13 The adventure of moving mathematics teacher education forward

A commentary

Núria Planas

What is the adventure?

The gap between the worlds of academic research and school practice has been treated from a diversity of theories and cultures of mathematical pedagogy (Adler, 2005; García, Sánchez, Escudero, & Llinares, 2006; Jaworski, 1998; Krainer & Zehetmeier, 2013; Lubienski, 2008). In a context in which the study of barriers between research and practice in mathematics teacher education is a major topic, the argument by Kieran, Krainer and Shaughnessy (2013) for more research on how to interact in ways that lead to positive synergies is very relevant:

The challenge now for all of us in the international mathematics education community is to consider how further to promote and systematize collaborative research work among teachers, with or without university researchers [. . .] A case can be made that all countries should consider implementing a systematic integration of linked research and practice.

(p. 388)

In this fourth part of this book, the contributions by other authors to the volume are viewed as belonging to the shared adventure of moving mathematics teacher education forward. The discussion of the shared adventure by different expeditions with different travellers, and of the learning attained, brings up a variety of teacher education processes and positive synergies. From my knowledge of the work on these expeditions, I believe that their travellers have important things to say about mathematics teacher education. First, a focus on gaps and deficiencies is replaced with a more refined language with a focus on challenges and performance. In this way, instead of sending an incomplete message on what has not been achieved in the work with teachers, a number of positive synergies achieved are outlined. Some of these synergies are addressed by Adler and Ronda in Chapter 8, who present a delicate elaboration of the many learning possibilities and outcomes involved in their teacher development activity.

To focus on synergies between research and practice, this commentary chapter draws on progress from collaborative research work with mathematics teachers and university researchers in Barcelona, Catalonia Spain. The professional
development initiative with teachers of multilingual classrooms in the Critical Mathematics Education (CME) Project are part of the shared adventure, and can be seen as a particular expedition in which I am one of the travellers. Although Catalonia is different from South Africa in many senses (see Adler & Pillay, Chapter 1, and Essien, Chitera, & Planas, 2015), the schools and teachers involved in the CME experience challenges and performances similar to those of School M and Teacher T in Gauteng (see Adler & Pillay, Chapter 2).

Next, I introduce the participants and activities in the CME Project. I then highlight one key tension concerning issues of expertise that was soon detected and from which I have learned a great deal. I discuss the productive nature of this tension through data from professional development work, and argue how it has contributed to creating classroom discourse research as a common site for the integration of different areas of expertise. I take data from a lesson taught by Teacher C in School B in CME to develop the argument, among others, that discourse research on lesson events provides teachers and researchers with a tool for collaborative inquiry into mathematics learning opportunities – opportunities for mathematics learning generated in the course of classroom interaction (Planas, 2014). I conclude with the idea that different expeditions are necessary to explore newer horizons in mathematics teacher education.

A teacher, a lesson and a classroom event at School B have been selected because most of the learners' dominant language is not the language of instruction, the school is located in a high-poverty neighbourhood, and also because it is the setting that I know best. I was a mathematics teacher and an action researcher in School B for some years. Teacher C arrived after I had left the school to become a PhD student and work as an assistant professor of mathematics education at a university.

**Travellers and milestones of a particular expedition**

With respect to how they deal with mathematics teacher education research, the Wits Maths Connect Secondary (WMCS) Project and the CME Project can both be seen as learning expeditions for the same adventure. CME is also a collaborative research and development project for secondary mathematics education. It is located in Barcelona, the capital city of Catalonia, a region in the north-east of Spain where Catalan is the language of instruction and where most people use Catalan and Spanish daily.

The CME Project originated to examine forms of improving the mathematics learning of language minority students in school contexts of poverty. It was set up in 2005 for 4 years in lower secondary classrooms. In 2008, it was extended for a further 7 years and into upper secondary classrooms. To date, the project has been carried out in a range of multilingual classrooms from Grades 7 to 10 in seven urban public schools. Overall and over the years, a total of 22 teachers and 5 researchers have participated in the three successive professional development programmes (see Planas & Civil, 2009, 2010, for details of the first two programmes). The related professional development model considers teachers as co-researchers of their teaching and learning in ways that attempt to broaden their knowledge, while questioning and reconstructing classroom practices through a design research approach in the work with researchers. It is a model that privileges collaborative group work by teachers and researchers. Here, group work mainly consists of discussing pedagogies for teaching particular topics of secondary mathematics education, implementing some of the newer pedagogies discussed in classrooms of the teachers in the team, and evaluating their impact on the creation of mathematics learning opportunities.

Moreover, our professional development model adds a further set of content for discussion, since we attempt to bring together the analysis of classroom designs and mathematical pedagogies with that of language issues and communication on practical and theoretical levels. In the case of the classrooms of the teachers in the team, on a practical level our discussions, for instance, include attention to the fact that most learners who are late arrivals or who come from first-generation immigrant families are in the process of learning Catalan, while sometimes (i.e. non–Latin American origins) they are in the process of learning Spanish too. On a theoretical level, the researchers introduce some of the main ideas of empirical studies in the domain of multilingual mathematics education.

The work by Cummins (1984), for instance, is briefly discussed to show that it takes 2–3 years to become proficient in basic communication skills in a language other than the home language. The work by Setati (2005) is also discussed to show that the students' home languages can be powerful pedagogic resources in mathematics learning.

Over all these years, what we have accomplished and discussed in group work has framed and has been framed by how different travellers see each other and themselves, and by how either teachers or researchers enact expertise within the team. The progressive construction of common sites where different areas of expertise could be shared has required deep reflection on what we regard as knowledge. In the project, knowledge (and related expertise) is taken as professional knowledge. It can thus consist of academic knowledge for someone whose profession is to investigate mathematics education. It can also consist of practical knowledge for someone whose profession is to teach school mathematics. None of these forms of knowledge is elevated above the other. In the very beginning, however, some participants referred to expertise in rather exclusive ways, somehow suggesting the incompatibility of teaching and research. The emergence of this tension led to a search for sites with potential for sharing expertise in the context of group work meetings. For this purpose, in March 2007 the team of researchers introduced the discussion of video-clips of lesson events. Since then, these events have come from the collection of lessons involved in the practical work of planning, implementing and evaluating newer pedagogies. The selection of events is carried out by the researchers on the basis of their expertise in the domain of multilingual mathematics education. Each month a video-clip, for which the researchers have detected breakdowns in verbal communication during the students' mathematical activity, is proposed for discussion with the teachers. At the time of group work, the teacher expertise helps to introduce a number of
considerations about the role of the teacher and the teaching in the analysis of breakdowns in communication. All in all, the implementation of the new joint activity concerning video-clips has become an important moment in the engagement of teachers and researchers in sharing expertise.

The experience of the bridge to the other side

Elsewhere, Adler (2013) has described many dilemmas and tensions at play in the course of collaborative professional development. Even when there is a great deal of synergy among participants, tensions emerge about the perception of different areas of expertise for teachers and researchers. In this section I explain some of the forms in which this tension has been expressed over time in the context of CME, some of the ways in which it has been managed, and one major opportunity that has come from dealing with it: the inclusion of collaborative classroom discourse research as a regular activity in the development programme.

An instance of data in 2005 shows an early expression of the tension on expertise. Teacher 1, a participant in the first professional development programme, had been involved in group work with teachers and researchers for 3 months. Moreover, I had visited his Grade 8 classroom to observe what he had called in a group work meeting “the immigrant learners’ lower participation in mathematics”. During a conversation in one of my visits to his school, he mentioned the existence of different sites (“sides”) of expertise for teachers and researchers in this way:

TEACHER 1: I like working with people like you [Núria] and reflecting on what can be done from that. We, the teachers, support learners in classes. It’s nice that someone with expertise supports those who support learners. It’s difficult to meet though. There is a sort of bridge to the other side that needs to be crossed. We may move a bit but we know our side.

When planning the goals of the project, I talked about building bridges between school practice and academic research. At that stage, I had not anticipated how problematic the metaphor of the bridge could be, and the extent to which it could point to distances instead of common sites. It took me time to give precise meaning to the words by Teacher 1 in reference to what these words might be telling us about the complex dialectical nature of the collaboration between teachers and researchers. Although Teacher 1 was generally positive about the work with the researchers in the team and the participation in the meetings, his emphasis had been on the divide of expertise. Such an emphasis accounted for a certain division of labour. It also carried with it the implicit enactment of differential roles represented through a number of dichotomies such as practitioner (in supporting learners in classes)/thinker (in supporting those who support learners). Teacher 1 might not be unique in this, since other teachers could be experiencing analogous distances within the team.

In 2006, the team of researchers initiated some attempts to address issues of expertise in order to turn the experience of the tension into a developmental tool. One of the strategies was to integrate direct questions into group work, such as: What is special about us collaborating? What does collaboration do for all of us? What can we learn from each other? These types of questions have been regularly posed in relation to the learning and teaching of the mathematical topic at hand, so that different contents of discussion become salient and change in their level of relevance over the course of the meeting. The following conversation in February 2006 illustrates this dynamic well:

NÚRIA: Umm . . . algebra . . . so . . . why are we here today?
TEACHER 2: Well, you said it, algebra. It’s good to know more about it.
NÚRIA: Yes, we’ll be talking about algebra today. But tell me, what is special about us collaborating on what we know about school algebra?
TEACHER 3: We can tell you about curricula, classrooms, notebooks, learners’ difficulties with algebra . . . That’s what we look at every day.
NÚRIA: Good. What can I tell you?
TEACHER 2: You look at studies of good teaching of algebra, what is known about algebra in classrooms.
TEACHER 3: So you tell us what you know about good teaching, and we’ll tell you what happens in our classrooms.
TEACHER 2: Shall we start sharing?

The distinction made that day between “classrooms” and “our classrooms” suggests another expression of the tension about expertise in the context of CME. The preceding conversation reveals the extent to which the diverse ways of understanding this tension have acted as productive forces rather than disturbing elements even before the new activity concerning video-clips was introduced in the development programme. This productive dimension can be traced to the dialectical relationship between, on the one hand, the perception of separate sites for the divide of expertise (e.g. the exclusive you and us in “You tell us what you know”) and on the other hand, the imagination of common sites for sharing expertise (e.g. the inclusive we in “Shall we start sharing?”).

Once the new activity was introduced, more subtle expressions of the tension came into play. Changes in the programme had been considered as a way to trigger changes in the relationships within the team. Nevertheless, the new activity was just one more among the other joint activities in the programme in which teachers and researchers continued to experience the many complexities of their collaboration. After watching a video-clip on the teaching of a concept definition for polynomials, in March 2008 Teacher 4 (the teacher in that video) raised one more variation on the tension:

TEACHER 4: We have been formally defining polynomials for years to learners, and we have been struggling with it too. The definition is in the textbook and we are expected to teach it, but what about the many
conflicts that it brings to learning the concept? None of us seems to have a final solution, right? Shall we think of tasks that can precede the formal definition?

Similar to Teachers 2 and 3, here Teacher 4 uses we and us with competing meanings. “None of us seems to have a final solution” refers to teachers and researchers involved in group work that day. It is all of them who are invited, by means of an inclusive we, to think of classroom tasks together to prepare students for the definition of polynomials. All participants are thus recognised as potential contributors to the challenge of teaching polynomials. This happens along with the recognition of differences within the team of teachers and researchers (“We have been formally defining polynomials for years to learners”, “We have been struggling with it”). What Teacher 4 said during the group work meeting, and what other teachers said in other settings of collaboration with the researchers in the team, is certainly a product of the many situations and activities created within the context of the project, but not only this. The teachers and researchers in the team may have other past and present experiences of collaboration outside CME. Furthermore, and particularly in the case of the teachers, their historically dominant construction as objects (of study) in mathematics teacher education research cannot be ignored in the interpretation of what they say and why.

Learning together from the classroom filmography

For the illustration of collaborative work on classroom discourse, I take an algebra lesson in 2010 with Teacher C and multilingual eighth graders in School B. The teaching was primarily in Catalan due to the language policy in the country. There were 11 students out of 26 who had been enrolled in the local school system for less than three years but more than one. Their home languages were Spanish (two learners from Colombia and one from Argentina), Arabic (five from Morocco), and Urdu (one learner from Pakistan and two others born to Pakistani families who had first immigrated to non-Catalan regions of Spain). The problems and the lesson dynamics had been designed in regular group work. At that stage of the development programme, the teachers had discussed with the researchers the norms operating in their classrooms and had agreed to introduce shifts that would foster collective reasoning. Visits to schools and observation of lessons had shown that individual work, textbook reading and reasoning modelled by the teacher were common practices.

Next I present the lesson, the interview with Teacher C about it, and the activity on an event in that lesson for group work. For many reasons, both the preparatory and the developmental work are similar to what was undertaken in the WMCS Project in their Lesson Study work (see Adler & Ronda, Chapter 8). Particularly for the construction of video-clips, in CME the researchers also split individual lessons of the teachers in the team into significant events. The criterion of significance is here first assessed by the researchers. It points to the detection of language issues linkable to breakdowns in communication, with inerible consequences in the creation of mathematics learning opportunities. In May 2013 the set of video-clips, together with the related activities, were called “our classroom filmography” by one of the teachers. This is a metaphor that points to the developmental role that the use of video-clips (“films”) is playing in many senses. Joint discussion about films has become a way of refining the understanding of mathematics teaching, learning and communication, by making researchers and teachers more reflexive and aware of a variety of practical and theoretical perspectives.

The lesson event and its significance

In the lesson selected, as part of the algebra unit initiated, Teacher C wanted her students to work on the construction and manipulation of algebraic expressions. She gave them three short word problems to solve in small groups, and said that answers to problems should be written by and discussed in the whole group at the end of the session. Of the six groups, one of them had three boys whose home language was Urdu (Adnan, Bilal and Haroon) and a girl (Maria), whose home language was Catalan.1 The first two problems were contextualised in the pedagogical tradition of realistic mathematics, while the third was posed in formal mathematical language, If $1/x = 6$, what is the value of $1/(x+3)$? Whole class interaction began with the discussion of the first problem:

Two knitted gloves use one ball of wool each. Saul buys $b$ balls of wool and at the end of the day finishes his pair. Does he have enough wool to knit two more gloves?

When Teacher C asked for someone to volunteer, Maria said that in her group they had figured out that Saul had $b - 2$ balls of wool left. She added that they could not know whether Saul could knit more gloves because they had not been told the numerical value of $b$. Maria argued that she had proposed to the group the invention of a value for $b$, but Adnan had rejected the initiative. The teacher’s question to Adnan about his proposal began an interaction concerning numerical intervals that took place in Spanish (italicized in the following transcript) and Catalan:

1. **ADNAN**: Necesita tener més de dos ... més de tres. *Al menos cuatro.* [He needs to have more than two ... more than three. *At least four.*]
2. **TEACHER C**: La $b$ ha de ser quatre o més gran? [*b* has to be four or greater?]
3. **ADNAN**: *Sí, b tiene que ser quatro o més gran.* [*Yes, b has to be four or greater.*]
4. **TEACHER C**: Doncs ho sabeu? Ho heu parlat en el grup, amb la Maria? [So you know it? Have you spoken about it in the group, with Maria?]
5. **ADNAN**: *Un poco, mientras ella hablaba de guantes de punt. [A little, while she spoke about knitted gloves.]*
6. **MARCIA**: Creu que enc gnats amb punts! Ho llegia així. [He believed they were gloves with dots! He read it like that.]
TEACHER C: D’acord, i això no el deixava resoldre el problema? [Alright, and this didn’t let him figure out the problem?]

MARIA: Ell parlava de moltes solucions i jo en volia fixar una. [He talked about many solutions and I wanted to determine one.]

TEACHER C: Bilan? Haroon? Vosaltres què diu sobre un únic valor per la $b$? [Bilam? Haroon? What do you say about only one value for $b$?]

BILAL: Como Adnan. [Like Adnan.]

MARIA: Tampoc sabien què són guants de punt. [They didn’t know what knitted gloves are either.]

For each lesson, the initial analysis by the team of researchers leads us to anticipate some of its significant events as well as some of the potential contents of professional learning in the developmental work with teachers concerning these events. From the analysis of the event of which the preceding transcript represents a part, learning how certain opportunities of mathematical communication can be missed by neglecting to talk and listen to other students in the class who have raised an interesting mathematical idea was anticipated. Here, “$b$ has to be four or greater” raises an idea whose potential is not exploited in the context of the problem resolution. The potential of this idea resides in that it brings to the fore the notion of an interval of numbers. Although there may be a number of intricate reasons involved in what happened that day in that classroom, the focus on the language of instruction and on its use seems to have triggered an interruption in the students’ mathematical discussion.

Knitting in Catalan is fer punt, which literally translates as “making dots/points”, and knitted gloves are guants de punt, which translates as “gloves of dots/points”. The original wording of the problem seems to have made Adnan think of gloves made of wool with drawn dots, as reported by Maria to the teacher when referring to what had happened in the small group. From the perspective of the problem resolution, Adnan mathematically modelled the proposed situation, and therefore whether the gloves are knitted or have dots does not actually matter. Nevertheless, the opportunity raised by this student to algebraically expand the arithmetic meanings for $b$ was interrupted by the focus introduced on the language of instruction. The video-clip shows that the opportunity that Maria missed was not picked up by Teacher C either. On calling attention to such an event, the purpose is not to blame the teacher or any student for the missed opportunity, but to use it to reflect on how to mould future situations.

Together with the initial analysis of each lesson by the team of researchers, an interview with the teacher in the lesson is conducted in order to revive the significance attributed to certain events and to more carefully anticipate contents of professional learning for developmental work on some of these events. In the interview with Teacher C at School B, I watched the minutes of the video with her with the whole class discussion in which the first problem was considered. I asked Teacher C whether she wanted to talk about any particular situation of that lesson. She said she was satisfied with the way the students had worked that day, and with how much they had been enjoying small group work. On this occasion, it was me who mentioned the interaction between Maria and Adnan for discussion of missed opportunities that are important in mathematics teaching and learning. The fact that by herself Teacher C would not have identified this event as being “significant”, at least not in the way the team of researchers did, points once more to the tension around expertise. This teacher, however, was aware of the whole class moment in the lesson when the language of instruction and its use had come into focus:

NÚRIA: Maria put the reading of the word problem at the forefront, the meaning of knitted gloves. She didn’t pay attention to the fact that Adnan knew how to solve the task.

TEACHER C: She is always fond of helping others. She always helps with vocabulary because there are so many languages in this class. Knitting is a bit weird.

NÚRIA: Do you think Adnan actually needed her help on that? Maybe it was Maria who needed his help with the intervals for $b$.

TEACHER C: If you don’t read the problem well, you are lucky if you solve it. Maria explained the wording, and they could use Spanish.

Teacher C referred to the flexible use of Catalan and Spanish and the active support for reading the wording of the problem as ways of helping Adnan in that lesson. She did not answer my question about who it was that needed help, nor did she recognise the mathematically important introduction by Adnan of the idea of an interval of numbers. I moved on to reflect on limiting language-based pedagogies of problem-solving for the precise purpose of bringing the unexploited learning opportunities to the fore. I could not, however, obtain clear evidence of Teacher C realising the criticality of the students’ (and the teacher’s) interaction in the development of the mathematical activity at least during that event of that particular lesson.

**The lesson event and its professional learning potential**

Drawing on the significance attributed to the lesson event exemplified and the contents of professional learning that had been anticipated by the researchers, a 2-hour meeting was planned to conduct the related classroom discourse research activity in June 2010. For joint group work on mathematical pedagogies, and before watching the “film” of the lesson event together, I proposed two questions about word problems and problem-solving: (1) How can word problems promote ways of knowing mathematics? (2) Do we need different mathematical pedagogies of problem-solving for learners who are not dominant in the language of instruction? After watching the film, I proposed three film-based questions addressing more specific issues: (3) Does Adnan have an idea of how to solve the problem? (4) Is Maria ready to learn mathematics from interacting with him? (5) Does the teacher use the situation for mathematics teaching?
Teacher C took the initiative to provide additional information on the lesson, as well as on various aspects that had appeared in the interview with me. While we all agreed that switching languages was a form of support for mathematical participation and reasoning, only a few teachers viewed the technical emphasis on how Adnan had read the wording of the problem as critical for all the students' mathematics learning in that particular lesson event. At this point of the development activity, it was Teacher C who referred to the "unintended outcomes for the learning of mathematics" coming from paying more attention to technical issues through actions of language support than to conceptual issues. The introduction by Teacher C of this argument in the work with the other teachers and the researchers can be interpreted as evidence of both professional learning and changes in the enactment of expertise.

The newer activity of classroom discourse research combines the strategy of proposing questions for joint discussion with that of considering mathematics learning opportunities that could have been fostered by expanding the intervention of a student. Drawing on the idea of figured worlds (Jorgensen, Gates, & Roper, 2013; Planas & Civil, 2015), we reflect together on what might have happened if a particular intervention had been followed up and, thus, alternative directions might have been possible. In the case of the event exemplified and its related activity, the teachers in the team were encouraged to record contents of the local mathematics curriculum that could have been examined in the lesson if "b has to be four or greater" had been expanded. In this context, three of the teachers imagined the following directions:

TEACHER 4: They [the students in the class] could have moved from the equal sign to the relational sign and from there to start looking at sets of values. They are not used to it even though it is in the textbooks of these grades.

TEACHER 5: When Adnan explains that the number of balls of wool is four or greater than four, that is only for the case of knitting more gloves. There is a second inequality, b strictly less than four. This idea of twin inequalities is important, and also the word "strictly".

TEACHER 6: My students would talk about formulae, and I would respond that this is not a formula but a mathematical model that comes from interpreting the problem. This is an idea for understanding the importance of algebraic expressions. Adnan does a little task of modelling.

These extracts are a good example of the expertise of teachers when creating figured worlds. Overall, they are a good example of how, and how much, the contents of professional learning anticipated by the researchers are subsequently enriched by the teachers in the team. What we all gain from the collaborative group work often goes beyond what is first anticipated by the team of researchers in isolation. More generally, work with films has shown that when teachers can see that a learning opportunity existed in a lesson and was missed, they are more likely to consider shifts in their teaching. Even if they are not the teacher of that lesson, the detection of either missed or unexploited opportunities stimulates thinking about mathematical pedagogies.

A cluster of many metaphors

In this commentary, my goal was to present some of my research experiences, considering other chapters in the book for a complementary perspective. Different local initiatives may not be comparable, but their description offers an insight to understand the whole picture. There are a number of differences between WMCS and CME – contents, aims, strategies and so forth – but all in all in the related processes in the two projects priorise learning. This is why the metaphor of the learning expedition serves well to represent both of them. Throughout the chapter, it has become clear that this metaphor is actually a cluster of other intersecting metaphors, namely the shared adventure, the bridge to the other side and the classroom filmography.

I made the key point of moving mathematics teacher education forward as a shared adventure that requires diverse learning expeditions all over the world. I presented this adventure as a framing metaphor that includes other particular metaphors attained from different professional development projects. The idea of an adventure with expeditions and travellers is useful to consider mathematics teacher education as an evolving domain of complex realities that are globally interconnected.

The bridge to the other side and the classroom filmography were introduced by participants in CME as reference of; on the one hand, the dialectical relationship between teaching and research and, on the other, the prominence of classroom discourse in collaborative group work. These two metaphors help to explain the number of challenges involved in the adventure of moving mathematics teacher education forward. The bridge to the other side brings out the tensions and possibilities of "bridging" professional communities and discourses of expertise, while the classroom filmography illustrates the importance of dealing with specifics in the understanding of generalities across expeditions. Any filmography provides lesson events that mathematics teachers and researchers can productively think about to represent more general phenomena at the intersection of a number of events.

What is singular about the classroom filmography in Barcelona is that all the events selected intentionally show some sort of breakdown in communication during mathematical activity due to issues of language and language use. These issues have not received much attention in mathematics teacher education programs in the past (Essien, Chitera, & Planas, 2015). As a consequence of this focus, there may be other substantial issues that are being inadvertently omitted in the CME developmental work with teachers. We certainly need to study more "films" to better understand what is it to be a mathematics student with a home language different to the language of instruction in the classroom. The collection of films in Barcelona brings together many mathematics learning opportunities
that could have been exploited if the circumstances of the interaction between the students’ languages and the language of instruction had been different. As a whole, the films point to the limited access to mathematics learning opportunities in the multilingual classroom, particularly for students who do not possess the language of instruction. The study of such a phenomenon is part of the shared adventure of moving mathematics teacher education forward. Whatever the starting point, the destination for this adventure is the equitable distribution of mathematics learning opportunities among all students.

Acknowledgements

I acknowledge the contributions of the teacher educators, researchers and doctoral students, as well as the many teachers who invited me into their classrooms. The research has been funded by the Spanish and Catalan governments (EDU2009–07113, EDU2012–31464, SGR2014–972, ICREA-Catalan Institute of Research and Advanced Studies), and the private foundations Fundació Propedagogic and Fundació Jaume Bofill. The views expressed herein do not reflect those of any funding agency.

Note

1 All students’ names are pseudonyms.

References


