

Using questions to explore student talk (and thinking) in Secondary 3 Geography classrooms

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Abstract

Helping students to engage in talk that develops thinking, conceptual understanding and domain-specific knowledge is an important task for educators. This paper explores the state of classroom talk in Pasir Ris Crest Secondary School. Specifically, do questions promote domain-specific talk that exhibits the desired knowledge and thinking within the Geography discipline? The study shows that domain-specific classroom talk is monosyllabic, limited or non-existent when questions posed are narrow. However, classroom talk has not exhibited the desired geographical literacy even with broad questions. Importantly, teacher's elicitation of geographical thinking and talking are crucial in promoting similar disciplinary literacy among learners, while the paucity of student agency in classroom tasks inhibits them.

Introduction

With the introduction of the Ministry of Education's (MOE) framework for 21st century competencies, greater attention is placed on enhancing students' learning through holistic education. While autonomy is given to teachers to design holistic education experiences for students, much of the classroom practices continue to prioritise examinations over holistic education. This could have resulted in didactic rather than dialogical pedagogy, and appeared to contradict the learning objectives stated in MOE's 21st century competencies framework. Therefore it is important to question the place of thinking and communicative skills in educating for the future. This study stems from the inquiries about the importance of social activity like classroom talk in shaping the thinking processes of students in learning Geography in Pasir Ris Crest Secondary School.

Question types and dimensions

Wragg and Brown (2001) carried out hundreds of lessons examining the use of questions in schools and they found that the kinds of questions posed in class influence student talk. There are four types of questions: (i) conceptual (ii) empirical (iii) value-based and (iv) managerial. With the exception of managerial questions, all other question types are used when learning a particular subject.

In addition, their research highlighted how each question type has different dimensions. Dimensions are often expressed in opposites like 'narrow/broad' or 'recall/thought' (Wragg & Brown, 2001, p. 20). For example, a conceptual question type can be described in a narrow dimension as 'What is the function of the ozone layer?' or in a broad dimension as 'To what extent does the ozone layer

contribute to global warming?'. Both dimensions test for the conceptual understanding of the ozone layer. Below is a summary of the two dimensions discussed in this study:

- Questions with narrow dimensions encourage convergent thinking and expect limited answers, while questions with broad dimensions encourage divergent thinking and accommodate a wide variety of answers.
- Questions with recall dimensions test existing knowledge and observations, while questions with thought dimensions use old knowledge to create new knowledge and ideas in learners.

Wragg and Brown (2001) cautioned that 'narrow/broad' and 'recall/thought' dimensions can be easily confused as they are not mutually exclusive. That means questions with a narrow dimension can also have a thought dimension. 'Are there more earthquake occurrences around the Pacific Ocean?' is an example of a closed question, but one that requires logical reasoning. Therefore, for each type of question, the dimension may exist as Narrow Recall (NR), Narrow Thought (NT), Broad Recall (BR) or Broad Thought (BT).

Talking and thinking geographically

The concept of "thinking geographically" is important in understanding what constitutes geographical talk. Geographical Association (2009) proposed that 'an essential outcome of learning geography is to think geographically' (p. 30), which is the thinking of geographical information in a conceptual form. Lambert (2004) alluded to "thinking geographically" as language learning where geographical information is Geography's 'vocabulary' and geographical concepts are Geography's 'grammar'. Thus geographical talk is evidenced when Geography concepts are accurately elaborated with the use of geographical information. The Geography concepts under this study are taken from the Ministry of Education's Geography teaching and learning guide (Curriculum Planning and Development Division, 2012, pp. 27-28) and they include concepts like 'place', 'space' and 'scale'.

Classroom talk

North American and English classroom research has shown that the most common talk sequences are the Initiation-Response-Evaluate/Feedback (IRE/IRF) sequences (Cazden, 2001; Nystrand, Wu, Gamoran, Zeiser, & Long, 2003). The authors have argued that IRE/IRF sequences are typical of "traditional" classroom discourse patterns which are dominated by teacher talk, leaving little or no room for promoting student understanding or cognitive depth. A typical IRE/IRF structure is shown here:

- Teacher: Initiates question
- Student: Responds
- Teacher: Evaluates or gives Feedback to students

Besides talk sequences, Barnes (2008, p. 231) also identified how the 'communication system' that teachers establish in their lessons determine the role students play, and the extent of their engagement in learning. He advocated the use of classroom talk as 'the readiest way of working on understanding' (p. 277) because spoken language is adaptable to the changes in students' minds, allowing them to experiment with new ways of thinking. Alexander (2008) continued Barnes' (2008) work further by positing the power of talk as a crucial and emerging pedagogy to shape students' thinking and to anchor their understanding in class. Alexander (2008), drawing from two decades of international research, observed that there are five kinds of teaching talk repertoires which teachers use in their teaching:

1. *Rote* is the drilling of facts, ideas and routines through constant repetition.

2. *Recitation* is the accumulation of knowledge and understanding through questions designed to test or stimulate the recall of what has been previously encountered, or to cue students to work out the answer from clues provided in the question.
3. *Instruction/exposition* is telling the student what to do, imparting information, and/or explaining facts, principles or procedures.
4. *Discussion* is the exchange of ideas with a view to sharing information and solving problems.
5. *Dialogue* is achieving a common understanding through structured, cumulative questioning and discussion which guide and prompt, reduce choices, minimize risk and error, and expedite the 'handover' of concepts and principles.

(Alexander, 2008, p. 2038)

From his research, the first three teaching talk repertoires are most commonly used and are the 'bedrock of teaching by direct instruction', while the last two are less prevalent and 'are most in line with prevailing thinking on children's learning' (p. 2040). Seen in this perspective, most IRE/IRF classroom talk sequences usually take on the first three forms of teaching talk as described by Alexander.

However, a large-scale three-year study carried out in Singapore's English and Mathematics classrooms showed that while IRE/IRF sequences may be typical of classroom talk, they are not a matter of elicitation of knowledge. Many of these classroom discourses are constructive, meaning the classroom talk promotes student understanding and opens up opportunities for cognitive depth (Hogan et al., 2013; Hogan, Rahim, Chan, Kwek, & Towndrow, 2014). Hogan et al. (2014) attributed their interpretation of the findings to the revisionist take by Gordon Wells and Courtney Cazden that IRE/IRF talk sequences is a neutral pedagogy and it is 'how the teacher optimally places particular questions during the classroom exchange, thereby opening up the range of potential responses' which is more important (p. 177). In fact, their findings showed that classroom talk that promotes understanding 'need not be dialogical in character' although dialogic teaching is efficacious in doing so (p. 181). Therefore it would be of interest to explore how questions influence student talk in Singapore's Geography classrooms.

The interaction between thinking, talking and learning

Social constructivists like Vygotsky (1978) argued that learning takes place in a socio-cultural context and is mediated by interaction between individuals. For example, when talk is carried out in a classroom by the expert teacher or the more knowledgeable peer, the novice students learn the language and ways of thinking associated with the subject discipline. This continual thinking and talking is discursive and reinforces the ideas every time lessons take place. Hence the most important learning we do, Mercer (2000) argues, is 'social' and 'mediated by others' because when people dialogue, they are not simply exchanging information, but are engaging in a social mode of thinking. Therefore, communicating is a collaborative endeavour in which meanings of words are negotiated as understanding always involves interpretation. This means that when students are educated in a subject discipline, they are also being inducted into new communities of discourse – which generate their own ways of 'speaking' and 'reasoning' and which students need guidance in learning.

Methodology

For this study, the topic *Variable Weather and Changing Climate – What is happening to the earth's climate?* was selected from the Secondary 3 Geography syllabus. A series of five inquiry-based lessons was designed to encourage social interaction (and talk) with students and teachers. A summary of the lesson inquiry, learning intentions and tasks is shown in Table 1 below.

Table 1

An overview of the lessons and tasks design

Lesson Inquiry	Learning Intentions	Learning Tasks
Lesson 1: What is happening to the earth's temperature?	Global temperature is increasing.	Understanding global temperature graph
Lesson 2: What causes global climate change?	There are natural and anthropogenic causes of climate change.	Expert-Home group work
Lesson 3: Is climate change detrimental to human society and the natural environment?	Climate change has brought both challenges and opportunities for our environment.	Debate
Lesson 4: Can changes in weather and climate be avoided?	Climate and weather changes are unpredictable and unavoidable.	Class discussion Written essay
Lesson 5: How are countries/nations responding to climate change?	Different countries have different responses to climate change.	ICT-based Performance Assessment

The lessons were critiqued and amended by four geography teachers to ensure alignment of learning intentions with the suggested activities and choice of questions. Two express stream classes taught by different teachers were selected because more curriculum time was allocated for those classes. Class A, which consists of 23 students, is average in their academic abilities and are more active. Class B, which consists of 26 students, is slightly above average in academic ability and is more reserved. All lessons were video recorded, transcribed and coded to understand how questions influence domain-specific talk in geography classrooms. Intercoder reliability was also high as every teacher coded the transcripts independently and then met together to share their insights.

Drawing on a range of literature, four rounds of coding (each with a specific focus) were carried out. In the first round, types of questions using Wragg and Brown's (2001) classification were coded. The second round coded for the use of geography specific terminologies (Geographical Association, 2012), the third round coded for the evidence of geographical concepts (Lambert & Morgan, 2010) as reflected in the MOE teaching and learning guide (Curriculum Planning and Development Division, 2012), and, in the final round, talk was coded to understand its purposes for teaching and learning. Table 2 summarises the coding carried out in this study.

Geographical talk and thinking is evidenced if classroom discourse reflects accurate geographical information (coding cycle 2) and geographical concepts (coding cycle 3), as explicated earlier in the literature review. Coding classroom discourse without understanding the talk in context may result in disparate understanding, therefore classroom talk is analysed in its linguistic, mental and cultural dimensions, an approach adapted from Littleton and Mercer (2013) as shown in Figure 1.

Table 2

An overview of the four coding cycles, each with a specific focus

Coding cycle	Coding cycle 1	Coding cycle 2	Coding cycle 3	Coding cycle 4
Focus of the coding	Question types and dimensions of questions (Wragg & Brown, 2001)	Geographical terminologies or information (Geographical Association, 2012)	Geographical concepts or “Big Ideas” (Lambert & Morgan, 2010)	Pedagogic function
Questions that guided the coding process	What is the type of questions posed? What is the dimensions of questions? (e.g. Broad or narrow? Recall or thought questions?)	How is geographical talk (& thinking) evidenced? Were geographic terms used in context to express a concept? How did students respond to the questions?	Was there evidence of conceptual understanding?	How is geographic information / questions used for the purpose of teaching and learning?
		What is the geographic term or information? How was it used – one worded or full sentences?		

Akin to the depth of focus in photography, analysis is carried out from a micro to a macro view, starting with the linguistic analysis and moving outwards to the cultural analysis. The ‘linguistic’ dimension analyses classroom talk as spoken text, hence it examines how geographical information and concepts are expressed as featured in the four coding cycles. The ‘mental’ dimension analyses classroom talk as shared thinking and action. Specifically, it analyses how reasoning is being pursued visibly and

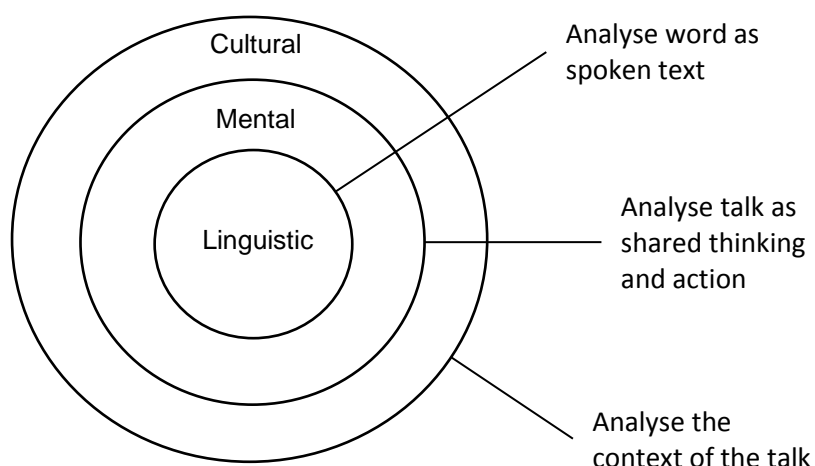


Figure 1. A model of classroom discourse analysis adapted from Littleton and Mercer (2013)

together with talk, and the interactions between speakers. The ‘cultural’ dimension adds an interesting perspective as it examines the context of talk, the ground rules (hidden or not) within the

class, and the kinds of reasoning that are valued and encouraged within the cultural institutions. Table 3 summarises the analysis made at each dimension used for the full study.

Table 3

Questions used in the analysis of classroom discourse

<p>Linguistic Analysis:</p> <ul style="list-style-type: none"> • How is language used in (school) Geography? • How are geographical terms and concepts expressed? • What are the purposes of statements, responses or questions?
<p>Mental Analysis:</p> <ul style="list-style-type: none"> • How is talk analysed as a chunk or whole? • How are questions posed by both teachers and students? • What are the responses given by both teachers and students to the questions? <ul style="list-style-type: none"> ○ Were the responses geographical? ○ What came before or after the responses? ○ Are the responses offered by the same or different student(s)? • For sections with extensive responses, what factors led to them? • For sections with shorter responses, what factors led to them?
<p>Cultural Analysis:</p> <ul style="list-style-type: none"> • What is the socio-cultural context of the classroom (and the school) environment in which the talk took place? • Are there any ground rules (obvious and/or hidden) that influence the kind of talk valued and encouraged in the classrooms?

Results

This report focuses on one lesson in order to keep the amount of data discussed here reasonable. Lesson 2 was chosen as the example as it contained more examples of teacher-students interactions in both Classes A and B. Lesson 2 will be summarised briefly before describing the analysed talk for Class A and Class B.

The recommended pedagogies for this lesson were expository teaching, a jig-saw cooperative learning technique and discussions. Students were posed a broad question, *‘Why do you think the earth’s climate is changing?’* to spark their curiosity. Thereafter, they were divided into groups to explore one of the causes of climate change. In addition to their textbook, each group was given a different information pack with additional readings. Every group was expected to become “experts” on the topic given, and hence students were to work collaboratively to achieve a common understanding before sharing with their classmates in a whole class discussion.

Questions and Responses in Class A

A wide variety of narrow and broad questions were posed to Class A by their teacher while each group presented their “expert” topic. It is noteworthy that about 95% of all questions were generated by the teacher.

Table 4

Distribution of question types and its dimensions in Class A

Dimensions of questions	Type of Questions			Total questions (by dimensions)	Questions by Students	Questions by Teacher A
	Conceptual	Empirical	Value			
Total NR questions	30	12	0	42	0	42
Total NT questions	18	1	0	19	1	18
Total BR questions	4	1	0	5	0	5
Total BT questions	4	1	0	5	2	3
Total questions (By type)	56	15	0	71	3	68

Most narrow questions generated one word answers and short phrases. However, when Teacher A continued to probe for further explanations, students were always able to respond in a coherently well explained (and geographical) manner. The team coded situations which required students to elaborate as ‘elaboration responses’ (ERs). Teacher A leaned towards questions that were incomplete and which required students to complete them in response. These were coded as “Fill-In-The-Blank” responses (FBRs). It appeared that narrow questions always generated one-word replies from the students, which were coded as ‘one-word responses’ (OWRs).

Sometimes, Teacher A’s questions did not generate accurate answers and she would in turn ask questions which required OWRs. In such situations, students’ OWRs were always correct. Interestingly, in two specific situations, Teacher A converted questions that could have generated ERs into simpler OWRs before the students had time to answer the initial question. It was also observed that whenever a series of three or four questions were posed, students only responded to the last question.

Talk structure in Class A

The groups in Class A presented their “expert” understanding by selecting a representative to share the information with the rest of the class. While this was taking place, the teacher posed questions to the group representative to clarify the concepts shared. An excerpt of the talk structure in Class A is shown in Table 5.

The talk structure in Table 5 typifies what authors term as IRE/IRF classroom discourse, which is dominated by teacher talk. Teacher A probed and provided a lot of guidance which encouraged ST1 to explain the concept to her classmates. Despite the lesson’s intention of having each group present, Teacher A was evidently in control of the discussion because responses from the rest of the “expert” group mates were hardly evidenced. There were occasional questions from other students in class which shifted the talk away from teacher-ST1 interaction to a teacher-students interaction. Nonetheless, teacher dominance was a significant feature for the remaining classroom discourse in Class A.

Table 5

Talk structure based on the group sharing on sunspot as a cause of climate change in Class A

Talk Pattern	Speaker	Classroom Discourse
Initiation	Teacher A	Okay ST1 will start. Okay ST1 can you explain variations in solar radiation, what does that mean. The rest of you should be looking at her.
Response 1	ST1	The total amount of solar radiation will rise.
Feedback 1	Teacher A	What does that mean?
Response 2	ST1	The change in the solar radiation is related to the number of sunspots
Feedback 2	Teacher A	Which means what? Explain to your friends.
Response 3	ST1	As the sun, as the number of sunspots decreases, it will contribute to a lower area.
Feedback 3	Teacher A	So you're sharing with us that there are sunspots on the, on where?
Response 4	ST1	The sun
Feedback 4	Teacher A	Okay so basically look at the photograph, that is how, er... this is the surface of the sun, you will see the black colour area right? Those are sunspots okay, so ST1, can you tell us these sunspots, are they hot or cold?
Response 5	ST1	Cold.
Feedback 5	Teacher A	Cold. So er... then would it be fair, if I say right, on the years that there are a lot of sunspots, then it would be cold?
Response 6	ST1	No.
Feedback 6	Teacher A	Why no? Explain to your friends.
Response 7	ST1	Because if there are more sunspots, the sun works to suppress heat right then if there are more sunspots, the heat will go to the surrounding areas causing the regions to be hotter and radiate more heat.

Generally, there was some evidence of geographical talk in Class A, but the phrases were highly contextualised and were difficult to decipher based on a one-time reading of the classroom discourse. Additionally, student responses from Class A were not extensive (eg. OWRs and FBRs), thus a geography concept was usually not explained comprehensively. From Table 5, it took Teacher A many probes and questions to help ST1 arrive at response 7, which is an example of geographical talk that exhibited the desired well explained concept of sunspots using the appropriate geographical terms.

Questions and Responses in Class B

Teacher B posed 75% of the total questions. The majority of the questions posed were narrow with the exception of two broad questions. A breakdown of the question types and dimensions are shown in Table 6. It is noteworthy that students contributed 25% of all questions generated in the classroom discourse.

Table 6

Distribution of question types and its dimensions in Class B

Dimensions of questions	Type of Questions			Total questions (by dimensions)	Questions by Students	Questions by Teacher B
	Conceptual	Empirical	Value			
Total NR questions	35	12	0	47	14	33
Total NT questions	6	1	0	7	0	7
Total BR questions	2	0	0	2	0	2
Total BT questions	0	0	0	0	0	0
Total questions (By type)	43	13	0	56	14	42

The majority of the students' responses were extensive, characterised by a greater quantity and quality of geographical talk. Even with fewer questions posed, it appeared that the use of questions had little influence on the quality of classroom (geographical) talk. The team contrasted this observation with Class A and thought it could be caused by other factors like the lack of wait time by Teacher A in Class A or how Teacher B invited the rest of Class B to question the "experts". Similarly to class A, whenever Teacher B posed narrow questions, OWRs and FBRs were always generated by the class.

It was evident that teacher B provided a wait time of about one to two minutes before each "expert" group presented their understanding to the class. Class B was more prepared to share their group's "expert" understanding on the causes of climate change with their classmates.

Talk structure in Class B

All members of the group took turns to share their "expert" understanding with the rest of the class. Teacher B reinforced the group's expertise by inviting the rest of the class to ask the "experts" questions if they were in doubt. An excerpt of the talk structure in Class B is shown in Table 7.

Students' responses appeared more extensive in Class B and most geography concepts were well explained using proper geographical terms. "Expert" groups readily answered their classmate's questions and individual students did not hesitate to clarify concepts with their "expert" peers if they were in doubt. Teacher B took on the role of a facilitator and allowed the "expert" group to control the classroom discourse. She only clarified misconceptions with instructional teaching when the students were confused. Such a talk structure, where interactions exist between students-students and between teacher-students, was typical of the classroom discourse in Class B.

Table 7

Talk structure based on the group sharing on sunspot as a cause of climate change in Class B

Talk Pattern	Speaker	Classroom Discourse
Initiation	Teacher B	The first group, variation and solar output, your job is to explain to us how that causes climate change.
Expert Group Talk	ST11	So the first chapter is variation and solar radiation, and sunspots are spots that have a lower temperature than the surrounding area on the sun. They are developed when intense magnetic field weakens the flow of gas that transport heat energy from the sun's interior... ... The heat flows to the surrounding area causes the region to be brighter than normal therefore radiating more heat and it contributes to a warmer global climate.
	ST12	
	ST13	
Invitation	Teacher B	Any questions class? Any questions for this group? Yes please. Don't look at me ... (and points to the "expert" group presenting)
Classroom Talk	ST00	Does the spot causes more heat?
	ST14	Cause like the heat go to the surrounding area right? So the surrounding area has more energy than... than...
	ST00	How does light suppresses.... How does the brightness affect the heat?
	ST14	So the heat is like suppressed by the sunspot right, so it wants to... like... compensate for that it have flow to the other region to radiate.
Inquiry	Teacher B	How does that result in climate change?

Discussion

Despite the teachers using the same planned lessons, teaching resources and pedagogical approach, this small-scale research has resulted in two different outcomes. This study recognised the difficulty in not controlling the differences in wait time and the quantity of questions, which may have contributed to the varying kinds of talk observed in both classes. Nonetheless, the question types, question dimensions and how they were used influenced the kind of talk in the Geography classrooms. It was evident that the use of questions by Teacher A influenced the geographical thinking and talking in her class. On the other hand, questions seemed to be of little significance in evidencing the geographical thinking and talking in Class B.

From the data, the lesson design and enactment appeared to play a critical role instead of the question types and dimensions. In the full study that looked at all five lessons, the data collectively suggested several plausible factors contributing to the varying degrees of student talk and learning. The factors were:

1. External Factor
 - a. Lesson design
 - b. Time given to complete the classroom task(s)
2. Student Factor

- a. Class ability
- b. Personal geographies/ Different everyday knowledge
- 3. Teacher Factor
 - a. Teacher beliefs
 - b. Site of geographical knowledge
 - c. Lesson enactment/ Teaching
 - d. Talking as communicative systems
 - e. Use of language
 - f. Managing social interactions
 - g. Managing responses

In this section, two pivotal factors based on Lesson 2 will be explicated to account for the differences between the two classes.

Teacher beliefs influence how learning is carried out

The versions of teaching that are enacted in class by every teacher derive their values from the purposes of education, the nature of knowledge and the social relationship between teacher and student (Alexander, 2008). For Classroom Talk Structure A, the site of geographical knowledge resided with the teacher because there was active ownership on her part in scaffolding the students' thinking and talking with many narrow questions – about 85% of the time! Alexander (2008) termed such a teaching talk repertoire as 'recitation', where knowledge and understanding of the causes of climate change were accumulated through narrow recall or thought questions. The narrow questions posed by Teacher A generated straightforward responses (i.e. OWRs and FBRs) from Class A. This may inevitably encourage students to "guess" the answers rather than think through the questions posed by the teacher. However, Teacher A's probing (seen in Table 5) eventually helped ST1 arrive at the desired geographical concept of how sunspot causes climate change.

Teacher A valued the accuracy of geographical information and she was more concerned that her students acquired the information correctly. In fact, she checked for understanding of the sunspot concept four times using different narrow question permutations like 'how does the number of sunspots affect world temperature?' and 'if sunspots are lower in temperature, why years with more sunspots have higher temperature?' (not included in the excerpt in Table 5). This might signal her uneasiness in the efficacy of using collaborative learning techniques in assessing students' learning. Additionally, Teacher A changed her more challenging 'narrow thought' questions into 'narrow recall' questions and this likely suggests that she was not confident her students could answer them accurately.

The classroom interactions always took place between Teacher A and one student. This was evidenced when Teacher A took the responsibility for answering students' difficult (and rather good) questions twice during the lesson. It is unclear why Teacher A did not get the whole class to think of the broad questions, which could have opened up the classroom discourse divergently. The lack of student agency in knowledge construction left little room for what Roberts (2013) called "sense-making", where students discuss or use talk as a means of "working on understanding" the concepts and of making sense of (through thinking about) the new information (Barnes, 2008).

In Class B, the location of geographical knowledge resided with the "expert" group. However, Teacher B took ownership of the learning when there were misconceptions over the geographical information shared. For example, one group misconstrued how volcanic eruptions led to an increase in temperature and Teacher B stepped in with many questions to help the group clarify their concepts with their classmates. Here is an example where the site of geographical knowledge is shared and

negotiated between the teacher and the “expert” groups. Despite the academic risks Class B might have encountered due to the inaccuracy of concepts presented by their peers, Teacher B’s actions suggested that she believed in the co-construction of knowledge through talk, particularly through the collaborative learning technique within the group and in the whole class discussion. According to Littleton and Mercer (2013), when children coordinate their mental efforts to share and challenge ideas through talk, they jointly construct new, more effective strategies for completing a task than they would doing the task alone. Thus, talking and thinking together further develops their ability to reason (Littleton & Mercer, 2013).

Teacher B was unconcerned with the inaccuracies that arose because she redirected the students’ questions to the “expert” group instead. In Vygotskian terms, the “expert” group took on the role of the “more knowledgeable other” in helping the class advance learning through expository talk or teaching (Vygotsky, 1978). The transfer of responsibility gave students agency in co-regulating their own “expert” responses to the class’s questions, thus promoting thinking and learning (Littleton & Mercer, 2013). This was seen when a group took ownership to clarify the geographical concepts three times to their classmates without Teacher B’s nudging or help, hence it was not surprising it generated the greatest number of narrow questions from their classmates, questions that Wragg and Brown (2001) pointed out were often used to clarify ideas.

Lesson design and enactment

Another important contributor to the varying degrees of talk between the two classes is the enactment of the planned lesson. For instance, the more active Class A was observed to be “quieter” than the more reserved Class B when it came to group work. “Expert” groups in Class A spent most of their time reading the geographical information silently, jotting down notes and had seven minutes of group discussion. However, “expert” groups in Class B were given the reading task a day before class and they were observed talking together most of the fifteen minutes which was allocated for group work. The longer preparation and discussion time could have contributed to the extensive talk observed in Class B.

While the planned lesson was designed to promote joint thinking and talking, this study was unable to ascertain if such collaborative work was really carried out because there was no recording of individual group talk besides the total time allocated for group discussion. Thus Littleton and Mercer’s (2013) speculation about ‘many students... do not know *how* to talk and work together effectively, but *teachers assume that they do*’ (p. 173, italics ours) may be true to some extent for both classes. Simply put, the students may not know *how* to go about doing a collaborative activity where ‘ideas are challenged and reasons offered in pursuit of a common goal’ (p. 173).

Conclusion

This study shows the extent to which types and domains of questions are able to encourage student talk in geography classrooms. Narrow questions have limited students’ responses, yet broad questions may not have opened up talk. Therefore this study believes classroom talk is influenced by *how* questions are asked and not just the *what* (Hattie, 2012).

The two teachers shared in the post-lesson interviews why they enacted their lessons in the manner which was observed above. As beliefs influence how knowledge is constructed in the Geography classroom which affects how teaching is enacted daily, this study suggests this is a likely factor which determines if student agency (in thinking and talking) is encouraged or inhibited. In fact, Roberts (2013) puts forward the idea that a shift in classroom culture is mandatory if classroom talk is to

include that which is discussion or dialogue in nature. Such classroom talk is very difficult to achieve because knowledge is constantly contested by the participants in the talk, yet firmly steered by the teacher with specific educational goals in view. For such teaching to take place, and,

[i]f we want to make the transformation of classroom talk achievable for other than the most talented teachers, we might concentrate first on getting the ethos, dynamics and affective climate right; that is by making the talk collective, reciprocal and supportive.

(Alexander, 2008, p. 2179)

Indeed, subtle aspects of a classroom environment that enable talk to thrive must be brought more to the consciousness of teachers in their practice, apart from just the choice of questions and use of probes which this study has considered. There are indications in the larger five lesson study that showed how teacher modelling of geographical talk (and thinking) is important in inducting novice students into the specialised ways of thinking and reasoning about geography, which this paper did not look at.

What kinds of learning do we want to see in our students? Essentially, all the learning in which students participate in school that helps construct geographical knowledge and understanding depends on the use of a powerful pedagogy, which should take a prominent place in the classroom culture to promote thinking, criticality and student agency through investigations and classroom talk (Roberts, 2017).

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