Positioning Students as Actors and Authors: A Chronotopic Analysis of Collaborative Learning Activities

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Bakhtin’s (1981) concept of chronotope provides a way of viewing student participation in the classroom as a dynamic process constituted through the interaction of past experience, ongoing involvement, and yet-to-be-accomplished goals. Although the actual design and use of classroom space may be important in facilitating a participatory pedagogy, chronotopic analysis directs attention to the grounding of interaction in dynamic and shifting time-space contexts that are emergent within the students’ and teacher’s discursive practices. In our analyses of classroom events and conversations, we focus on the agency of the students in actively shaping the space-time contexts of the classroom, considering how particular groundings for interaction are created as they draw on past, present, and future temporal relations to explain and justify their ideas to one another. Our analyses provide insights into the contested nature of the time-space relationships in the classroom, the hybridization of time-space contexts, and the ways students enter into past, present, and future time-space contexts during collaborative work in the classroom.

INTRODUCTION

Designing a more participatory classroom pedagogy that engages students in the knowledge-making process, transforms teachers’ roles, and reconfigures the spatial characteristics of typical classrooms has been central to our research for over a decade (Brown & Renshaw, 2000; Renshaw & Brown, 1997). This work may be situated alongside the efforts of others to bring about change in classroom teaching–learning relationships. For example, Magdalene Lampert (1990, 1998) organized the classroom in such a way that students could learn the processes of generating, examining, and verifying assertions about their solutions to problems. As a result of this structure, Lampert was able to describe a “new kind of practice of teaching and learning,” one that engages the teacher and students in authentic activity associated with a disciplinary community (Lampert, 1990, p. 59). Ann Brown (1994) described her work in urban classrooms in terms associated with a “community of learners.” According to this conception, students are encouraged to enact roles typical of a research community through the use of strategies such as a “jig-saw” (dividing units of study be-

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tween learners) and through “majoring” (placing students in the role of tutor for particular activities). In addition, Michael Roth (1995) designed classrooms along the lines of a “community of practice” (Lave & Wenger, 1991) where conditions integral to supporting learning, such as enabling students and their ideas to move about and meet in areas of high participant density, the promotion of mediating tools and resources by the teacher, and supporting student talk within the classroom, were viewed as integral to the teaching–learning relationship.

In contrast to these reform efforts, the conventional classroom locates teachers in privileged spaces where they can see, be seen, and influence all aspects of classroom activities. We have tried to ensure that students are regularly located in such spaces to present their proposals for addressing problems, to answer questions from other students, and to engage in dialogue with their teacher and peers. Rather than a single position of privilege and authority, we have attempted to design classrooms with multiple positions of authority that facilitate negotiation and dialogue and a socially engaged approach to learning and the knowledge-making process. The contrast between a conventional and a more flexible and negotiated spatial arrangement in the classroom resonates with the research of Vadeboncoeur (2005). Comparing the official school chronotope with an alternative school chronotope, Vadeboncoeur found that flexible and negotiated use of space and time characterized the alternative high school program. Students were allowed to use rooms flexibly for meetings or individual study, and they were encouraged to use official spaces such as a student center or the library to engage in diverse activities such as class meetings, intimate conversations, tutoring one another, and individual study. Altering the arrangement of physical space in the classroom or school per se may not create preferred forms of pedagogical space. Rather, the redesign of physical space is one attempt to facilitate different relationships between students, the teacher, and classroom activities.

To facilitate participatory classroom relationships we have employed the pedagogical tool of collective argumentation (CA). The CA format entails interacting in three kinds of spaces. Initially, students work alone to represent a problem in words, diagrams, or drawings based on their own resources. Second, they work together in a small group of peers to compare and explain their representations and to negotiate a consensus within the group regarding the group’s preferred representation. Finally, they prepare and present their agreed representation to the whole class to validate their solution to the problem. The spatial characteristics of the CA format require students to move from multiple individual spaces to multiple small group spaces and finally to a collective space where different viewpoints are interrogated and tested against common knowledge. In the following, we reflect on and reconsider our research on CA, employing Bakhtin’s (1981) notion of the chronotope to foreground the interplay of “times” and “spaces” in students’ speech and to explore their shifting identities associated with these time–space zones. In particular, we identify the emerging sense that students have of themselves as authors within the classroom, and even as “local heroes” who show courage and persistence as they redeem the seemingly hopeless ideas of their partners.

**CHRONOTOPIC ANALYSIS OF CLASSROOM EPISODES**

Bakhtin developed the principle of chronotopicity to capture the spatiotemporal matrix that shapes the actions of protagonists within literary texts. His essay “Forms of Time and the Chronotope in the Novel” (Bakhtin, 1981) traces the slow emergence within narrative genres of the appreciation
of the temporal and spatial situatedness of human actions (Morris, 1994). Bakhtin (1981) considered the spatiotemporal matrix as produced and productive, rather than as a container for action or a passive background for ongoing activity. So with regard to our focus on classrooms, although the specific physical features of a particular classroom might be described and represented in great detail, they alone cannot reveal the chronotopic grounding of classroom activities because they are produced, shaped, and reshaped by the discourses that participants draw on, often playfully and unpredictably, as they talk about spaces and times beyond the here and now (see Hirst, 2004; Leander, 1999, 2001). For example, Leander (1999) described a discussion of Huck Finn by a group of junior high school students in which students “romp across abstract spaces” (p.11) located in imaginary moments of the future or the past to accomplish the classroom task. Sid, one of their teachers, intervenes in the group’s discussion to imagine someone a hundred years into the future, looking back at contemporary pop music—characterized as violent, vulgar, and sexist—and making judgments about our era. This imaginary space–time is constructed as an analogy to assist students in reconsidering the world of Huck Finn, but as Leander shows, Sid’s romp across abstract spaces opens up unpredictable and ever-shifting locations from which students can develop discourses antithetical to the teachers’ pedagogical intentions.

Although chronotopes are organizing centers for significant events within a setting, they are not stable or predictable but playfully shaped by the discourses that participants draw on (Hirst, 2004). The chronotope provides a way of viewing a student’s participation in the classroom as being a situated, dynamic process constituted through the interaction of past experience, ongoing involvement, and yet-to-be-accomplished goals. Neither the product of learning, as coming to know, nor the process of learning, as ways of coming to know, is viewed as fixed or stable. Viewed as relational and transformative, classroom contexts become creative spaces in which identities, both personal and collective, may be imagined, enacted, and contested. Following the work of Wertsch (1990), the personal and collective dimensions of identity may be said to reflect the choice of mediational means employed by an individual to engage in intrapersonal and interpersonal activity.

As noted by Leander (2001), there is no explicit analytical procedure to follow in conducting chronotopic interpretation. Such analysis is complex because “chronotopes are not so much visibly present in activity as they are the ground for activity” (Morson & Emerson, 1990, p. 369). In the following analyses of classroom events and conversations associated with CA, we focus on the agency of the students in actively shaping the space–time contexts of the classroom. We also consider how particular groundings for interaction are created by students as they draw on past, present, and future temporal relations in explaining and justifying their ideas to one another. The excerpts of classroom events are taken from a longitudinal study (Brown, 2001) into the emergence of a classroom community of practice within an elementary mathematics classroom. They are representative of the activity of the classroom in that they capture a broad selection of students using the tools of CA (represent, compare, explain, justify, agree, validate) in collaboration with others to come to know and do mathematics. Placing students in roles where they are required to represent, explain, and justify ideas to one another is important in the learning of mathematics. For example, Lampert (1990) employed explanation and justification to assist elementary students’ participation in the construction of a view of mathematical knowledge that was more in tune with the conventions of the discipline than with those of popular belief. By requiring students to discuss the relative merits of their ideas, Lampert was able to have them reveal the assumptions they were making about how mathematics works and enter
into a relationship with them whereby she could employ her expertise as a mathematician to promote mathematical understanding.

The episodes of classroom interaction and talk analyzed in the following section occurred in a Year 7 classroom situated in a metropolitan elementary school located near the center of Brisbane, Australia. The class comprised a male teacher–researcher and 26 students (12–13 years old) drawn from middle-class and working-class families of the immediate neighborhood. Pseudonyms have been used in the texts to protect the identities of the speakers.

CONTESTING CHRONOTOPE

Allowing students considerable flexibility about where and with whom they work in CA can reveal the shifting affiliations between students and their pliable identities in relation to classroom norms and everyday practices. Across the course of the school year, we have observed mobility and flexibility as groups of two or three students coalesce to form a single larger group or as a large group differentiates into smaller units for various reasons. In one dramatic example that we documented, a fifth-grade student, Linda, constructed her own private space by using a library shelf and a desk to establish a physical boundary between herself and the other classroom members (Brown & Renshaw, 1997). This is evocative of a desire to create a sense of “my place,” or a “personal home” within the classroom (see Massey, 1994). The individualistic ethos that is implicit in Linda’s action contrasts with the sense of a shared and communal space that the teacher was attempting to develop with the students. That is, the use of classroom space during CA was necessarily flexible to enable students to share ideas and present their work to others. Areas in the classroom were not coded or regarded as “teacher space” or “student space,” because students routinely used the whiteboard, blackboard, and overhead projector to report their ideas and the teacher often sat with and among the students to listen and challenge their thinking. Linda’s “home” reinforced her social identity as resistant to the participatory norms in the classroom and created an alternative time–space within the classroom.

Linda’s home allowed her to step outside the ground rules of CA, and its concrete physical presence in the classroom created a challenge to both the teacher and the other students who were attempting to ground their relationships on the collaborative and participatory norms of CA. The teacher decided to accommodate Linda’s wishes and explicitly defended to her classmates her right to work alone. This created tensions for the teacher in relating to some students who questioned why Linda was allowed to be separate and not required to participate in the CA format. Even though the teacher continued to respect Linda’s wishes, a few of her classmates refused to accept Linda’s separateness. For example, two girls whose small group bordered Linda’s home occasionally joined Linda (one at a time) to work with her on mathematics problems, intrusions that were accepted by Linda as long as she could control the space. Although Linda was given the breathing space to be separate, neither the teacher nor the students passively accepted her nonparticipation. The option of more complete participation was left open by the teacher, who told the other students that Linda would participate when she was ready. He regarded her actions as an attempt to live within a student identity where classroom work was individually completed and other students were treated with suspicion, rather than trust.

Eventually Linda moved beyond this identity and in the final few weeks of the school year she did remove the barriers and enter actively into all spaces in the CA classroom, including the space
where ideas were presented for whole-class discussion and validation. As this instance demonstrates aptly, spatiotemporal relations are actively produced, contested, and changed by students and the teacher to afford the enactment of certain preferred identities.

HYBRID CHRONOTOPOES

As our account of the case of Linda illustrates, the chronotopic grounding of classroom interaction is contested and multiple. There is always interplay between the past, the here and now, and the possible and imagined. The interplay of chronotopes is similar to Bakhtin's analysis of multiple voices in dialogic interanimation. Dialogue between voices produces hybrids that are local and novel. Similarly, Bakhtin (1981) argued that chronotopes are also hybridized through dialogic processes. As Leander (2001) noted, "Bakhtin imagines such hybridity as a highly productive form of dialogue between persons in past, present, and future space-times" (p. 652). In the statement that follows, Angela is explaining to the rest of the class how her small group had represented infinity. She speaks explicitly of the official definition, "our ideas," "my ideas," as well as from a common or general perspective on behalf of all humanity.

We had the dictionary meaning which says this—infinity has the state of being infinite, infinity of the universe, infinity of space, time, quantity—so infinite space, so, it’s so that you can’t describe it … So we thought that we would make a meaning of our own. So we thought that infinity means everlasting number, object and the universe. So infinity is an everlasting thing … Infinity can(not) be determined or explained over a vast amount or period of time, because it is an everlasting idea. And I made this up. I think the word infinity is similar to life. No one can fully explain it and just like infinity it has many definitions. We can’t really explain life and we can’t really explain the word infinity (Cited in Brown & Renshaw, 2000, p. 59).

Angela speaks with multiple voices, initially by revoicing an official dictionary definition ("We had the dictionary meaning"), then reporting her group’s rephrasing of that definition ("So we thought that we would make a meaning of our own"), adding her own idea of infinity ("I made this up. I think the word infinity is similar to life"), and finally adopting the generalized voice of humanity as she speaks on behalf of us all ("We can’t really explain life and we can’t really explain the word infinity"). This sophisticated performance, we have argued (Renshaw & Brown, 2000), arises from ongoing opportunities to occupy diverse spaces in the classroom where ideas are canvassed and communicated to different imagined audiences. What we have found intriguing in transcripts such as the infinity script is the way space and time are implicated and connected in the students’ utterances.

Angela created different chronotopic groundings as she presented her group’s ideas of infinity. She drew on the accumulated knowledge of the past ("We had the dictionary meaning"), which is grounded in the abstract spatiality and timelessness of the formal definition. Such definitions are not to be argued with, not to be contested, and yet they are not helpful to Angela in understanding or communicating clearly the idea of infinity. In moving from the past to the present ("So we thought that we would make a meaning of our own"), Angela shifts to the local context of the classroom and to a strong sense of joint authorship indicated by the repetition of we and our in her account. However, Angela does not stay either in the voice of her joint authorship ("we would
make a meaning”) or in the present context of the classroom. She creates another timeless and abstract space to ground her ideas in an imagined future (“No one can fully explain it and just like infinity it has many definitions. We can’t really explain life and we can’t really explain the word infinity”).

Angela’s repertoire of voices, taken together, shows fluidity in moving across different time-space contexts to convey to her classmates a remarkably sophisticated notion of infinity. The hybridization is achieved in juxtaposing alternatives by drawing on and revisiting multiple times, spaces, and authors. We would also suggest that the opportunity afforded Angela and others in the CA class to occupy the privileged space normally reserved for teachers coincided with Angela’s adoption of multiple voices, including the generalized voice of humanity. By populating the words and ideas of others with her own intention, Angela is becoming an engaged thinker–learner, taking on an identity as a critical participant in the learning process.

"WHERE DO YOU PEOPLE GET YOUR IDEAS FROM!": AUTHORING THE PAST INTO THE PRESENT

Next we focus specifically on two students, Allan and Annie, fraternal twin siblings who usually chose to work with other students during CA sessions, but for research purposes agreed to work with each other once a fortnight over the course of the study. Audio and video recordings of Allan and Annie’s group interactions and whole-class interactions were made during these sessions. This episode focuses on their efforts to explain to their classmates how they had legitimately reconstituted and deployed ideas that had previously been accredited to others. A key distinction here is between copying an idea that others had authored, considered to be illegitimate, versus remembering an idea previously used in the classroom. The latter is strongly endorsed by the everyday norms of CA and this classroom.

In their prior schooling, Allan and Annie had learned mathematics by individually completing textbook tasks, answering teacher directed questions, and listening to adult explanations. Like their classmates, Allan and Annie had learned to regard mathematics as a process of remembering and reproducing sets of unrelated facts rather than as an inquiry directed toward enhancing “our understanding of the world and the quality of our participation in society” (Australian Education Council, 1991). Allan revealed his frustration early in the school year with the inquiry approach central to CA. The students had been investigating number patterns and the teacher had asked Allan and his partner to share their ideas with the class. As the two students approached the whiteboard, Allan slammed his book on the desk and shouted: “Where do you people get your ideas from!” His question gestures toward a place-space for the origin of ideas. Where? Allan appears to be looking for a physical or embodied space, such as a textbook or verbal direction from the teacher; in many ways, he is looking for a traditional place where official knowledge can be found, immutable and unchanging, and given by an authority, rather than coconstructed by everyday participation in communities of practice. The CA pedagogy, however, presents Allan with a relational space where ideas are coconstructed. The chronotopic grounding of CA pedagogy calls forth actors and authors, rather than followers and copiers. However, actors and authors have heightened ethical responsibilities regarding the genesis of ideas, as shown in the following, where becoming an actor and an author requires participation in a new learning activity, one that locates knowledge and knowing in relationships between people, dialogue, and work toward consensus.
Annie and Allan's Word Problem

To make a cake a chef must put 3 x 4 = 12 flour for every 4 cups of flour 3 cups of egg white. How much flour and egg white will you need for three cakes? 3 x 3 = 9 egg white

Write your answer in ratio form.

Answer = 12 : 9

(Angela crosses this out and writes 12 flour : 9 egg white.)

FIGURE 1 Allan and Annie's representation of their ratio word problem.

Later in that same year, Allan was working with Annie, still experiencing difficulties in "coming up" with ideas. In the following episode, Allan and Annie present their solution to the task "Write a word problem that can be expressed in the form of a ratio and solve it for the class." In preparation for their presentation to the class, Allan and Annie represented their word problem on the classroom whiteboard for all to see (see Figure 1).

As highlighted in Figure 1, Allan and Annie wrote a simple ratio word problem contextualized around the making of cakes. They also provided a solution to their word problem involving the operation of multiplication and the use of the ratio symbol. We enter the episode as Annie is presenting their problem for discussion by the whole class (see Transcript 1).

Transcript 1: Copying Versus Remembering

<table>
<thead>
<tr>
<th>Turn</th>
<th>Speaker</th>
<th>Utterance</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>Annie</td>
<td>(To class) Well, this is our problem (reads from the whiteboard).</td>
</tr>
<tr>
<td>02</td>
<td>Annie</td>
<td>&quot;To make a cake, a chef must put for every 4 cups of flour 3 cups of egg white. How much flour and egg white will you need for three cakes? Write your answer in ratio form.&quot;</td>
</tr>
<tr>
<td>03</td>
<td>Allan</td>
<td>And we timesed [sic] 4 by 3 which equalled 12 flour, and we timesed 3 times 3 which gave you 9 for the egg white, and our answer is 12 flour is to 9 egg white.</td>
</tr>
<tr>
<td>07</td>
<td>Annie</td>
<td>Alice?</td>
</tr>
<tr>
<td>08</td>
<td>Alice</td>
<td>Where did you get this idea from?</td>
</tr>
<tr>
<td>09</td>
<td>Annie</td>
<td>Well, me and Allan had exactly the same idea except Allan had his expressed in cement, and he wanted to go with my idea.</td>
</tr>
</tbody>
</table>
In the preceding sequence, students contested the past by discussing the place of remembering in this classroom community. Alice and Katie referred to a previous session on ratio where the class had been presented with word problems contextualized around the making of concrete and cakes. They jointly constructed an argument inferring that Allan and Annie copied their word problem (Turns 8, 11, 13, 14, 15, 16, and 17). Annie inquired as to whether Katie meant that they copied from another group. Katie stated that she did not mean “another group,” but a previous session’s problems. It is clear from the children’s questions to Annie that copying from another group is regarded as unacceptable, but the class is still growing accustomed to the idea that drawing on ideas from past learning sessions is legitimate.

The students’ distinction between copying and remembering is a significant moment in the establishment of classroom ground rules. Copying implies that the group neither was the original author of the ideas nor had appropriated the ideas in a meaningful fashion. To retort that they had “remembered it” is actually a subtle way of saying that they had “copied it,” with an important difference: The idea had been stored over time and retrieved as appropriate for use in this particular context. Accessing the past in this way implied meaningful appropriation. The students clearly felt that they could speak confidently about “their” ideas. This brief exchange reveals an emerging awareness by these young students of how the past can be reauthored or reinserted into their present in a legitimate way. It is also a significant moment in their learning, a moment with the potential for the students to notice that parallel word problems can be operated on using the same mathematical procedure.

The making of this parallel word problem shows that a generic axiom or principle can be authored with respect to this procedure. To ensure that such reauthoring happens, it is important that the teacher’s role extends to that of being an “agent for the collective memory of the class” (Renshaw & Brown, 1997). By being strategically placed to orchestrate the communication of Allan and Annie’s group activities to the whole class, the teacher was able to create for them and the class a sense of legitimate continuity in Allan and Annie’s work—to construct for the children
"a usable past," that is, a place for the active contestation and negotiation of ideas and representations (Wertsch, 2002, p. 35). This mediation by the teacher is important to ensuring that the mathematics arising within the classroom is not only a reflection of past participation, but also a bridge to eventual participation in the conversation of a broader community of mathematicians—a community where collective memory may be viewed, as Middleton (1987) advocates, as a tool in the service of present and future activity.

RESISTING THE PRESENT BY IMAGINING THE FUTURE: PLAYING THE "LOCAL HERO"

In this episode (taken from Brown & Renshaw, 1999) we examine how Annie resists the teacher’s attempt to influence the direction of her assistance to Allan during small group work. This episode is particularly interesting because Annie’s resolve is based on imagining a possible future solution to the problem, a solution she cannot fully articulate at the moment. Whereas the teacher focuses on the present situation (it won’t work), Annie focuses on the future possibilities that she can only vaguely apprehend in Allan’s ideas (but I think it can). Annie takes on the identity of “local hero” who works on behalf of her partner to reveal his intelligence and competence both to the teacher and to Allan himself.

As we noted in the introduction, CA is designed to transform the traditional authority framework of the classroom where the teacher gives directions and students are expected to comply. In this episode, it is Annie and Allan who remain within the norms of CA and resist the teacher’s momentary adoption of the traditional authority space. They achieve this resistant stance by imaging a time-space—a possible future—where their half-formed ideas can be brought to fruition. In the previous transcript about copying and remembering, we examined how students deployed different notions of the past to explain and justify their ideas. In this episode we analyze how an imagined future is deployed by Annie to create a space where her partner, Allan, is positioned as a legitimate author of ideas within this classroom. We suggest that Annie acts as the local hero by redeeming and articulating the idea proposed by Allan in the face of resistance to both Allan and the explicit authority of the teacher.

We enter the dialogue where the students are attempting to find the area of an eight-pointed star enclosed within a square. The teacher has joined the group to review its progress. Annie has employed a conventional representation to successfully solve the problem. Her partner Allan has adopted an imaginative but inadequate representation that requires viewing the figure as two equivalent rectangles. Annie is exploring Allan’s idea to see if it can be successfully adapted to solve the problem. The teacher demands that Annie cease her attempts to coconstruct a response to the problem and comply with his directions. Annie maintains her viewpoint in the final line of the transcript, even after the teacher’s insistence that she follow his directions (“I didn’t …”).

Transcript 2: The Local Hero Resists the Teacher

<table>
<thead>
<tr>
<th>Turn</th>
<th>Speaker</th>
<th>Utterance</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>Teacher</td>
<td>You’ve turned the eight-pointed star into two rectangles, but you’re no longer measuring the eight-pointed star.</td>
</tr>
</tbody>
</table>
In the preceding sequence the teacher had engaged a voice characteristic of the “expert” operating within the framework of pedagogical scaffolding. However, in response to the teacher’s statements Annie maintains the argument that she is not simply subtracting her answer to the problem from Allan’s answer (“I didn’t take my answer away from his”), but combining his ideas with her ideas to solve the problem in a novel way (“So I got that idea off mine and took it away from Allan’s answer”). This contradiction of the teacher’s voice is not an act of defiance by Annie, but an example of a sociomathematical norm (see Yackel & Cobb, 1996) that Lampert (1990) refers to as “wise restraint”—where a mathematical point of view is not changed wantonly, without serious examination. Annie persists, as can be noted in the continuing sequence of text (see Transcript 3).

**Transcript 3: The Local Hero Imagines the Future**

<table>
<thead>
<tr>
<th>Turn</th>
<th>Speaker</th>
<th>Utterance</th>
</tr>
</thead>
<tbody>
<tr>
<td>07</td>
<td>Annie</td>
<td>Okay, let’s go with your idea.</td>
</tr>
<tr>
<td>08</td>
<td>Allan</td>
<td>No.</td>
</tr>
<tr>
<td>09</td>
<td>Annie</td>
<td>Yes.</td>
</tr>
<tr>
<td>10</td>
<td>Allan</td>
<td>We don’t have time.</td>
</tr>
<tr>
<td>11</td>
<td>Annie</td>
<td>No, we’re going to fix up your idea. We’re going to find out where you went wrong.</td>
</tr>
<tr>
<td>12</td>
<td>Allan</td>
<td>But it [the worksheet] is wrecked.</td>
</tr>
<tr>
<td>13</td>
<td>Annie</td>
<td>Allan, we’ll do your idea. Can you draw that shape [the figure] please on the back [of the sheet]? On the back of this and we’ll fix up your idea.</td>
</tr>
<tr>
<td>14</td>
<td>Allan</td>
<td>(Commences to draw the problem figure on the back of the worksheet. Teacher approaches the group.)</td>
</tr>
<tr>
<td>15</td>
<td>Teacher</td>
<td>How are we going?</td>
</tr>
<tr>
<td>16</td>
<td>Annie</td>
<td>I know where he went wrong.</td>
</tr>
<tr>
<td>17</td>
<td>Teacher</td>
<td>It doesn’t work!</td>
</tr>
<tr>
<td>18</td>
<td>Annie</td>
<td>I know, but I think it can.</td>
</tr>
<tr>
<td>19</td>
<td>Teacher</td>
<td>I’ll get you another sheet.</td>
</tr>
<tr>
<td>20</td>
<td>Teacher</td>
<td>(Gives the children a new problem sheet and leaves the group.)</td>
</tr>
</tbody>
</table>

In the preceding sequence, Annie first recruits Allan’s participation in the co-construction of a solution by expressing confidence that his idea can be “fixed” and by organizing their work space so that time can be used efficiently (working on the back of the worksheet). Annie then recruits the teacher’s tacit participation by her confidence (“I know where he went wrong”), affirming the
teacher's argument that the idea does not initially work ("I know ..."), and expressing faith in the status of the idea as being an important element of a coconstructed response ("I think it can").

At the completion of this sequence, Allan and Annie set about coconstructing a response to the task that they can share with the class. This response is organized around Allan's original representation and stepwise procedures that display how Allan's representation organized their thinking. The discussion resulting from Allan and Annie's subsequent presentation of their solution to the class validated their response as being an approximate, novel solution that displayed a good understanding of the task. However, Allan and Annie's approach to solving the problem was not a preferred approach of the class, as it was considered to be unnecessarily complicated. In other words, Allan and Annie's response to the task was accepted socially within their classroom community, but rejected mathematically in terms of its lack of elegance and efficiency.

The social acceptance of Allan and Annie's solution method provided both students with affective rewards—rewards necessary to the continued maintenance and further development of their identities within this classroom community. The affective rewards were evidenced by both students in statements recorded in their mathematics journals after this CA session. According to Annie the session was a very good one in which she had "a challenge," "enjoyed working out a solution," and felt she "worked at [her] best level." Annie's journal entry follows the typical schema of a simple story where a protagonist faces a challenge, overcomes the difficulty, and experiences satisfaction at performing well—heroically. For Allan, the session was a very good one in which he "enjoyed representing," "felt confident," and "worked great." In this happy ending for both characters, the local hero overcame the challenge, and her partner developed confidence.

CONCLUSION

The episodes analyzed in this article provide insight into the significant learning that is occurring for the students and the teacher as they engage with one another in the CA classroom. Through engagement with shared resources and practices and by drawing on past experiences and agreements and imagining future possibilities, the students created and communicated quite sophisticated ideas. Allan and Annie, for example, provided the class with a space in which to negotiate an understanding of the terms copying and remembering and the ethical responsibilities of being an author of ideas. Annie, in her resistance to the teacher's reassertion of the conventional classroom chronotope, created a space for herself to play the hero and for Allan to experience success and feel confident in his ideas. This episode reveals the complex interplay between established and emergent chronotopes, when a participatory pedagogy is introduced to challenge traditional teaching methods. The teacher, cast as the villain in Annie's hero script, was actually the designer of CA and had worked hard with students to establish the participatory norms of the classroom. In the shifting scenes of the classroom, however, he reverted to an identity he knows well—a past where the teacher's word was not to be questioned. Annie's courage in challenging his word, we suggest, is grounded both in the current time-space of her classroom where good ideas cannot be silenced even by the teacher, and in a future time-space where Allan's ideas can be shown to be worthwhile.

The episodes also show that students in this classroom were beginning to act as authors of ideas, and to adopt an epistemology consistent with a sociocultural approach to teaching and learning: namely, that ideas had to be meaningful, or personally understood, rather than just copied; communicable, or able to be explained and represented for other members of the community.
to appreciate; and testable, or able to be supported by logical argument or empirical demonstration. The episodes reveal the interplay of the personal histories of the participants and the institutional milieu of a typical school so familiar to them.

Over the course of our research, we have developed a number of valuable insights into the efficacy of employing Bakhtin’s notion of chronotope to explore issues related to learning in collaborative classrooms. First, chronotope highlights the importance of considering the intertextuality of the utterances within students’ presentations—where the speech is not viewed as a neutral medium to express personal thoughts but as a social tool that is populated with the purposes, meanings, values, and authority of others situated in different space–time contexts. For Allan and Annie, for example, their remembering of past word problems was imagined as a collective reauthoring with the potential to link past experience to future learning goals. Second, chronotope alerts us to the struggle for influence within the dialogic act (Bakhtin, 1986)—where learning to speak within a particular community means exhibiting mastery in constructing utterances privileged within the history of that community. This is evidenced in Episode 2, where Annie is able to transform the failed context of Allan’s activity, despite the subversive intervention of the teacher, into an experience that makes Allan feel confident and successful.

Using the chronotope as an analytical tool, educational researchers and practitioners can gain purchase on important educational issues. We have presented brief sketches of four young students whose learning trajectories suggest a pedagogy of hope concerned with the transformation of current conditions, in the light of future possibilities, for a better collective life. Linda’s learning trajectory is toward trusting others and participating with her peers in developing understanding at school; Angela’s sophisticated presentation of the idea of infinity indicates her movement toward multiple ways of understanding and communicating complex ideas; Annie is learning how to be courageous and effective in supporting her partner’s learning; Allan is learning that ideas are not located in some static space in the past (“where do you get your ideas from?”), but are actively coconstructed through persistent effort and engagement. By foregrounding the spatiotemporal grounding of learning where past, present, and future time–spaces intersect, chronotopic analysis has enabled us to see the importance of hope as a pedagogical imperative.

REFERENCES


