the perceived importance of the language on the part of the school's administration. L2 instruction was focused on classes of third- through fifth-grade students (ages ranging approximately 8–11 years) who each received 15-minute lessons per day. As the only Spanish teacher in the school, Tracy traveled from classroom to classroom to conduct her 15-minute lessons, bringing all materials with her. At the time of her experience with DA, Tracy was in her second year at the school and her third year of teaching. She read Lantolf and Poehner (2006) prior to the beginning of the spring semester of classes at the lab school. As Tracy worked through the guide, she remained in contact with the authors by e-mail and by phone and became deeply interested in developing a solid grasp of DA principles and how they might be applied to her own instructional practice. As she planned her lessons, Tracy began to consider how her interactions with learners might move beyond response-feedback exchanges to include mediation aimed at engaging with learners in their ZPD.

Given her knowledge of the students and her teaching context, Tracy felt most comfortable following an interventionist approach to DA. For each lesson she prepared menus of mediating moves arranged from most implicit to most explicit. Typically, the menus consisted of 6–8 moves, with the first intended to call the learner's attention to the fact that there was problem with the performance and the final moves revealing and explaining the needed lexical item or grammatical structure. The precise content of the prompts varied slightly in keeping with the focus of any given lesson. At the time we began to video-record her lessons, the students were studying a unit she had prepared on the Peruvian rainforest, which included a range of vocabulary for describing animals and their habitats. The grammatical focus of the unit concerned noun–adjective concord. This feature of Spanish was challenging for the students, mostly first language (L1) speakers of English (one student was a bilingual speaker of English and German, which also marks agreement but with different inflections from Spanish), who were unaccustomed to marking gender and number agreement. Figure 1 contains the mediation inventory Tracy designed and implemented in her classes. It is arranged from most implicit (pause) to most explicit (explanation).

This mediation inventory enabled Tracy to be highly systematic in interactions with her students. As they worked through the activities, her initial response to learner difficulties (in the case under consideration, when learners failed to correctly mark noun–adjective agreement) was to pause. For some students, this sent a clear message that something was amiss with their performance and they attempted to work through the difficulty, often with a positive outcome. For other students, the pause either resulted in an inappropriate response or it failed to trigger any response at all. When this occurred, Tracy moved to the next prompt in which she would repeat the utterance produced by the student with rising intonation as a way of signaling that there was something wrong but without indicating the nature of the problem (e.g. lexical, syntactic, morphological) nor precisely where in the construction the problem was located. For instance, if a student said **La lechuza*ts *tiene alas gris* 'The owl has gray wings', she repeated **La lechuza tiene alas gris?* If the student responded with the appropriate form *alas grises*, the interaction concluded, the student received a number 2 in the interaction grid (see below) to indicate the level of mediation required, and the activity continued with another student. If the prompt failed, however, Tracy would move to the next level of mediation (3) in an

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1. Pause
2. Repeat the whole phrase questioningly
3. Repeat just the part of the sentence with the error
4. Teacher points out that there is something wrong with the sentence. Alternatively, she can pose this as a question, "What is wrong with that sentence?"
5. Teacher points out the incorrect word
6. Teacher asks either/or question (*negros o negras*?)
7. Teacher identifies the correct answer
8. Teacher explains why

Figure 1 Inventory of Teacher prompts

attempt to narrow the student's focus to the portion of the utterance where the error had occurred. In the example at hand this was *alas gris* produced with rising intonation.

To systematically document learner performance and responsiveness to mediation, when needed, Tracy prepared interaction grids with each learner's name alongside several columns. Because she had assigned a numerical value to each mediating prompt (1–5), she was easily able to mark a number in the column next to the student's name for each interaction in the lesson, and in this way she captured how often she interacted with each learner during a given lesson as well as the level of mediation they required to perform various tasks. The charts also included a space where she recorded comments about the interactions, usually pertaining to the type of problem the learner experienced. This allowed Tracy to maintain a simple, ongoing record of the class's progress, as well as that of individual learners, as together the charts provided documentation of what individual students and the class as a whole were and were not able to do during any given lesson and over the course of the entire four-month semester. Tracy was also able to track changes in learner response to mediation over time. As Aljaafreh and Lantolf (1994) argue, shifts in responsiveness to mediation are significant indicators of development through the ZPD that are missed when the focus is exclusively on learner independent performance. From this perspective change from reliance on explicit to implicit mediation indicates that the learner is gaining increasing control over what is to be learned and that he or she is therefore further along the way toward autonomous performance than might appear to be the case if we focus solely on the product of performance. In this way, Tracy appropriated Vygotsky's genetic approach to development with its commitment to the 'historical study of behavior' (Vygotsky 1978: 65). An example of the kind of interaction grid Tracy designed is reproduced in Figure 2.

In the grid depicted in Figure 2, the numbers relate to the activity described above, where 0 indicates that Amora required no direct mediation from Tracy in order to produce appropriate noun–adjective agreement, and 3 signals that Gabriela required more explicit mediation to mark agreement. Vicente, on the other hand, required level 6 mediation (namely, a choice between a correct and an incorrect option) before he was able to determine the agreement. The phrases written under the Comments column served as reminders to Tracy regarding the feature at issue and the nature of the problem, if there was one.

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NAME	INTRCT. 1	INTRCT. 2	INTRCT. 3	COMMENTS
Gabriela	3			dos ala gris
Manuel				
Vicente	6			dos orejas cafe
Roberto				
Amora	0			dos ojos negros
Raquel				

Figure 2 Interaction grid (student names are pseudonyms)

Even though in terms of their initial performance two of the three students (Gabriela and Vicente) produced incorrect agreements, because of the different levels of mediation required to prompt an appropriate response, they seem to be at different developmental levels in terms of the ZPD. However, as we will observe in the following section where we analyse the interactions between Tracy and the three students, the situation is a bit more complex than it may at first appear.

1 Analysis of student–teacher interactions in the ZPD

In the activity under consideration here, the students are given a plastic cube with a photo of a different Peruvian animal on each side of the cube. Tracy calls for students to volunteer to come to the front of the class, toss the cube onto the floor, name the animal depicted on the cube that faces up, and then say two things that describe the animal. The first volunteer is Vicente, who, according to the roll of the cube, must describe a *lechuza* 'owl'. We pick up the interaction between Tracy and Vicente in protocol A at the point where Tracy tries to focus Vicente on features of the owl he might describe by calling his attention to its ears (line 1). It is important to note that throughout the interaction Vicente appears to be quite comfortable performing in front of the class. Indeed, even when he has problems, as described in Protocol A, he continues to smile while reacting to Tracy's prompts.

Protocol A: Tracy and Vicente

T: 1. *¿Cuántas orejas?* 'how many ears?'

V: 2. *tiene dos orejas* 'it has two ears'
(long pause, points at the image on the cube, then looks at Tracy)

3. **café* 'brown'
(looks out to the class, then back to the teacher)

4. **café* 'brown'
(then looks back at the cube)

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T: 5. *¿Tiene dos orejas *café?* 'it has two *brown ears?'
V: (looks at the cube again and points at it twice with his finger)
6. *sí dos orejas …… *café* 'yes two *brown ears'
T: 7. *¿*Café?* 'brown?'
V: 8. *¿Amarillo?* 'yellow?'
T: 9. '*Café' es correcto pero ¿dos orejas <u>café</u>?*
(brown is correct but two <u>brown</u> ears?)
V: 10. (no response, turns his body to face the class, looks at cube then out at class and back to cube)
T: 11. shhh (directed to another student murmuring something off camera)
12. *Hay un problema …… con la palabra café* 'There is a problem with the word brown'
V: 13. (Vicente does not respond but another student in the class says 'oh' and raises her hand)
T: 14. (looks toward the other student and then back to Vicente)
15. *¿Es *café or cafés?* 'is it *brown sg. or brown pl.?'
V: 16. *Cafés* 'brown pl.'
T: 17. *Sí muy bien tiene dos orejas cafés muy bien excelente Vicente* 'Yes very good it has two brown ears very good excellent Vicente'

In response to Tracy's initial question in line 1, Vicente correctly states the number of ears the owl has and then proceeds to describe their color in line 3; however, he fails to mark the color for plural agreement with the noun it modifies, *orejas*.[1] Tracy does not verbally respond to the error but instead pauses (level 1 prompt) to allow time for Vicente to potentially notice and correct the problem himself. However, Vicente repeats his mistake in line 4, where upon Tracy uses the level 2 prompt and repeats the entire utterance with rising intonation in line 5. This also fails to trigger a change on Vicente's part, who first confirms (*sí* 'yes') and then repeats the full sentence with the agreement error intact in line 6. Tracy next shifts to level-3 mediation (line 7), repeating the problematic segment in an attempt to focus Vicente's attention in the hope that this might lead him to revise his utterance. Although Vicente detects that there is indeed a problem, he mistakenly assumes in line 8 that it is lexical rather than grammatical and changes the color term to 'yellow'. The fact that Vicente is unable to notice the error even when he is alerted to it – and instead begins searching for potential features of the construction that could be incorrect – indicates that he was not attuned to noun–adjective agreement at this point in the exchange. In line 9 Tracy affirms that Vicente's original lexical choice is appropriate but once again offers level 3 mediation, although this time using the full noun phrase and with stress on the modifier 'brown', perhaps hoping that this will alert Vicente to the grammatical nature of the problem. This fails to prompt a verbal response from the student (line 10). In line 12 Tracy then explicitly states that there is a problem with the color term to which another student in the class responds with 'oh' and raises her hand (line 13). This is significant because it shows that at least some students are actively observing the interaction between Tracy and Vicente. The student's uttering of the exclamation suggests that she has been pondering the same problem as Vicente and that she has found a solution. Of course, we are unable to confirm whether her solution is correct,

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since Tracy in line 14 does not call on the student.[2] Instead she moves to level 6 mediation and offers Vicente two options, which results in the correct selection.

As one can imagine, it is not difficult for Vicente to choose between the two forms offered by Tracy, particularly when one of the forms (*café)* is the very one he produced and that she indicated was problematic. However, the important point here is not that Vicente ultimately chose the correct form but rather that level 6 was the level of support needed before he was able to do so. For instance, it would certainly have facilitated completion of the task if Tracy had simply given this choice to Vicente at the outset, when he first produced the incorrect form. From the perspective of the ZPD, however, the focus of the interaction is on the process of performing rather than its product. How learner performance is carried out is crucial in diagnosing their level of ability. Had Tracy provided level 6 mediation from the outset, she would have lost a good deal of information about Vicente's knowledge of noun–adjective agreement in Spanish. For example, if Vicente had been able to correct himself following the less explicit utterance provided in line 5, we would have concluded that he had a higher level of control over agreement than he in fact had. This information would not have emerged had Tracy begun with a very explicit prompt. Moreover, as we will discuss a bit later, it is our contention that Vicente's struggle with the problem – which was stimulated by Tracy's mediating moves and which would not have occurred had she merely offered him the choice between forms when the problem initially arose – provided him with a rich opportunity to internalize the information regarding adjective–noun agreement. We will consider the effects of this interaction on Vicente's subsequent performance shortly, but we will first follow Tracy's exchanges with two other learners during the same lesson.

Following the interaction between Tracy and Vicente, Gabriela volunteered to participate in the animal description activity. Gabriela tossed the cube and by chance it again landed on *lechuza* 'owl'. The interaction between Tracy and Gabriela is presented in Protocol B:

Protocol B: Tracy and Gabriela

T:	1.	Okay, *¿cuál animal es?* 'what animal is it?'
G:	2.	uh, I don't get this one?
T:	3.	*Clase*, *¿quién puede ayudarle? ¿cuál animal es?* 'class, who can help her? what animal is it?'
		(Several students raise their hands)
T:	4.	uhhh, *¿Josué?*
J:	5.	*la lechuza* 'the owl'
T:	6.	*la lechuza* 'the owl'
	7.	*Uh la lechuza tiene* …? 'the owl has …?'
G:	8.	uh … *¿*dos ala gris?* 'two wing *sg.* gray *sg.*'
		(looks at the teacher)
	9.	Wai-wai-wait *¿*dos alas gris?* 'two wings gray *sg.*'
T:	10.	goooood *¿*alas gris?* 'wings gray *sg.*?'
G:	11.	*¿Grises?* 'Gray *pl.*?'
T:	12.	*Excelente muy bien Gabriela* 'excellent very good Gabriela'

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Interestingly, even though this activity began almost immediately after Vicente's turn, Gabriela fails to remember the name of the animal (line 2). Tracy (line 3) asks the class to help Gabriela, which Josué does in line 5. Instead of calling on another student, Tracy might have instead tried prompting Gabriela first by pointing out that the animal is the same one that Vicente had described. This might or might not have succeeded in helping Gabriela recover the name, but the point to keep in mind is that when working in a student's ZPD, it is important to first probe the student's ripening knowledge before providing explicit information.

Once the Spanish word is given, Tracy in line 7 prompts Gabriela to begin describing the owl, which she does in line 8 by saying that it has two gray wings. The problem is that she neglects to inflect the noun for the necessary plural form, given that she indicates that it has two wings. Her use of the singular adjective form *gris* 'gray' at this point appears to be correct since it agrees with the noun *ala* 'gris', which she has also incorrectly marked as singular, given her quantification *dos* 'two'. Gabriela then looks at Tracy, and here we are not sure if she picks up a subtle facial clue from the instructor that something is wrong with her response or whether she detects the problem on her own; nevertheless, she tells herself in English in line 9 that she needs to revise her response. She does this and appropriately inflects the noun but overlooks the need for plural concord on the adjective. In line 10, Tracy first approves Gabriela's change in number inflection with the utterance 'good'; however, she pronounces it with exaggerated vowel length, coupled with level 3 mediation, thus signaling to Gabriela that something is still amiss in her revision. Gabriela in line 11 immediately detects the problem and correctly inflects the adjective for plural, *grises*. However, she uses interrogative intonation, indicating that she is not completely sure of her correction. Tracy confirms that it is indeed correct in line 12. Tracy then writes a 3 next to Gabriela's name on the grid and notes the source of the problem as well.

Comparing Vicente to Gabriela we see that Gabriela required considerably reduced mediation (level 3 vs. level 6) in order to detect and rectify the agreement problem. We might conclude then that for this feature, Gabriela is more advanced than Vicente even though in their respective independent performance they both manifested the same problem. It is entirely possible, although we cannot say with absolute certainty, that Gabriela vicariously benefited (see Ohta, 2001) from the interaction between Vicente and Tracy. Although she did not produce the correct response from the outset, she was able to overcome the problem and with considerably less mediation from Tracy than Vicente needed. Poehner (2009) indeed argues that the students as a group operated in a collective ZPD, whereby they all benefited, although to different degrees, from dyadic interactions between the instructor and any given student. As the group-as-whole develops, the individuals comprising the group also develop. This is a very important notion with regard to the ZPD in education, and while it has not been robustly explored in L2 instruction (although see Gibbons, 2003) it has been studied in the general SCT literature (e.g. Newman et al., 1989; Cole, 1996; Cole & Engeström, 1993).

The final student called on for the activity is Amora, who selected *alpaca*. The interaction between Amora and Tracy is given in Protocol C.

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Protocol C: Tracy and Amora

T: (looking out at the class)

1. *Por favor un voluntario más* 'please one more volunteer'
(several student raise their hands)

T: 2. *Amora gracias* 'Amora thank you'
(Amora comes to the front of the room, and tosses the cube)

T: 3. *¿Cuál animal es?* 'Which animal is it?'

A: 4. *La alpaca* 'the alpaca'

T: 5. Okay

A: 6. *um la alpaca tiene dos ojos … uh negros?* 'the alpaca has two black eyes?'

T: 7. *Perfecto dos ojos negros* 'perfect two black eyes'

The first thing we note about this interaction is that it is the shortest of the three we have presented. In fact, if we begin at the point of Tracy's initial question in line 3, it consists of 5 turns. The brief duration of this exchange indicates that the process of arriving at the appropriate construction, which for Vicente and Gabriela occurred externally in their dialogue with Tracy, occurs for Amora internally. Once Tracy confirms that the name of the animal is correct (line 5) Amora quickly proceeds to describe one of its features with correct nominal concord, inflecting the adjective 'black' for gender and number agreement.

We would like to call attention to the filled pause in Amora's response in line 6. It is crucially situated between the noun and the adjective, thus impacting on the fluidity of the transition between the two constituents. The early work of Goldman-Eisler (1968) argued that pauses, and especially filled pauses, are indications of internal processing activity. Amora's filled pause, in our view, is an indication that while she produced the correct agreements, she does not fully control it at this point and still needs to focus her cognitive resources in order to produce an appropriate construction. We interpret this as an additional indication that the class as a whole is still trying to master the agreement property of Spanish. Amora might well have profited not only from observing one previous interaction, as in Gabriela's case, but from two such interactions and therefore the mediation provided to her predecessors may have vicariously served her development as well. We acknowledge that our argument here is speculative and requires further exploration before it can be confirmed, but based on what is know about how social groups function (see Petrovsky, 1985), we think there is merit to our position.

2 Evidence of language development

Three days after the activity discussed above was conducted, the class engaged in a different, and slightly more complex, activity in which one student was given a picture of an animal and asked to describe it to another student. The second student was then supposed to guess the name of the animal. The second student was encouraged to ask questions of the first student, although this did not always transpire.

The focus of our analysis is once again on Vicente who, in his efforts to describe the animal he selected from a set of pictures provided by Tracy (but unseen by the guesser),

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is compelled to mark noun–adjective agreement. The animal that Vicente has selected is a *chinchilla*. For some reason, which we cannot explain fully, Tracy physically moves toward Vicente's dyad at the start of this activity; usurps the voice of the guesser and proceeds to ask Vicente the questions. Perhaps Tracy's involvement in this interaction was due to her desire to complete the activity in a timely fashion (recall that each class period lasted only 15 minutes), or her desire to prompt utterances that called for agreement. At any rate, the interaction is given in Protocol D below:

Protocol D: Tracy and Vicente

V: 1. *Tengo* … (looks at photo he is holding in his hands) *dos ... orejas ... cafés* 'I have two brown ears'
T: 2. *Dos orejas cafés ¿y?* 'two brown ears and?'
(Vicente looks at the teacher)
3. *¿Qué más?* 'What else?'
(Vicente looks at the photo)
V: 4. *Orejas* 'ears'
T: 5. *Sí, dos orejas cafés. Sí.* what else? *¿qué más? Y … ¿De qué color es la boca?*
6. *¿o los ojos? Or* [sic] *las piernas* 'What color is the mouth? Or the eyes? Or the legs?'
V: 7. *Ojos* 'eyes'
8. *Y*? *y dos ojos* 'and? and two eyes'
9. *Y dos ojos* 'and two eyes'
T: 10. *Dos ojos ¿de qué color?* 'Two eyes, What color?'
(Vicente looks at the teacher, who points to the picture)
11. *¿De qué color son los ojos? dos ojos …?* 'What color are the eyes? Two eyes?
V: 12. *Ah, negros* 'ah, black'
T: 13. *Negros. Perfecto. ¿Yo soy?* 'Black perfect. And I am …?
(Vicente looks at the picture)
T: 14. *¿Yo soy?* 'I am?'
V: 15. *Yo soy ...* 'I am …'
T: 16. *La chinchilla.*
V: 17. Yeah
T: 18. *La chinchilla, excelente ¡siéntate! otra persona.* 'The chinchilla, excellent, sit down. Another person'

Vicente begins the activity by describing the color of the animal's ears, which he does marking appropriate agreement between the noun 'ears' and the color 'brown'. This is the same construction that gave him problems three days earlier when describing the owl. Although his speech contains hesitations, similar to Amora's in Protocol C, he nevertheless remembers the appropriate form of the construction that gave him so much trouble earlier in the week. In lines 2 and 3, Tracy confirms Vicente's response and prompts him to say more. Apparently misunderstanding Tracy, Vicente in line 4 repeats the description he gave in line 1. Tracy, in line 5, acknowledges once again, that what he has already said is acceptable, but encourages him to extend his description. Here she repeats her request in English,

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perhaps feeling that Vicente did not understand her. She then proceeds to offer examples of additional details he might offer: 'what color is the mouth, or the eyes or the legs?' Vicente responds in lines 7 to 9 by mentioning that the animal has 'two eyes'. In lines 10 and 11, Tracy asks what color the eyes are; Vicente in line 12 thinks, expressed by 'ah', and then says 'black', appropriately inflected for gender and number. Tracy confirms his performance in line 13 and then asks him to identify himself, as if he were the animal. This actually confuses Vicente, since he believes that the other student is supposed to guess the name of the animal because these were the directions to activity originally articulated by Tracy. Eventually, he provides the name, *la chinchilla*. Again, the teacher confirms Vicente's response, asks him to sit down and then asks for another volunteer.

We believe that Vicente's performance in Protocol D clearly evidences change from his performance in Protocol A. In both cases, the appropriate Spanish constructions are ultimately produced, but whereas in Protocol A the context of performance was substantially modified by the teacher's intervention to the point that Vicente simply had to choose between alternate forms of the adjective *café,* in Protocol D the task of selecting appropriate modifiers in the target language and inflecting them correctly for gender and number rests squarely with Vicente. Tracy's contributions function primarily to elicit the description but do not pertain to their actual content or accuracy. Change of this type is, in our view, a clear indication of language development resulting, in this case, from Vicente's struggle with agreement features of Spanish in the first activity. The struggle was in large part prompted by Tracy's mediating moves. He may have also appropriated information from observing the respective performances of Gabriela and Amora. In terms of Vicente's ZPD, at the time of Protocol A noun–adjective agreement was a feature of Spanish that he had not yet developed adequate understanding to independently perform with accuracy, as he did in Protocol D. Rather, in Protocol A Vicente's control over this feature of the language was still in the process of emerging and therefore ripe for mediating intervention, both in the form of direct support from his teacher as well as from the interactions he observed between his teacher and classmates.

V Concluding comments

In this article we have analysed the interactions between an elementary school teacher of Spanish as a foreign language and her students as she undertook to implement DA in a normal (i.e. non-experimental) classroom setting. Following the dialectical relation between theory and practice articulated by Vygotsky, the application of DA described here was driven by the teacher herself in consultation with the authors. That is, the teacher's use of DA was not merely the implementation of a generic model designed by someone else; rather it reflected the teacher's own interpretation of DA as well as her familiarity with her students and the constraints of her particular classroom context. This is noteworthy not only because it illustrates the interrelation of theory and practice but also because it underscores that DA is not a pre-specified technique or method of assessing that must be followed in a prescribed manner, but in fact is a way of reconceptualizing the relationship between teaching, assessment and development, and therefore its realization must take account of the immediate instructional context.

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In the interactions examined, the teacher mediated learner development by providing a set of prompts designed to encourage learners to actively engage with the relevant features of the language. She understood that in order to optimally support learner engagement in the process of working through difficulties, prompts should initially provide the opportunity for learners to maximize their own agency to the degree possible by positioning the learner at every step to take over the performance and resolve the problematic circumstance. Although this procedure may be less expedient than overt correction in terms of identifying problems and completing learning activities, it allows the teacher to assess the extent to which a learner has or has not gained control over the relevant feature of the new language. For instance, if the instructor takes on most of the responsibility for producing an acceptable performance early in the interaction, not only will a good deal of the learning process remain hidden from observation, but the process itself may well be impeded, as we mentioned above. While jointly engaging with the learner, the instructor must determine when and how to intervene to provide increasingly more explicit assistance as the learner requires it. The more a learner is able to respond to implicit mediation the closer he or she is to gaining control over the language; and the more a learner requires explicit mediation the further away he or she is from mastery. At the same time, by supporting learners as they struggle to move beyond what they can achieve independently, mediation – whether implicit or explicit – potentially pushes development forward.

On the basis of performance alone, it would be reasonable to conclude that Amora was more advanced than either Gabriela or Vicente in controlling Spanish nominal concord. Indeed, she was able to produce appropriate agreement without any mediation from Tracy, while both Gabriela and Vicente had problems. However, as Tracy's Interaction Grid (Figure 2 above) shows, and as the above protocols attest, Gabriela was able to correct her problematic performance with less explicit mediation from Tracy than was Vicente, who required very explicit assistance before working through the difficulty. We might conclude, therefore, that Vicente is further from gaining full control over nominal concord than is Gabriela and that it should take more time for him to develop mastery than for Gabriela. Based on the data analysed in their study, Aljaafreh and Lantolf (1994, p. 480) proposed that development toward independent control of features of a new language would be a gradual process of moving through different levels of mediation from explicit to implicit. However, as Vygotsky (1978) argued, development is not necessarily a smooth and steady process that progresses from one level of mediation to the next until mastery is achieved. Rather it can be a revolutionary process that occurs in 'spasms' and 'upheaval' (p. 73). This was confirmed for L2 development in Lantolf and Aljaafreh (1995).

Although we are uncertain of Gabriela's progress, it is clear that Vicente's development was anything but gradual. He progressed relatively quickly from his initial problematic, and heavily mediated, performance to his correct autonomous performance three days later. We attribute this to the overt struggle he was compelled to carry out through the process of co-regulation, as he responded to Tracy's shifting mediation, which itself was offered in response to Vicente's performance. This does not mean, however, that any learner who struggles through the process as Vicente did should be expected to develop as quickly. From an SCT perspective, development is very much an individual process that

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depends on the mediation offered and on the uptake of that mediation. It can be gradual for some and abrupt for others, and may also vary for the same individual over time.

In the general SLA literature, some have questioned the value of single occurrences of correction. Lightbown (2000, p. 446), for example, argues that for error correction to be effective it must at least be sustained over an extended period of time. While we agree that time can be an important factor, we also propose that equally important, if not more important, is the quality of interaction between learner and mediator. Indeed, Feuerstein, whose DA work we discussed earlier, posits an important difference between DA and everyday interactions, noting that while the latter may include intentional efforts to provide mediation, the former comprises a range of mediation that is continually and systematically calibrated according to learner needs (Feuerstein et al., 2003). Although Feuerstein has designed DA programs that are sustained for months and even years, his research also evidences the value of single DA sessions for learner development.

Vygotsky also insisted that psychological functions may form over very short periods of time, a process Wertsch (1985, pp. 54–55) terms ‘microgenesis’. From this perspective, we propose that Vicente’s development may be understood as development in the microgenetic domain resulting from the quality of his initial interaction with Tracy, during which she did far more than point out an error or offer a recast. As explained, the ultimate goal of the interaction was not for Vicente to produce the required form but rather for him to struggle through the process of determining which forms to produce and how to do so. Their interaction may be considered not so much a negotiation of form as a negotiation of control over performance, with Tracy subsequently relinquishing control as Vicente came to rely more on self- than other-regulation. In fact, it is important to remember that while the examples considered here concerned Spanish morphology, collaboration in the ZPD, as occurs in DA, is not limited to discrete features of language but rather pertains to the development of all human mental abilities. The general DA research literature includes studies of abilities in reading and math, general intelligence, first language development, and vocational training (see Haywood & Lidz, 2007), while the L2 DA research to date has examined reading comprehension (Kozulin & Garb, 2002), verbal tense and aspect in oral language use (Poehner, 2008), and phonological, lexical, and cultural issues in listening comprehension (Ableeva, 2008). Thus, our intent in the present article has not been to make generalized claims about the development of learner control over nominative concord in Spanish. Rather we have sought to illustrate how interaction in the ZPD, as an extensive and intensive collaborative experience, redirects our attention from an exclusive focus on the product of development to the process itself; this is a process in which mediation moves from the intermental (social) to the intramental (psychological) plane.

Acknowledgements

Research for this article was funded in part by a grant from the United States Department of Education Grant (CFDA 84.229, P229A060003–08). However, the arguments presented here do not necessarily represent the policy of the Department of Education, and one should not assume endorsement by the Federal Government.

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Notes

1 In some dialects of Spanish *café*, while used as a modifier, maintains it original substantive meaning 'coffee'. In this case it is normally used in the construction *color de café* or *color café* 'color of coffee'. Agreement would not be marked even when the noun described by the construction is plural: *dos orejas color de café* 'two ears the color of coffee'. However, there are speakers who treat *café* as a full adjective and therefore inflect it for number agreement, especially when describing body parts, such as eyes, ears, and nose. This observation was corroborated by John Lipksi (personal communication, April 20, 2009), an internationally recognized expert on Spanish dialectology. We speculate, although we cannot be certain, that Tracy had contact with speakers who used the word as a normal adjective. Gender agreement is not normally marked on adjectives that end in the vowel *-e*, but it must be marked for those adjectives that end in *-o* or *-a*, as in *rojo* or *roja* 'red'. Adjectives that end in consonants may or may not mark gender agreement. The adjective *gris* 'gray' does not indicate gender agreement, but an adjective such as *encantador* 'charming' appends *-a* to mark agreement with feminine nouns.

2 Poehner (2009) argues that there is evidence from data such as presented in line 13 that even though Tracy interacts with individual learners during the activity, she is at the same time operating within the ZPD of the class as a whole. A group ZPD from this perspective is predicated upon tasks that require a level of functioning beyond what any group member can reach independently but that every group member may reach with mediation, although it is understood that some members in the group will require more extensive mediation than others. It should also be noted that an individual's ZPD is dynamic rather than stable, varying over time and with experience. Such intra-group and intra-individual variability makes it difficult to clearly establish a priori the 'boundaries' of a group ZPD. Rather, teachers may endeavor to create conditions favorable to the emergence of a group ZPD, such as by analysing learners' independent work to identify common areas of difficulty, but they must also remain attuned to the responsiveness of individuals during interactions with the group. As Poehner (2009) argues, when operating within a group ZPD particular mediating behaviors at a given moment may be more meaningful for some than for others, but it is equally the case that support offered to an individual may also serve as an affordance for others in the group. More important, from this perspective the needs of the group and the individuals within it are understood not to be in competition but to be interrelated.

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