

BRO05411

The Mediation Of Collaborative Pedagogical Activity: What Happens When The Teacher Isn't There?

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Pedagogies designed to enable collaborative learning, position students on a more equal footing with each other in a manner that facilitates the evaluation of the worth of competing ideas and the co-construction of understanding. However, teachers are often reluctant to implement these collaborative ways of knowing and doing in the classroom as they are deemed to be ineffective when the teacher is unable to participate in and/or supervise the group level process. This paper examines the interactions of four Year 7 students as they go about solving a novel problem, unrelated to the current work of the classroom, away from the direct supervision of the classroom teacher. Student interactions are analysed in terms of the 'speaking' positions that students take up within the group, the mediational means that they employ, and the quality of the product of their collaboration. Conclusions are drawn about the generalised benefits to student learning of sustained engagement in classroom collaborative learning.

For over a decade curriculum documents, such as *A National Statement on Mathematics for Australian Schools* (Australian Curriculum Council, 1991), have called on teachers to employ classroom pedagogies that focus on how students learn so as to challenge students to reflect upon, change, and expand their ways of knowing and doing. Central to this call is the development in the classroom of collaborative approaches to teaching and learning. However, although classroom teachers often recognise the merits of collaborative learning, such as the attainment of intellectual quality and positive interdependence (Johnson, Johnson, Holubec & Roy, 1984), they rarely implement such approaches in their classrooms. This lack of implementation may reflect reluctance by teachers to share control of the executive processes of learning (such as goal setting, planning, the monitoring of sub-goal achievements, and evaluating outcomes) with students.

A theory of learning and development that lends itself to the development of collaboration activity in the classroom and to the development within students of executive processes is that proposed by Vygotsky (1978). According to Vygotsky (1978), learning is a mediated process of appropriation brought about by students co-constructing meaning as they participate in the social activity of the classroom. Learning occurs in collaboration with others and is an interpretive activity embedded in engagement with critical inquiry. This claim requires that the explanatory framework employed to account for the development of higher mental functioning in students, be reformulated to take into account the role of semiotic tools in interweaving students everyday ways of knowing and doing with the sophisticated ways conventionalised by society.

One way of reinterpreting the mediation of the personal by the social is provided by Wertsch and Rupert's (1993) account of 'mediated agency'. The notion of 'mediated agency' revolves around the "irreducible tension" manifested between students on the

one hand and the mediational means that they employ or have access to on the other (Wertsch & Rupert, 1993, p. 230). Through interpreting the relationship between students and mediational means in terms of 'mediated agency', Wertsch and Rupert promote a view of human action which positions mental functioning within systems of collective action that are culturally and historically situated. From this point of view, issues which affect the organisation of mental functioning on the 'intermental' (social) plane, (such as issues related to power and authority, membership and identity, consensus and diversity, and commitments which privilege certain ways of thinking and acting) are seen as essential aspects of functioning on the 'intramental' (personal) plane. As understood here, action has a social as well as a personal dimension of experience that allows executive processes such as the regulation of 'attention', 'memory', and 'thinking' to be exercised by groups as well as by individuals (Wertsch, 1998). A key theoretical claim of 'mediated agency' is, therefore, that collaborative learning is fundamentally shaped and constrained by mediational tools that students have available to them.

In elaborating this notion of 'mediated agency', Wertsch draws on Bakhtin's theory of voice (Wertsch, 1991). 'Voice' is highlighted as providing a means of identifying processes of appropriation and resistance within the classroom as the teacher and the students participate in the production and reproduction of knowledge practices, processes, and products. 'Voice' directs our attention to the multiple stances or speaking positions that teachers and students take up, negotiate and resist during their interactions, and to the multiple and shifting forms of participation which contribute to defining the relations between the students and between the students and the teacher. In classrooms where teachers are reluctant to share their authority with students, learners may be provided with few opportunities to give 'voice' to the management skills that they employ to direct their thinking and learning, resulting in a lack of appropriation of executive skill. In other classrooms, where teachers position students on a more equal footing, learners may be provided with multiple opportunities to give 'voice' to the tools of thought (representation, explanation, justification, etc.) which organise their thinking - privileging the use of one tool or another depending on their goal.

One model of collaboration that provides students with access to a range of semiotic tools and that may be used to facilitate learning in the classroom is "collective argumentation" (Brown & Renshaw, 2000). Collective argumentation is organised around a key word format that requires students to represent a task or problem alone, compare their representations within a small group of peers, explain and justify the various representations to each other in the small group, reach agreement about a possible solution or solution path within the group, and finally present (validate) the group's ideas and representations to the class to test their acceptance by the wider community of their peers and the teacher. Through accessing the tools of representing, comparing, explaining, justifying, agreeing, and validating students are able to coordinate the phases of their interaction in small groups and to facilitate the occurrence of specific opportunities for co-constructing understanding. Through implementing 'collective argumentation' in the classroom, the teacher is able to allocate goal setting to the group, facilitate a common purpose for completing goals, model particular ways of completing tasks, and provide students with strategies for evaluating the effectiveness of goal completion.

An important element of ‘collective argumentation’ that supports the teacher and students in engaging in the practices of the classroom is the negotiation of a class charter of values (Renshaw & Brown, 1997). The values negotiated reflect social virtues of engagement, courage, humility, honesty, restraint, persistence and affirmation, and together with the key word format guide activity and participation in the collaborative classroom - a classroom where students are encouraged to display (a) the courage required to state their ideas and opinions to others, (b) the humility necessary to accept that their ideas may not always be adequate, (c) the honesty essential to giving accurate feedback and reports, (d) the restraint integral to maintaining social cohesion, (e) the persistence required to pursue ideas and views in the face of opposition, and, (f) the generosity necessary to affirm the achievements of others.

Past research conducted in classrooms that employed ‘collective argumentation’ on a regular basis provides evidence of the enhanced appropriation and development by students of mathematical knowledge and higher mental functions such as planning, monitoring, and evaluating goal completion (Brown & Renshaw, 1995). However, little evidence is available as to whether students familiar with the key-word format of ‘collective argumentation’ will employ these tools to plan, monitor and evaluate goal completion when engaged in learning activities away from the domain of mathematics and away from the direct influence of the teacher. This paper explores the interactions of four Year 7 students, familiar with the ‘collective argumentation’ key-word format, as they go about solving, away from the direct supervision of the teacher, a novel task unrelated to the mathematics of their classroom. In particular, the study attempts to provide insights into what executive strategies were made explicit by this group of students as they decided on what they were aiming for, how they were going to achieve it, and when they knew they had completed the task – essential elements of a successful approach to problem solving (Dweck & Elliot, 1983).

Method

The context of the study

The problem solving session was conducted in an ante-room to a Year 7 classroom. The participants in the problem solving session were four Year 7 students Allan, Annie, Chris and Tracey. Allan and Annie are fraternal twin siblings who were used to working with each other on mathematics tasks. They had also, on occasions, worked with Chris and Tracey. All four students were members of a class who had been the focus of a year-long, intensive research study designed to document the emergence a collaborative community of mathematical practice (see Brown, 2001). All four students were familiar with the key-word format of ‘collective argumentation’ and had deployed the voices afforded through the discourse format of ‘collective argumentation’ on a daily basis to complete mathematical tasks.

Audio and video-recordings of the students’ interactions were made by another Year 7 student from their class. No adult was present during the problem-solving session and the students maintained control of the recording equipment at all times. Even though this task was not assessable, we acknowledge that the video camera is a powerful surveillance tool, and mediates students’ performance on this task. The problem-solving session occurred within a class time planned to allow students to engage in individual and/or group projects.

The content of the problem-solving session

Problem content revolved around the concept of ‘bullying’- a concept not addressed formally in class lessons. The problem posed to students consisted of a problem statement followed by 5 separate questions that the students were required to complete (see Figure 1). Each student was provided with an individual response sheet and the group was supplied with a group response sheet. The students were instructed to complete the individual and group sheets and return them to the their teacher.

Problem Statement As Posed To Students	
Problem Statement	One lunch time a year 7 student turned a corner between two buildings to see John hit Jason, the class bully, in the jaw and Jason take a few swings back at John.
Question 1	Is this action against the rules at this school?
Question 2	Should there be an explicit (written down) rule against this action? (If ‘yes’} Why should there be an explicit rule? (If ‘not an explicit rule’) What kind of rule and why? (If ‘no’) Why not?
Question 3	What do you think the Year 7 student would do in this circumstance? What would you do if you were the Year 7 student? Why/why not?
Question 4	Think of a Year 7 student who would suggest a different response (but don’t name them). What would he or she suggest the Year 7 student do? Why do you think they would suggest that?
Question 5	Can you think of a circumstance at a school where this action would be acceptable? Why do you think that?

Figure 1: The problem-solving task as presented to the group of students.

Data collection and utilisation

The problem solving session was video-taped and transcribed for analysis. For the purpose of analysis, that is, to investigate the executive strategies made explicit by students, only those sections of the protocol relevant to the what, how and when of the problem-solving process were examined. Due to the constraints of this paper, only data relating to questions 1, 2, and 5 (see Figure 1) of the task will be addressed.

Analysis and Discussion

The Goal Script: What are we aiming for?

We enter the problem-solving protocol where the group are just ‘getting started’ on the problem-solving task (see Table 1).

Table 1: Setting the goal: To construct an understanding of the task.

Turn/Speaker	Text
01 Chris	We are just going to read the problem, Annie will you start to read the problem.
02 Annie	Reading the problem: “ <i>One lunch time a year 7 student turned a corner between two buildings to see John hit Jason, the class bully, in the jaw and Jason take a few swings back at John. Is this action against the rules at this school? Give reasons for your answer</i> ”.
03 Chris	Now we can represent the answer to the question.
04 Allan	I don’t know (the answer).
05 Chris	No but, that’s why you have to write reasons to why you don’t know.

06 Annie	We'll write down our response and then . . .
07 Chris	Just write down what you think is right.
08	(Students individually represent their responses to the question)
09 Tracey	Annie, you read yours (your answer) out. (Reading: <i>Is this action against the rules of the school?</i>)
10 Annie	(Yes) Because we have a 'hands off rule' which means we cannot hit people.
11 Allan	(Yes) I think so because all schools 'don't let other kids punch others'. I know at my school we are not allowed to punch people.
12 Tracey	(Yes) Because violence is not something to be taught at school or anywhere else and children should be taught to respect one another.
13 Chris	(Yes) I think so because nobody should be physically abused at school. It is a place of learning new things and to cooperate with each other and it is in the values of collective argumentation.
14 Allan	Well some schools might not know of collective values of argumentation.
15 Chris	Well at this school we have collective values of argumentation and things like caring and sharing and other things.
16 Allan	What school? At this school?
17 All	(Reading from problem text) " <i>At this school</i> ".
18 Tracey	Reads out the next problem: <i>Should there be an explicit rule against this action?</i> Explicit means written down.
19	(Students commence to individually represent their answers.)
20 Chris	Okay, how about we read that problem (the original problem) again and find out what it means? Referring back to the question 2: <i>Should there be an explicit rule against this action?</i>
21 Allan	I know that's what we are supposed to do, question 2.
22 Tracey	It says <i>Should there be an explicit rule against this action?</i> What does that mean?

It can be observed in the above text, that the students are employing the 'key-word' structure of 'collective argumentation' to guide their problem solving efforts. Under Chris' direction (turns 01, 05, 07), they read the problem (turn 02) and individually represent their responses (turn 08). Under Tracey's direction (turn 09), they proceed to share (compare and explain) their responses (turns 10, 11, 12, 13) and to question and justify their thinking (turns 14-17). Upon completing question 1, the group then proceed to use the same procedure to answer question 2 (turns 18 and 19). However, before the students can share their representations, Chris re-directs the group to the original problem statement with the suggestion that "we find out what it means" (turn 20). Allan's statement, that he knows what he is supposed to do (turn 21), moves to the background as Tracey, like Chris, highlights (turn 22) the meaning making process of the problem situation.

This text highlights the difference in the executive skills that members of this group have developed. For many students (like Allan) the task may be interpreted procedurally with progress being measured by the group's advancement through the elements of the 'key-word' structure. This approach can be expected of students skilled in the practices of traditional schooling as they appropriate the voice of the 'official' classroom script. This entails the expectation that the purpose of school tasks is to practice and consolidate given ways of 'knowing' and 'doing'. However, for students such as Chris and Tracey, the task is interpreted at the level of making meaning, a process that entails negotiating with the mediational means afforded to them by 'collective argumentation' in order to ensure that the requirements of the task

rather than the requirements of the process are met. So, in terms of the group aims for this problem solving situation, members of the group are not prepared to accept that the task is simply about employing the ‘key-word’ structure to solve a novel problem, but about using given ways of knowing and doing to negotiate the task effectively. This meaning-making stance, adopted by Chris and Tracey, enables the group to deploy a discourse format that assists students to populate the group talk with their own purposes, for example, those relating to personal experience or personal belief systems. This type of talk has the potential to weave together students’ ideas with the phases of the ‘key-word’ format so that the students’ approach to solving the problem reflects their specific circumstances and the requirements of the task (Brown & Renshaw, 2004).

The Method Script: How do we get there?

The group’s interweaving of personal understandings/beliefs with the mediational means afforded by group problem-solving continues as the students attempt to co-construct an understanding of how task requirements are to be met (see Table 2).

Table 2: Deciding how to achieve understanding.

Turn/Speaker	Text
23 Chris	This question here (pointing to the question on the sheet) wants it explained in three ways. Okay. What we are supposed to do is not just answer ‘yes’.
24 Annie	Attempts to interrupt to refer to the second (group) sheet.
25 Chris	Excuse me, just wait, I want to talk. This question number two here, we are supposed to answer it like in three sections like if ‘yes’, if ‘not’ and, um, ‘if no’.
26 Allan	Sorry to interrupt, but there is another page (group response) to the worksheet, this is just an (individual response sheet). . .
27 Tracey	We have to agree on everything because on our group sheet (the other page) we have to write down what we agreed.
28 Chris	How about we go on to question three and at the end we go back to that question.
29 Annie	No, but what we are supposed to be doing is writing down all our individual answers for the whole worksheet and then at the end we share them all with the class. Not going through each one (question) right away.
30 Allan	Why? We will get them done quicker that way (going through each question separately).
31 Annie	I know, but that is not the way it is supposed to be done.
32 Chris	Why? We are going to be doing it like this. Why we are answering our questions like writing down number one and then sharing it is because (if) we are just writing it down we are not going to be talking (about it).
33 Allan	That (Annie’s approach) will get boring
34 Annie	We’ll talk at the end
35 Allan	That (going through each question separately) will get all of our topics (ideas).
36 Annie	Get your ideas, individually represent them. . .
37 Allan	No you don’t do that question then that question and then that question and then that question and answer them all (talk about them all) at the end.
38 Chris	It’s too much, we should keep our mind on one question and then we talk about it.

The text commences with Chris informing the group that the task requires an explanation of any response that is made to question 1 (turn 23) and with Chris

dominating Annie's voice with the authority of the text (turn 25 - "we are supposed to answer it"). Invoking a social convention related to manners (turn 26 - "sorry to interrupt"), Allan raises the point that the task requires a group response to the questions. Tracy interprets the group response sheet as requiring that the group attain consensus before recording a response to each question (turn 27). Chris at turn 28 proposes that the group proceed to question 3 and return to question 2 later. Rejecting this proposal (turn 29), Annie informs the group that they are "supposed" to be treating the task as a whole and not break it up into sub-components. Allan (turn 30) queries this idea, stating that the questions will be "done quicker" by going through each question separately. Annie, agrees with Allan (turn 31), but states that the task is not supposed to be completed that way. Querying this statement, Chris, at turn 32, justifies why the group should approach the task question by question, offering the reason that it provides opportunities for group members to talk about their individual responses. This view is supported by Allan (turn 33 and 35) as being an interesting way of approaching the task that will support the voicing of each member's ideas. Maintaining that the group can talk after individually responding to each question (turn 34), Annie reinforces the process implied by the 'key-word' format of 'collective argumentation' (turn 36). However, this interpretation of the 'key-word' process is rejected by Allan (turn 37) and by Chris (turn 38) as being "too much" to keep in mind.

In this text we see how, as students negotiate ways to tackle the problem, they variously draw on the mediational means or voices available to them as they contest the purpose and ways of completing the task. The text highlights also how students (for example, Chris and Annie) view teacher authored texts (for example, problem statements) and pedagogical procedures (for example the 'key-word' structure) as authorities in the learning enterprise. For Chris, each response to each sub-component of question 2 must be explained because the text requires it. For Annie, each response to each question in the task must be represented individually before being explained. It is as if the problem text and the 'key-word' structure instantiate the presence of the teacher. However, both of these authorities are contested as the students populate the meaning of the task with their own purposes and beliefs. For Allan, the task needs to be interesting and completed as 'quickly' as possible. For Tracey, the group needs to reach a consensus before recording a response to each question. For Annie, the task needs to remain faithful to her interpretation of the procedures of 'collective argumentation'. For Chris, the task needs to be made flexible to the point where the group do not have to approach each question in sequence and manageable so that they can be mindful of each other's responses. Eventually the group decide to go with Chris' interpretation of the task and to represent, compare, explain, justify and agree on a question by question basis.

The use of the pronouns 'I', 'me', 'we', and 'our' in the above text signifies this group's approach to doing the task. The students use of the personal pronouns 'I' or 'me' is infrequent and restricted to situations where a personal contribution to the conversation is not perceived as being valued (Chris at turn 25) or to acknowledge personal agreement (Annie at turn 31). However, the frequent use of the collective pronouns 'we' and 'our' during the group discourse indicates that the students do not see their contributions to the conversation in narrow personal terms, but rather in broader communal terms. The group's prevalent use of 'we' and 'our' indicates that the members of the group view the responses to the questions posed as being co-

authored – that the responses were to arise out individual contributions that were transformed, appropriated and revoiced by the group.

This distinction between the personal and communal voice is important because it indicates that for the group, the solution process is taking on a ‘cultural’ character, that is, a cultural form of reasoning (Vygotsky, 1929/1994), where the individual responses need to belong to a conceptual framework in which both the meaning of the task and the individual responses which relate to it are part of a broader discourse - a discourse governed by the common knowledge and consensus making measures of the group. In this way, individual responses become “our individual answers” (turn 29), the task questions become “our questions” (turn 32), and individual thought becomes “our (thought) mind” (turn 38).

Evaluation Script: Knowing when you’ve gotten there.

Through populating the discourse with their own purposes and beliefs, the students are able to co-construct a hybrid response to the task that not only satisfies task requirements but also their specific requirements (see Table 3).

Table 3: Evaluating the completion of a goal.

Turn/Speaker	Text
39 Tracey	(Reading) <i>Can your group think of a circumstance at school where this would be acceptable?</i> No, we all agreed no because no fighting is acceptable?
40 Annie	We had to agree on countries?
41 Chris	We are talking about Australia here.
42 Allan	It (the problem statement) is already based on this country, it (the response) can’t be based on another country.
43 Tracey	“No, because no fighting can be acceptable”, okay, what else?
44 Allan	Yes, it’s not human to punch other people.
45 Tracey	Ok, its not acceptable – what else?
46 Allan	It’s not acceptable at all
47 Annie	But, it (fighting) happens, it cannot be stopped
48 Chris	It is very immature for a person to (fight)
49 Annie	There is a rule saying um . . .
50 Chris	It’s a law.
51 Annie	There are laws in the world saying you cannot lie, you cannot rob, you cannot kill, but people still do that, so punching - you cannot stop it.
52 Tracey	So, it’s very hard to stop it.
53 Annie	It’s not hard to, you can’t stop it, no way - even though there are rules that people get arrested for, they still do it.
54 Chris	It’s assault.

In the above text, Tracey acts as a monitor for the group, reminding them of the question that they were addressing and voicing their agreed response to question 5 (turn 39). Annie reminds the group that, before coming to this consensual response, they had to contextualise the task to Australian schools (turn 40) and Allan informs the group of the context evidenced in the text of the problem statement (turn 42). At turn 44, Tracey revoices (O'Connor & Michaels, 1996) the group's response to question 5 inviting further contributions from group members – “what else?” Allan contributes a value judgement about ‘punching other people’ and Tracey subsumes this response by paraphrasing the group's response and again asking for further contributions (turn 46). Annie, at turn 48, places a proviso on the group's response by stating that ‘fighting’ cannot be stopped even if legislated against by governments (turns 51). This proviso is revoiced by Tracey (turn 52), however this revoicing is rejected by Annie (turn 53) as not being emphatic enough – a seriousness which is given voice by Chris with the term ‘assault’.

The above extract is an example of co-authoring as students' ideas are interanimated by Tracey to provide a ‘wholeness’ to the group's response to a sub-component of the task. It is Tracey's voice that takes precedence as she revoices students' utterances in an endeavour to weave the group response. Through Tracey's monitoring, the group are able to enclose their discourse within clear boundaries (for example, to only talk about Australian schools) and to extend their thinking beyond the requirements of the task so as to contemplate the seriousness of ‘punching’ other people. This can be seen functioning at Turns 45 to 54, where Tracey's utterances position students as co-authors of the group's response to the task – authors capable of making a judgment regarding the relevance and acceptability of a re-voiced utterance.

Conclusion

This paper examines the interactions of four Year 7 students as they go about solving a novel task, unrelated to the current work of the classroom, away from the direct supervision of the classroom teacher, although still ‘under the surveillance’ of the video camera. In particular, the paper attempts to provide insights into the nature of the executive strategies made explicit by this group of students as they decided on what they were aiming for, how they were going to achieve it, and when they knew they had completed the task. The above analysis of student interactions suggests that the executive functions associated with understanding task demands, determining how to achieve task demands, and monitoring the achievement of task demands were shared between group members.

In terms of goal setting, the group engaged in a type of discourse that interweaved different perspectives – a type of discourse that appeared productive in enabling the students to appreciate the relevance of individual contributions to completing the task without marginalising the need to come to a more flexible, common understanding of task demands. In determining how to achieve task demands, the group employed linguistic devices, such as collective pronouns, to signal an approach to problem solving that foregrounded consensus making without disempowering the individual voices of students; that facilitated the taking up of reciprocal responsibilities in the learning process without explicitly allocating task roles; and that employed social conventions, such as not interrupting when others are speaking, without dominating the behaviour of the group. In evaluating task completion, students employed

discursive tools, such as revoicing, to position group members as authors of ideas and to enclose ideas in clear boundaries that allowed the group to extend their thinking without pursuing ideas that were irrelevant or unacceptable to task demands.

In summary, therefore, it may be stated that these students were motivated to 'speak' and 'act' as members of a collaborative group. In so doing they were able to generalise their thinking about the problem so that they could compare and reflect on ideas; objectify ideas so that they could accept, reject or modify them on the basis of reasoned argument; expand ideas so as to make their expressions more consistent with the 'voice' of the group; and to share ideas so as to establish a consensus. It must be remembered, that these students were not engaged in a task that was going to be extrinsically rewarding to them in terms of grades or class recognition. They were engaged in a teacher set task, away from the direct influence of the teacher, in a time usually devoted to their own projects of interest. It is surprising, therefore, that these children entered into such a high quality collaborative relationship in the pursuit of fulfilling task demands. It is even more surprising that these children continued on with the task during their own lunch time until they submitted a group response sheet that the whole group was satisfied with. A key theoretical claim of 'mediated agency' is, therefore, that collaborative learning is fundamentally shaped and constrained by mediational tools that students have available to them.

The benefits of collaborative learning need not be restricted to the formal contexts of the classroom nor to engagement with the content of specific subject disciplines. The benefits of participation in a collaborative process, such as participating in decision making processes and the adoption of executive roles within the learning process, originate from the partnerships established between teachers and students over an extended period of time. Through modelling the use of mediational tools, such as 'revoicing', in the teaching-learning relationship, the teacher provides students with opportunities to evaluate other interpretations or extensions of their representations in a manner that encourages the co-construction and evaluation of ideas. Through the provision of 'key-word' scaffolds and 'value' charters the teacher assigns authority to students in a manner that encourages participation in the collaborative process. Through providing students with the means to author individual and group responses to tasks, the teacher challenges students to extend their thinking beyond the personal and the individual to consider the social and the cultural.

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