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“How Do the Apples Reproduce (Themselves)?” How Teacher Trainees Negotiate Language, Content, and Membership in a CLIL Science Education Classroom at a Multilingual University

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This article discusses findings from ongoing research into plurilingual group work interaction in a Content and Language Integrated Learning (CLIL) teacher training classroom at a university in Catalonia, Spain. We explore how participants make use of available verbal and non-verbal resources—for example, their multilingual verbal repertoires, posture, gesture, gaze—to collaboratively accomplish various activities and, specifically, to problematize linguistic and subject knowledge, to construct science teacher discourse, and to dynamically and simultaneously negotiate membership in immediate and “imagined” communities. Although the shift in European higher education toward teaching nonlanguage subjects through the medium of a foreign language would appear to favor monolingual practices and be detrimental to local languages, our data reveal that participants’ plurilingual repertoires can act as a resource in classroom interaction, creating a favorable framework for performing a range of activities that would seem to enrich the collective learning process.

Key words: CLIL, community membership, multilingualism, multimodality, university

RESEARCH DESCRIPTION

This research is part of the DYLAN project, a European project funded under the Sixth Framework Program of the European Union, which involves 20 research institutions in 12 European countries (<http://www.dylan-project.org>). One of the major aims of this project is to explore how multilingualism¹ may be an asset rather than a drawback for the development of knowledge and for the economy by looking into language policies and practices in 3 fields: institutions, companies, and higher education. The team from the Universitat Autònoma de Barcelona² is involved in carrying out research in the latter of these fields at

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¹A distinction is sometimes drawn between plurilingualism, meaning the use of many languages by an individual, and multilingualism, meaning the use of many languages in a society. In this text, the terms will be used interchangeably.

²The members of the UAB team involved in the DYLAN project at the time of writing were Luci Nussbaum (coordinator), Eva Codó, Victor Corona, Melinda Dooly, Emilee Moore, and Virginia Unamuno.

two universities in Catalonia, Spain, focusing above all on multilingual language practices that emerge at local universities therein, and how they relate to language policies and strategies.

One of the practices studied by our team up to now—and presented in this article—has been student group work interaction in a science education class taught in English, a foreign language for the students, at one university in Catalonia, Spain. Subjects taught through the medium of the students' foreign language (in most cases, English) are becoming more and more frequent in European higher education, with the aim being twofold. On the one hand, such classes are aimed at favoring student exchanges across institutions and, on the other, they are meant to foster foreign-language learning on behalf of local students. The latter was the case in the classroom analyzed in this article.

The sequence we presented involves a group of first-year university students who had been given some apples by their teacher and asked to discuss and formulate questions in English that they could ask an imaginary group of primary-school pupils about the apples. We examine how they make use of available verbal and nonverbal resources—for example, their multilingual verbal repertoires, posture, gesture, gaze—to collaboratively accomplish various activities; specifically, to problematize linguistic and subject knowledge, to construct science teacher discourse, and to dynamically and simultaneously negotiate membership in immediate and “imagined” communities.

In this text, we, firstly, discuss some of the relevant literature by highlighting some basic conceptualizations of plurilingual talk-in-interaction as the starting point for our analysis. We then focus on the idea of membership in both immediately tangible communities of practice and “imagined” communities, briefly outlining some of the major research in this direction. In doing so, we briefly outline our understanding of participation, a central element of membership, as being both verbal and nonverbal. The classroom data are then presented in order to provide empirical evidence for the discussion that appears at the end of the text.

PLURILINGUAL TALK-IN-INTERACTION

It is important to highlight some basic theoretical and analytical conceptions relating to plurilingual talk-in-interaction. Work on code-switching in interactional sociolinguistics and conversation analysis has described how the “the alternating use of two or more ‘codes’ within one conversational episode” (Auer, 1998, p. 1) serves as a communicative resource. Gumperz (1982), for example, described code-switching as a “contextualization cue” or one of many elements in plurilingual conversation contributing to the construction of meaning. Mondada (2007, p. 174) defines contextualization cues as “*pratiques par lesquelles les participants mettent en évidence, reproduisent, transforment, effacent des éléments du contexte qu'ils rendent pertinents pour l'interprétation de l'énoncé en cours*” (“practices through which participants display, reproduce, transform, or blur out elements of the context that they consider pertinent for the interpretation of the utterance in course”).³ She continues to claim that code-switching is “*l'une des ressources qui accomplissent ce travail de guidage interprétatif, notamment en créant un contraste entre un*

³The translations of Mondada (2007) in this paragraph are our own.

segment énoncé dans une langue et le segment suivant énoncé dans l'autre: ils soulignent ainsi une transformation dans les détails à prendre en compte pour l'interprétation" ("one of the resources carrying out the task of interpretative guidance, notably in creating a contrast between a segment produced in one language and the following segment produced in another, thereby highlighting a transformation in the details to be taken into account for interpretation") (p. 174).

Auer (1984; 1998) explains that participants in conversation have to solve two major communicative problems. Firstly, in plurilingual conversation, there are problems related to what language to use. Auer (1984; 1998) uses the term participant related code-switching to describe changes in the language being used that may be explained by factors relating to the participants, such as language competence, preference, and local interactional roles. That is, participant related code-switching provides cues "about attributes of the speaker" (Auer, 1998, p. 192). The work by Lüdi and Py and their colleagues (e.g., Lüdi, 1989; Lüdi & Py, 1986) also highlights the use of code-switching as a communicative resource between speakers with different degrees of competence in the language(s) being drawn on in a given interaction. They use the term "exolinguist" to refer to situational frames in which speakers have heterogeneous degrees of competence in a particular language being used, leading to a type of code-switching to speakers' preferred languages, which in Auer's terms would be participant related.

Secondly, in both monolingual and plurilingual conversations, there are problems related to the general organization of the conversation (e.g., topic, turn-taking). Auer (1984; 1998) claims that the alternating use of two languages may be a means to cope with these organization problems. He uses discourse related code-switching to refer to changes in the linguistic code in an interaction that have a discursive function; for example, to indicate a change of topic, to add emphasis to an utterance, to show encouragement or cooperation, to mark direct speech, to make jokes, etc. That is, discourse-related code-switching provides cues "for the organization of the ongoing interaction" (Auer, 1998, p. 192).

THE CONSTRUCTION OF MEMBERSHIP IN INTERACTION

The concepts of membership and community have drawn the interest of researchers and theoreticians from diverse realms of the social sciences. For example, sociolinguistics has long been interested in the role of language varieties in the formation of speech communities (Gumperz, 1964; Labov, 1972). Ethnomethodology (Garfinkle, 1974) has been concerned since its origins with how membership in collectives is accomplished sequentially in ordinary activities. However, in this article we especially draw on the concept of community of practice (CoP) (Lave & Wenger, 1991; Wenger, 1998) as a useful model for describing groups of people participating in concrete, tangible, mutual social activities guided by certain rules and practices recognized by the particular community. In this regard, we believe that language has a central role; as Auer (1998, p. 3) argues, "from earlier and recent studies, we know . . . that code-switching is related to and indicative of group membership in particular types of bilingual speech communities." Our analysis also remains firmly grounded in an interactionist perspective by using naturally occurring data and focusing on the sequential organization of local activities.

Of particular interest to this discussion is the concept of modes of belonging to a CoP, developed by Wenger (1998) more fully than in the previous publication. He argues that there are three

possible modes: “engagement,” “imagination,” and “alignment.” Engagement refers to active involvement in mutual processes of negotiation of meaning. Alignment refers to how individuals coordinate their energies and activities in order to fit within broader structures and contribute to broader enterprises. Finally, imagination addresses how people create images of the world and see connections through time and space by extrapolating from their own experience. Wenger (1998) draws on research with insurance-claims processors and argues that the workers’ experience of both participation and nonparticipation reaches beyond the walls of their office. He argues that

they see themselves as participants in social processes and configurations that extend beyond their direct engagement in their own practice. They have to make some sense of the many artifacts they encounter coming from practices they do not have access to. They may have to use their imagination to get a picture of these broader connections. (p. 173)

The notion of imagined communities in educational spheres was inspired by CoP theory. First coined by Anderson (1983) and adopted by Wenger (1998) in his discussion on modes of belonging, the concept of imagined communities has been applied to second- and foreign-language learning in previous research to explain learners’ investment in their learning (Kanno & Norton, 2003; Norton, 2001; Norton & Toohey, 2004). Kanno and Norton (2003) claim that

on a temporal dimension, the notion of imagined communities enables us to relate learners’ visions of the future to their prevailing actions and identities. It is a way of affirming that what has not yet happened in the future can be a reason and motivation for what learners do in the present. (pp. 247–248)

While this concept is an attractive one, research that draws on classroom interactional data is perhaps lacking. As Ryan (2006) points out,

the challenge to articulate the imagined is indeed a daunting one, and is . . . only possible with the kind of qualitative data that can only be provided by actual learners in EFL contexts. Without this data it is impossible to develop this model so that it represents something more concrete and meaningful to the realities of teaching and learning. (p. 42)

In this article, we aim to provide qualitative evidence of how participants sequentially orient both to tangible and imagined communities of practice in dealing with both subject and language content and in constructing science-teacher discourse in their L2.

As for participation, a central element in CoP theory, we follow from Goodwin and Goodwin (2004) in understanding that being part of social activities involves more than just talk (see also Goodwin, 2000; Mondada, 2007; Olsher, 2004). According to Goodwin and Goodwin (2004), the act of speaking always emerges within complex and changing contextual configurations. Such configurations include actors drawing on the semiotic resources provided by their bodies to orient toward others the actions in progress and the broader activity, and so forth. For Goodwin and Goodwin (2004), the notion of participation provides a framework for investigating how individuals mutually build action, at the same time as attending to, and helping to construct, relevant action and context. An interesting example of such mutual verbal and nonverbal construction of participation in a university classroom is given in a study by Veronesi (2007), who demonstrates how a lecturer included the participation of an entire class through gesture. Given the importance of such nonverbal elements, we adopt a multimodal transcription by including certain screen shots highlighting posture, gesture, gaze, and so on that we deem relevant for understanding the sequential organization of the interaction and the negotiation of membership in the immediate student group.

The classroom sequence we present involves a group of 4 female students and 1 male student. It took place in a science laboratory and followed on from a lecture that had taken place in the classroom the same day. The students had some apples on the table in front of them and were formulating questions they could ask primary-school pupils about the apples, in order to then relate those questions to goals of science education. The expected output was a worksheet to be completed and handed in to the teacher for grading (a fragment of the worksheet may be found in the Appendix).

Data from the beginning of the laboratory session, when the teacher, Lluïsa,⁴ gave instructions for the task before the students broke up into their groups, demonstrates how the teacher endeavors to get the students to place themselves in the imagined community of primary-school science teachers. In Fragment 1, which follows, she instructs them to formulate questions, not just about apples, but that they could ask primary-school children and, in turn, relate those questions to the goals of science education and think about the particular view of science that their questions reflect. In short, the students are required to put themselves in the role of science teachers and produce not just *science-student* discourse, but rather *science-teacher* discourse in the target language (English).

Fragment 1: What Can Students Learn from an Apple?⁵

1. Lluïsa: here we are at the second- in the second part of the session (.) a little bit late (..) so we have to be more on time\ (.) we\ (.) the first group does\ (.) the activity for today is- (.)

⁴All names of participants have been changed in order to protect their anonymity.

⁵Transcription conventions:

1. Intonation:
 - (a) Falling: \
 - (b) Rising: /
2. Pauses:
 - (a) Short: (.)
 - (b) Long: (..)
3. Overlapping: [text]
4. Latching: =
5. Interruption: text-
6. Lengthening of a sound: text:
7. LOUD
8. "soft"
9. <slow>
10. >fast<
11. Transcriber's comments: ((text))
12. Incomprehensible fragment: XXXX
13. Unidentified speaker: ?
14. Languages
 - (a) *Spanish*
 - (b) **Catalan**
 - (c) *Could be Spanish or Catalan*
 - (d) English

do you have the handout with you/ (1.13) it's about (..) what can students learn FROM an apple\ (.) today we are going to observe apples\

2. ?: oh\ (.)

3. Lluïsa: but the purpose is not to know about apples but to reflect on the goals of science education\ (.) that's the title\ (.) so this is an activity that will help you THINK about what are the goals of science education\ (..) I'm going to read (.) for you\ (.) ok/ (..) science teachers like to teach the topic of FRUITS (.) in primary education\ (..) children are usually asked to take fruits from home and observe them in the classroom\ (..) there are many ways to teach science FROM an apple\ (1.5) this activity aims at helping you reflect on what are the goals of science education\ (.) while observing yourselves (1.46) an apple and thinking about the best questions to guide students' work\ (1.35) so what is the proposal/ (1.08) take three different apples and observe them carefully\ (.) so if there are two no matter if it's one it's one\ (.) take an apple and observe it\ (..) don't eat\ (..) it's not the time\ (.) you can eat this later but not at the beginning\ (1.02) write a list of good questions related to an apple you would like- you would ask children in a science classroom\ (.) °in primary education° ok/ (..) think about questions\ (1.73) you can do whatever you want with the apple\ (..) to think about questions you can(..) eh/ be as free as you want to do things with the apple\ (..) but the purpose is to write questions\ (..) then when you- once you have the list (..) read the list of specific goals of science education 5–12 (.) ATTACHED\ (.) and relate the- and relate the questions you have written with the goals\ (.) the goals are behind\ (.) so don't read these goals right now do this later\ (.) so to see what questions you can COME up with\ (..) so first you write the question\ (.) and then you read the list of goals and relate each question (..) to the goals (.) and see what goals have you been thinking (..) ok/ (..) and finally what view of science were your questions reflecting\ (.) this is the difficult part\ (..) this is not for now\ (.) this is for: ah: when you write the report\ (.) to think about\ (.) what were the questions (.) the idea of science the questions reflect\ (2.67)

The participants begin the group work task by negotiating what the task entails and then completing the first part of their handouts, which involves observing and describing the apples. The following sequence, which we have broken down into short fragments (2–7) for ease of analysis, takes place when the participants are working on the second task on their handout and are formulating their fourth question to ask primary-school children about the apples. It begins with one group member, Sandra, rereading the instructions. The students are seated, clockwise, in the following order: Monica, Laia, Sandra, Sergi, Maria.

Fragment 2: The “Reproduction” of Apples (1)

1. sandra: ((reading) write a list of good questions\)\ (.) hmm (.)
2. sergi: e::h (.)
3. laia: why:: o:ne apple reproduce=



4. sandra: =how- how the apples hm::(..)



5. Sergi: grow/(..)



6. sandra: *se reproducen*\(.)

sandra: they reproduce\(.)

Once Sandra has reiterated the instructions about writing “a list of good questions,” Laia begins to formulate the first question (turn 3), but Sandra interrupts and partially formulates a different question (turn 4). She looks for consensus from Sergi, demonstrated by her eye contact and body position, while at the same time, through gesture, requests the needed word. Sergi proposes a word, with a rising intonation, looking for confirmation that his proposal is indeed the word Sandra was expecting. Instead, Sandra proposes another word in Spanish (turns 3 to 6). The code-switch by Sandra in turn 6 moves the interaction from the central activity of writing questions as imagined primary-school science teachers—an activity predominantly carried out in English—to a metalinguistic activity of translating the Spanish words “se reproducen.” This code-switch, therefore, also makes one of the norms of membership in the immediately tangible student group salient. That is, in the imagined community of science teachers, English is the working language (although it goes without saying that plurilingualism-in-use might also find its way into their imagined classrooms, as it has into this “real” one). On the other hand, in the student group the norm is that several languages are at the disposal of participants to get the task done and to negotiate difficulties as they arise in the interaction. A similar argument was made by Masats, Nussbaum, and Unamuno (2007), who explored the language practices displayed in a bilingual socioeducational milieu by 3 dyads of English learners while carrying out oral communicative pair-work at a primary school in Barcelona. Their analyses indicated that learners’ choice of linguistic code was related to the local linguistic norms of the community of practices they belonged to.

A new activity sequence is opened in Fragment 3 following a loud noise in the classroom.

Fragment 3: The “Reproduction” of Apples (2)

((there is a very loud noise, they all look to where it came from)



7. all: ((laughing))
8. sergi: oh oh\(.)
9. sandra: ((laughing) **quin susto**\(..))
sandra: ((laughing) what a fright\(..))



10. sergi: don't frighten me\(.)
11. all: ((laughing))



12. sandra: ((laughing) *°qué caradura\º*\(..))
sandra: ((laughing) *°what a cheek\º*\(..))



13. sergi: e:h [excuse me\(.)
14. sandra: [how many-(.) how the apple:s hm=
15. laia: =o:r how many parts have the apples/(.)



16. sergi: how many pa:rts the apples have/(..)



17. laia: thank you for\(.)



18. sandra: how many: (.)



19. sergi: parts\=

20. sandra: =parts\(.) can ((*kæn*)) you identify\(..)

21. ?: the apples have\(.)

22. laia: can ((*kan*)) you identify\(.)



23. sandra: you identify\(.. .)



24. sandra: an apple/(.. .)

25. laia: in an (..)

First, the noise provokes laughing, an exclamation from Sergi, and a comment by Sandra in turn 9 in Catalan. In this case, Sandra's code-switch is linked to a change in activity from writing questions to joking around about the noise. Sergi comments in English in turn 10 in a joking tone, "don't frighten me," to which all the participants respond by laughing. In turn 12, with a similarly light tone, Sandra tells Sergi he is cheeky and Sergi jokingly apologizes (turn 13). This sequence, in which the participants temporarily move out of their imagined future teacher roles and into roles as members of the immediate student group, again demonstrates the norm in the group that multiple languages may act as resources in the local management of discourse and in contrasting activities. Once Sergi has apologized (turn 13), the participants engage once more as members of the imagined community of science teachers and the interaction continues with the activity of constructing questions. However, there is tension between Sandra and Laia to impose their formulations, looking toward Sergi for consensus and thus legitimizing his central role within the immediate student group.

After the question proposed by Laia has been finished, Sandra goes on to recover her original proposal (turn 26), which had to do with the "reproduction" of apples, with the topic change discursively marked by her "now" in turn 26. Laia's laugh in turn 29 suggests the term may be awkward, as does Sergi's "e::h" in turn 30. In turns 28 and 32, Sandra modifies "the reproduction" to "the way of reproducing," but still unsure of the appropriate formulation of the concept she draws on Spanish to request help from her peers at the end of turn 32.

Fragment 4: The “Reproduction” of Apples (3)

26. sandra: NOW\(.) the repro-(.)



27. laia: °sí\(.)

laia: °yes\(.)

28. sandra: the [way of reproducing\(.)



29. laia: [sí XXXX\(.) ((laughs))

laia: [yes XXXX\(.) ((laughs))

30. Sergi: e:h(.)

31. laia: ((laughs))

32. sandra: the way of reproducing\(.) or: the way of(..) °tu sabes/(.)
XXXX\(.)

sandra: the way of reproducing\(.) or: the way of(..) °do you
know/(.) XXXX\(.)



33. Sergi: hm:(..)

34. maria: **com creixen\(.)**

maria: how they grow\(.)



35. sandra: how grow up\(.) how the apples reproduce\(.)

36. laia: grow\(.)



37. sandra: they\(.) °es que no sé cómo decirlo°\(..)

sandra: they\(.) °it's that I don't know how to say it°\(..)

38. sergi: ((sergi leans over, takes the recorder and speaks into it)
com es diu reproduir\(.)

sergi: ((sergi leans over, takes the recorder and speaks into it)
how do you say reproduce\(.)



39. all: ((laugh))

40. sandra: ((laughing) *es* reproduce\(.) [es reproduce\()

sandra: ((laughing) it's reproduce\(.) [it's reproduce\()

41. sergi: [how- how do the apples
reproduce\(.)



42. sandra: *es* reproduce\(.)

sandra: it's reproduce\(.)

The interaction thus moves into a metalinguistic activity dealing with the difficulty in expressing the idea of the “reproduction” of apples. In turn 34, Maria introduces an alternative, in Catalan. Sandra switches back to English in the following turn, opting for her original (although modified) question using the word “reproduce.” In turn 36, Laia retakes “grow.” In turn 37, Sandra offers “they” although she doubts as to how to continue, again switching to Spanish to request help with a language-related difficulty. After a silence, Sergi takes the voice recorder off the table and asks a question directly into the recorder, in Catalan. After laughter, Sandra asserts that “reproduce” is the correct term. In turn 41, Sergi offers “how do the apples reproduce” with rising intonation, which is accepted by Sandra in turn 42, who reaffirms both that the correct term is “reproduce” and legitimizes Sergi in his central role in the group.

In the above fragment, we can observe how a language problem is overcome in interaction, an interaction that moves between the central activity of writing questions as imagined future teachers, in which English is the dominant (official) language, and lateral “student” sequences of solving language related difficulties, making jokes, and managing a discourse in which an array of verbal and nonverbal resources are drawn on. The above sequences also suggest that content learning is highly integrated with language learning, as the participants’ problem seemed to be not only how to word the question, but also how to word the concept of the growth cycle of an apple. This subject-related work endures in the following fragment, which begins with Maria seeking clarification as to whether or not “reproduce” is the correct term to write down (turn 43):

Fragment 5: The “Reproduction” of Apples (4)

43. maria: reproduce/ =

44. sergi: =itself/ (.)

45. sandra: *es lo que te decía*\(.)
sandra: it's what I was telling you\(.)



46. sergi: ((all writing) <ho:w
47. sergi: do:=
48. maria: =**no es tracta de traduir-ho**=
maria: =it's not about of translating it=

49. sergi: =the: apples: (.) repro- repro:>
50. sandra: how do the apples\(.)



51. laia: how do the apples/(.)
52. sergi: themselves/(.)
53. maria: reproduce themselves\(.))



54. sandra: *queda muy mal esto de* [themselves *aquí*/
sandra: does it fit really badly this [themselves here/
55. laia: [sí\(.) how do the apples-
laia: [yes\(.) how do the apples-



56. sandra: *xxx es una cosa\(.) no no no es* themselves\(.)
sandra: xxx it's a thing\(.) no no it's not themselves\(.)
57. maria: itself\(.)



58. sandra: *si no es* themselves [*pero XXXX*
sandra: if it's not themselves [but XXXX

59. sergi:

[it's- it's themselves\(.)



60. sandra: *ya pero-*

sandra: yeah but-

61. sergi: it's themselves\(.) [ai::



62. sandra: [pero que no se reproducen xxx (..) que no se reproducen themselves\(..)

sandra: [but they don't reproduce themselves xxx (..) they don't reproduce themselves\(..)

63. sergi: no\(.) [y qué hacen\]

sergi: no\(.) [and what do they do\]



64. sandra: [how do the apples reproduce *ya está\(.) or grew or grow\(.)*

sandra: [how do the apples reproduce that's it\(.) or grew or grow\(.)



65. laia: *o themselves yen parentesis\ (..)*

laia: or themselves and in brackets\(..)

In Fragment 5, we can observe how a problem with the translation of the Spanish (reproducirse) or Catalan (reprodir-se) reflexive verb leads to an extended discussion over whether the verb should be reflexive or not in English. However, in addition to this metalinguistic activity, the participants are bringing into play their knowledge of science. In other words, the problem is not only the verb, but also whether apples in fact reproduce themselves, if they simply grow, and so on. In turn 62, Sandra makes this clear to her peers, telling them that apples do not reproduce themselves ("que no se reproducen themselves"). In turn 63 Sergi asks her to explain what they do, to which Sandra replies in turn 64 that they just reproduce; they do not reproduce *themselves*. She provides another linguistic option to express the concept, being that they *grow*. Laia, in turn 65, suggests putting "themselves" in brackets. This suggestion is evidence of her awareness that her role as a teacher is an imagined one; after all, the task is a classroom one and the finality of the questions is to hand them in to the "real" teacher for correction.

The sequence continues in turn 66 with Sergi suggesting another option, referring to the “parts of the growing”; that is, he seems to consider the problem unsolved. Maria seems to be content with the outcome of the discussion and tries to change the topic in the following turn, marked by her “that’s it.” However, in turn 68 Laia begins to suggest another way of starting the question but is interrupted by Sandra who asks Sergi for clarification of his previous turn, laughing.

Fragment 6: The “Reproduction” of Apples (5)

66. sergi: what are the parts of the growing of the apple/(.)



67. maria: **ja està:**\(.)

maria: that's i:t\(.)

68. laia: what do you know about-

69. sandra: *dónde/* ((laughs))

sandra: where/ ((laughs))



70. sergi: *cuáles son las partes/*=

sergi: what are the parts/=

71. sandra: =ya ya\=

sandra: yeah yeah

72. sergi: =*del crecimiento de la manzana/*(.) *primero es una flor/*(.) *y todo eso*(.)

sergi: of the growing of the apple/(.) first it's a flower/(.) and all that/(.)

73. laia: *cuál es el proceso*=

laia: what is the process\=



74. sandra: =XXXX (.)

75. sergi: *primero se hace la flor/*(.)

sergi: first the flower is made/(.)

76. sandra: XX the seeds (.) and the:n [we can go: with the water\

((watering action))



77. laia: [first of all grow the *flor y cuando la [flor/*
laia: first of all grow the flower and when the [flower/



78. sergi: [no:\(.) at the: (.) at the: *melocotón(.) at the peach\(.)*
sergi: [no:\(.) at the: at the: peach(.) at the peach\(.)



79. sandra: ah yes\(.)
80. sergi: ((to the recorder, stylised) PEACH\(.) PEACH\(.)



81. sandra: ((laughs))



82. sergi: at the peach\(.)
83. sandra: *y almendras\(..)*
sandra: and almonds\(..)



84. sergi: ((to recorder) eh the ALMOND\(.) almond\(.)



85. girls: ((laugh))



86. sergi: ((to recorder) eh Magnum almond\(.)
87. girls: ((laugh))



Sergi responds to Sandra's doubt in turns 70 and 72 and goes on to explain the process of the growth of apples. However, Laia provides a more scientific way of expressing this concept in turn 73, demonstrating an awareness of what counts for her as appropriate *science-teacher* discourse. This discussion continues over the following turns, with Sergi comparing the growth process of apples with that of peaches and almonds at the end of the excerpt. Interestingly, in turns 80, 84, and 86, Sergi again speaks directly into the voice recorder, but this time in English, as he jokes about the pronunciation of "peach" and "almond" (turns 80 and 84) and, reacting to the laughter from the girls, explains how he knows the word "almond" (turn 86). This joking from Sergi continues over the following turns, with Sandra switching to Spanish in turn 88m in an unsuccessful attempt to get her peers back onto the central activity of writing the question.

Fragment 7: The "Reproduction" of Apples (6)

88. sandra: *a ver\(.) no va en serio\(.)* how do(.) the apples-
sandra: let's see\(.) no come on seriously\(.) how do(.) the apples-



89. sergi: I LEARN EATING ICE CREAMS\(.)
90. laia: yes yes\=



91. sandra: ((laughing) =(Magnum xx)\(.)



92. sergi: Magnum almond\(..)
93. sergi: ((to recorder) [you know/])
94. ?: [almond\(.)

95. sandra: how do the apples reproduce\(.) **va\(.)**
sandra: how do the apples reproduce\(.) come on\(.)



96. sergi: ((adjusting chair) I'm very tall\(..) down down down
down\(.) down down down\(.))



97. maria: XXXXX (.)
98. sandra: another one\(.)



99. maria: **sí però al final com hem quedat\(.)**
maria: yes but in the end what have we agreed on\(.)



100. sandra: how do the apples reproduce\(.)
101. laia: XXXX



102. sandra: *es que* XXXX-
sandra: the thing is that-



103. maria: XXXX(.)
104. sandra: *el* themselves *para mí no me-*
sandra: the themselves for me doesn't-

105. laia: **el** themselves **jo l'he posat en parèntesi**(.)
laia: the themselves I've put it in parentheses(.)



In turn 95, Sandra again attempts to get her peers back on task by saying the question as it has been formulated and then switching to Spanish/Catalan to mark a change of activity at the end of the turn. Sergi continues to joke around in English, adjusting his chair in the following turn. However, Sandra keeps the interaction moving, prompting another question from her peers in turn 98. Maria seeks clarification in turn 99, asking her peers in Catalan what they had decided on in the end. Sandra explains that she had written just “how do the apples reproduce,” whereas Laia had written “themselves” in parentheses. In fact, the students’ completed worksheets, collected after the activity, reflected 3 different ways of formulating the question adopted by the students: “how do the apples reproduce” (Maria and Sandra); “how do the apples reproduce themselves” (Sergi); and “how do the apples reproduce (themselves)” (Monica and Laia). Despite their lengthy discussion about what they deem more appropriate ways of phrasing the concept they wanted to ask about in English (the process, growth, etc.), this is not reflected in what they handed in at the end. One explanation for this may be that students were writing throughout the sequence and had already written down their questions before the end of the discussion.

DISCUSSION

On Language and Subject Knowledge

In the classroom group-work sequence presented above, the problem that emerges as a result of the translation of *reproducirse* in Spanish and *reproduuir-se* in Catalan into English at first problematizes students’ knowledge of the L2. However, their knowledge of the subject is soon brought into focus as they discuss whether apples do indeed reproduce (itself/themselves) or whether they just “grow,” and whether this “process” is similar or not to that undergone by other fruit trees. Our data, therefore, provides evidence that the acquisition of linguistic and nonlinguistic knowledge is highly integrated. As Lantolf and Thorne (2006, p. 5) write: “Learning a new language is about much more than acquiring new signifiers for already given signifieds. . . . It is about acquiring new conceptual knowledge and/or modifying already existing knowledge as a way of re-mediating one’s interaction with the world and with one’s own psychological functioning.” For these authors, *linguistic form* and *meaning* are dialectically dependent upon one another, and this argument is well supported by our data.

However, in this negotiation of form and meaning, talk, or discourse, is a central element as both a vehicle for learning and, in the case of the L2, one of the objects of learning, as the group members explore how to ask about the growth of apples in an English they deem appropriate for primary-school science teachers. In this regard, the work by Gajo (2007) is of particular interest to us. For him, “discourse is structured by both the subject and the linguistic paradigms, which

are at the same time structured by it. Knowledge is shaped in this complex interrelation" (Gajo, 2007, p. 568). Gajo (2007) proposes that mediation is about putting subject knowledge into discourse, and about breaking down the *density* of the discourse. Re-mediation, similar to the argument by Lantolf and Thorne (2006), mentioned earlier, is for Gajo (2007) about dealing with the *opacity* of the discourse, or with the metalinguistic aspects.

What is of particular interest to this research is the role that plurilingual verbal repertoires play in the local sequential organization of the interaction and in the collaborative construction of science-teacher discourse in a foreign language. Our data lead us to hypothesize that by having 3 languages available to them, the participants in the interaction had more resources at hand for solving the problems that emerged in the interaction and for problematizing the "signified" and the "signifiers," to use terminology from Lantolf and Thorne (2006, p. 5), than if they had had only one language. Such a claim is in line with code-switching studies by Auer (1984; 1998), Gumperz (1982), and Gajo (2007) among others.

On Membership

The participants in the group interaction we analyze are dynamically and simultaneously doing "being students" (members of the immediate community), to use terminology from Sacks (1994) and doing "being teachers" (members of their imagined community). The participants negotiate roles in the immediate student group interaction (e.g., turn taking, legitimization of turns, introduction or change of topics, roles of expert/joker, etc.). Sergi takes on a central role in the group, especially through his use of humor, as do Laia and Sandra, although their turns at talk and their contributions themselves are often legitimized verbally and nonverbally by Sergi, especially through eye contact and by body position. Maria and Monica, although having more peripheral forms of participation, do orient and align to the interaction, by looking at their fellow group members, smiling, laughing, following the conversation, and taking down notes. That is, participation in the immediate student group is legitimized both by verbal and nonverbal actions to varying degrees (Goodwin, 2000; Goodwin & Goodwin, 2004; Olsher, 2004; Veronesi, 2004; Mondada, 2007).

The participants also show evidence of aligning to the imagined community of primary-school science teachers, formulating what they consider appropriate questions to ask primary-school children as their teacher had instructed them to do. As discussed in the previous section, in negotiating linguistic form and subject meaning, the participants also negotiate what is for them appropriate science-teacher discourse (e.g., "reproduce" vs. "grow"; "the parts of the growing" vs. "the process"). Thus, their imagined community of primary-school science teachers may indeed be a motivation for their actions in the present, as Norton and her colleagues claim (Norton 2001; Kanno & Norton, 2003; Norton & Toohey, 2004).

Significantly, the participants' shared multilingual verbal repertoire acted as a powerful resource in the construction of community membership. On the one hand, to be a competent member of the classroom and of the imagined community of science teachers meant being able to carry out certain tasks in English, such as writing what are for them appropriate questions for imagined primary-school children, speaking in open class discussions, doing the readings, handing in assignments, and so forth. Yet, on the other hand, our analyses show that being a participant in the local interaction on which we focus our discussion also required sharing a plurilingual verbal repertoire (English, Catalan, and Spanish) and being able to mobilize multiple languages

(Masats, Nussbaum, & Unamuno, 2007) and other embodied resources (Goodwin, 2000; Goodwin & Goodwin, 2004; Olsher, 2004; Veronesi, 2004; Mondada, 2007) contingently as communicative resources in the sequential organization of the interaction—that is, to joke around, to change topics, to shift from the central activity of writing questions in English to lateral sequences in which linguistic and subject knowledge and appropriate science-teacher discourse were problematized.

FINAL REMARKS

Although the shift in European higher education toward teaching nonlanguage subjects through the medium of a foreign language would appear to favor monolingual practices and be detrimental to local languages, our data reveal that participants' plurilingual repertoires can flourish in classroom interaction, creating a favorable framework for performing a range of activities that would seem to enrich the collective learning process. Such activities include metalinguistic reflection, problematizing and negotiating nonlinguistic knowledge, and constructing appropriate discourse from the point of view of the participants. We have also demonstrated how plurilingualism contributes to the local organization of the interaction and to the dynamic and simultaneous negotiation of membership in immediate and imagined communities.

Internationalization of higher education and the increasing use of a foreign language—alongside local ones—as a vehicle for teaching/learning nonlanguage subjects bring to the forefront the idea of teachers' and students' language competence. Our analysis suggests that using several languages in the same communicative event causes no problems for the participants. However, the competence displayed by the participants does not fit easily into traditional models of language competence based on idealizations of the monolingual native speaker. Over the past couple of decades, work in several language-related fields (SLA, Applied Linguistics, Conversation Analysis, Interactional Sociolinguistics, etc.) have begun to deconstruct some of the taken-for-granted conceptualizations such as the native versus nonnative speaker, the language learner, and so forth. New conceptualizations of language *users*, such as the concept of multicompetence proposed by Cook (1991; see also Hall, Cheng, & Carlson, 2006; Cook, 2007; Guasch & Nussbaum, 2007), in which plurilingual repertoires can be understood as a communicative resource, offer great promise for the future and provide a better model for describing language competences such as those observed in our data.

Likewise, the concept of community of practice is also a useful one for understanding the role of different languages, as well as nonverbal elements such as those analyzed in this article, in the organization of multilingual communities. Hall, Cheng, and Carlson (2006, p. 232) argue that

locating theoretical and conceptual concerns with language knowledge in communities of practice rather than in groups defined by language codes moves the focus away from a-contextual language systems and toward communicative activities comprising particular communities of practice. Likewise, it defines individual language knowledge not in terms of abstract system components but as communicative repertoires—conventionalized constellations of semiotic resources for taking action—that are shaped by the particular practices in which individuals engage, be they interpersonal . . . or intrapersonal.

With universities in Europe becoming more and more multilingual, not just through innovative teaching/learning practices such as we have described here, but also through immigration, they face the challenge of finding ways to make the most of their linguistic capital. Further descriptive research, such as that presented here, is needed to better support the argument in favor of multilingualism as a teaching/learning resource. However, our research should not stop at the level of description, but should aim at action, by working with decision makers and teachers to find innovative ways of making plurilingual classrooms work. This is one of the aims of our work in the DYLAN project.

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APPENDIX: TASK HANDOUT

LABWORK ACTIVITY N° 2: WHAT CAN STUDENTS LEARN FROM AN APPLE?: THE GOALS OF SCIENCE EDUCATION

Science teachers like to teach the topic of fruits in primary education. Children are usually asked to take fruits from home and observe them. There are many ways to teach science from an apple. This activity aims at helping you reflect on what are the goals of science education while observing yourselves an apple an thinking about the best questions to guide students’ work.

- Take three different apples and observe them carefully
- Write a list of good questions related to an apple you would ask children in a science classroom
- Read the list of “Specific Goals of Science Education 5–12” attached and relate the questions you have written to those goals.
- What view of science were your questions reflecting?

Questions about an apple	Goals