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A Dialogic Teaching Approach: Talk Moves to Deepen Students' Understanding in the Geography Classroom

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Abstract

In most Singapore classrooms, lessons are typically characterised by the traditional Initiation-Response-Feedback (IRF) instructional sequence. Such an approach limits students' ability to engage in meaningful classroom discussions and is contrary to achieving 21st Century skills. This paper analyses the power of dialogic talk in the classroom to engage students in more critical thinking and learning. This paper examines how the quality of dialogue and learning outcomes in the classroom will be influenced when students are conferred more authority in the classroom and positioned as significant figures of knowledge construction. This topic of study is significant as the foundation of Singapore geography is underpinned by an inquiry approach, where knowledge construction is anchored upon asking key and guiding questions.

Introduction

Leading researchers of classroom talk (Barnes, 2008; Mercer, 2008; Alexander, 2006 & Baktin, 1981) have noted that in most classrooms, lessons are typically characterised by the ritualised exchange of Initiation-Response-Feedback (IRF) instructional sequence. The nature of such an approach breeds over-reliance on the teacher for the 'model' answer (ibid). Recent research has shown that students have limited opportunities to engage in rich classroom conversations, which is contrary to achieving the 21st Century skills vital for the development of Singapore's workforce to think independently, critically and creatively (ibid).

Dialogic teaching is a powerful approach in harnessing the power of talk to stimulate thinking and enhance students' learning (Scott, Mortimer & Aguiar, 2006). Through the study of talk moves, one will better understand how to engage students to think critically, optimally bouncing off ideas in the classroom. This study is highly relevant to the Desired Outcomes of Education (DOE) in Singapore to develop students to become a confident person, a self-directed learner, an active contributor and a concerned citizen (MOE, 2004).

The question begets: How can a teacher create an environment that engages students in investigating, reasoning and promoting deep critical thinking? Through dialogic teaching, teachers are able to use strategic questioning to effectively engage students to think and form complex knowledge. Moreover, this topic of study is significant to Singapore because the foundation of geography is underpinned by an inquiry approach, where knowledge

construction is anchored upon key and guiding questions.

Dialogic Teaching in Classrooms

Through dialogic teaching, the aim is to facilitate critical thinking and deep authentic learning. "Dialogic" is a form of classroom talk that builds students' understanding over the course of the lesson in a process that exhibits evidence of 'purposefulness', 'reciprocity' and 'cumulation' (Alexander, 2008). As argued by Mercer & Hodgkinson (2008), one key element of classroom talk is teacher questions. The dialogic questioning approach has proven to be an effective means to promote deep student learning as it encourages active participation, where through the exploratory transactions, students improve upon their own understanding (Wells & Arauz, 2006).The distinction between discussion and dialogue is the inclusion of cumulation. Cumulation occurs when 'teachers and students build on their own or others' ideas and chain the claims into coherent lines of thinking and enquiry' (Toh, 2012, pp. 33). Without cumulation, classroom talk becomes discussion only, not dialogue. Specific to geography, adopting the dialogic approach will potentially involve students in working together to apply a new geographical idea to construct an explanation.

Douglas Barnes (2008), a distinguished classroom discourse analyst, notes that "knowledge is too often presented as if it is beyond challenge and beyond the examination of alternatives' (pp. 14). Over the years, he analysed teachers' questioning in the classroom and his report showed the disproportionate number of questions asked that require a predetermined answer (closed-answer) as compared to open questions which are not seeking just one right answer. Closed teacher questions position teachers as the sole legitimate source of knowledge (ibid).

In contrast, dialogic approach finds it roots in the casual conversation of informal discussion (Alexander, 2006). In the UK, the Qualifications and Curriculum Authority (QCA, 2000) strongly identifies "dialogic teaching" with effective whole-class instructional approaches as a basis for learning. In North America, there has been a shift towards students working collaboratively on open-ended activities and talking their way to solving problems (Kelly & Brown, 2003). Research done in understanding classroom talk in secondary schools in Singapore is predominantly focused on mathematics lessons. There has only been one piece of research done on geography (Ho, Rappa, Bong, Chin & Ng, 2017) in Singapore to date. Specific to geography, meaningful understanding of geographical knowledge must entail dialogic passages of interaction that contribute to students' meaning making of geographical concepts. Do geography teachers do most of the talking and the students participate merely by responding to teacher questions and receiving evaluation of their responses? Or is there scope for students to be initiating more of the talk in the classroom?

This research study on the patterns of interaction in the Singapore classroom is specific to geography. It seeks to examine whether the quality of interactions in the classroom are better by looking at two types of lessons with the same teacher and same class and how the quality of interactions in the classroom differ when the teacher or student leads.

Methodology

The study was carried out in an average mainstream school in Singapore. One teacher was selected along with a

secondary one express class with 15 students. A video camera was set up at the back of the classroom to capture the transactions occurring in the classroom. The various lesson segments were broken-down into two different teaching approaches – teacher-directed teaching and student-initiated teaching. The recordings were transcribed verbatim and served as primary sources of data for the research.

The analysis was guided by Mortimer & Scott's framework to analyse how teachers guide students in meaning making and knowledge construction through talk in the classroom (2003). The framework looks at 5 key aspects (see full details in Mortimer & Scott, 2003) with particular focus on the role of the teacher and is categorised into 3 main themes – the teaching focus, approach and action (Refer to table 1).

Table 1: The analytical framework: A tool for analysing meaning making interactions in classrooms

	Aspect of analysis	
i) Focus	1. Teaching purpose	2. Content
ii) Approach	3. Communicative approach	
iii) Action	4. Teacher interventions	5. Patterns of interactions

I focused on two aspects in the analysis – 1) communicative approach and 2) patterns of interactions. The concept of "communicative approach" provides an avenue to analyse how the teacher guides the students to construct ideas in the classroom. The different classes of communicative approach are denoted based on whether the classroom rhetoric is authoritative/dialogic in nature and whether it is interactive/noninteractive (Mortimer & Scott, 2003, p. 33). I also drew on Chin's work (2006) to break down the exchanges in the interaction discourse into four main components: 1) the form of the utterance/move (I, R or F structure), 2) type of utterances (whether the utterance is in the form of a question Q, answer A, statement S, comment C), 3) purpose of utterance representing the function in that discourse move (reply, recall, elicit, clarify, probe, etc.) and 4) the type of cognitive process (hypothesise, predict, evaluate, etc.) which indicates the thinking processes linked with student's responses.

Findings & Discussion

Through the analysis of the lesson sequences, the main findings were that student-initiated interactions led to more critical and evaluative thinking in students, while teacher-initiated interactions led to fixed IRF sequences where the teacher did most of the talking and students tended to give one-word replies with little scope for discussion.

Teacher-Initiated/Directed Teaching Approach

Through the analysis of the interaction sequences of teacher-directed talk, data showed that teacher-initiated talk generally produced sequences that were authoritative in nature. Moreover, the interaction patterns hindered students from making their thinking explicit, which also limited the scope for discussion in the classroom discourse.

Patterns of interaction & communicative approach

Focusing on the pattern of the moves in the sequence of the teacher-initiated talk, the IRF format generally took on a very distinct triadic structure. Referring to Excerpt 1 below, the pattern of interaction plays out in patterns of three generating interaction chains, which take an I-R-F-I-R-F-… form. This form of chain of interaction is closed in nature where the final evaluation is from the teacher. The students participated less and the bulk of the sequences were the teacher talking.

Excerpt 1:

12	Teacher	Okay, maybe we expand from the point on over usage. Who will overuse it?	I
13	Student A	People who take it for granted.	R
14	Teacher	Okay, can you give me examples?	F–I
15	Student A	Humans.	R
16	Teacher	Definitely. Give me examples on how humans can take it for granted and overuse the water.	F–I
17	Student A	Waste.	R
18	Teacher	Okay. How? [How can humans waste water by overusing it?]	F–I
19	Student B	Open the tap.	R
20	Teacher	When you turn on the tap and then you just let it flow…	F

With particular attention to turns 15 and 17, it can be seen that prompts by the teacher elicited single-word replies from students. The consequent environment created in the classroom due to the fixed IRF sequences led to low levels in the quality of student participation. This was also mentioned in Dillion's (1985) work where he concluded that question sequences posed in the fixed IRF format resulted in the lack of student active engagement.

Furthermore, in the interactive and authoritative communication approach, the classroom interaction sequences flowed through a more authoritative discourse where the direction was already set in advance by the teacher. With particular reference to turns 25 (Except 2) and 43

(Excerpt 3), it can be seen that the teacher focuses on one specific point of view and leads the students through a question and response routine and heads towards the goal to establish and consolidate that point of view.

Excerpt 2:

23	Teacher	When the water evaporates it will condense and fall as rain right?	I
24	Student C	(Silence)	–
25	Teacher	So rather than saying the weather is too hot, can we focus on the rainfall?	F–I
26	Student D	Maybe it rains lesser.	R
27	Teacher	(Approving nod) Maybe there is less rain. For some reason, it does not rain as much. (Writes 'low rainfall' on board)	F

Excerpt 3:

39	Teacher	What else? (Where do you think the waste come from?)	I
40	Student I	Factories.	R
41	Teacher	Okay. How do factories pollute the water?	F–I
42	Student J	Oil.	R
43	Teacher	Factories can pollute by throwing their chemical waste into the river… or oil as well. (writes 'oil spilage' on board) So when we say factories oil spilage right, what kind of industries is it? Starts with 'i'.	F–I
44	Student K	Industrial.	R
45	Teacher	Yes. (Writes 'industrial waste' on the board)	F

As a result, this produced low levels of explicit interanimation of ideas (Mortimer & Scott, 2006) where the teacher simply listed students' ideas on the board to make the different ideas available, but little development was made on the ideas. This also supports Lemke's (1990) study that drew linkages to the control of knowledge in the classroom when teacher authority assertion is maintained through the fixed IRF sequences. Here, the students are perceived to be 'receivers' more than 'producers' of knowledge construction in the classroom – this results in the students being stuck in the mentality of passivity even when the teacher puts in effort to probe further during discussions.

Authority and power

As seen from the above discussion, the teacher attempted to probe further on many

occasions, but the students still gave short-ended responses that did not allow for cumulation of ideas from peers. Students seem to be stuck in the passive mentality of 'absorbers' of knowledge despite constant probing and this could be due to the authoritative climate set up in the classroom. Mehan and Griffin (1979) argued that most authoritative interactions are facilitated through the distinct IRF pattern. This creates the mentality that the teacher is the sole knowledge producer and that students are merely receivers to the knowledge narration.

Student-Initiated/Directed Teaching Approach

In contrast, student-initiated talk in the classroom tends to be more interactive and dialogic in nature where interaction exchanges have more room for alternative responses and unplanned sporadic discussions. Analysing the interaction sequences, data showed that student-initiated talk resulted in higher productive engagement in class.

Patterns of interaction & communicative approach

Looking at the structure of the exchanges between the teacher and students in the classroom, it can be seen that the interaction patterns are nontriadic in nature. Referring to Excerpts 5 and 6 below, interaction patterns generated an I-I-R-I-R-I-I-R-I-R I…F form, where the questions (I) were not solely posed by the teacher, but by students as well. These patterns are highly complex, as the response from one student may not address the initial question posed, but might be a comment on a particular student's response.

Excerpt 4:

46	Teacher	Okay, times up! Ok. Anyone wants to volunteer?	I
47	Ali	(Raises hand)	–
48	Teacher	Ok Ali. Can everyone give him a round of applause?	I
49	Class	(Claps for Ali)	–
50	Ali	The water evaporates and vapour condenses into tiny water droplets and then there is precipitation. There is condensation of the water vapour. There is surface water that flows into the sea. This whole process repeats.	R
51	Student A	How do you know when the clouds get too heavy?	I
52	Class	Waah…	–
53	John	Oh because when too much water vapour evaporates to form clouds then cause what is held up in the air by water vapour Then the water vapour that is evaporating … Then the cloud will fall down as rain.	R
54	Student B	What? How did you know?	I

55	Teacher	I think the question will be better if rather than 'how do you know when it is heavy' because you cannot really go and weigh it right? But what do you mean by the clouds are too heavy?	I
56	Student C	Colour.	R
57	Teacher	So that is when we know it is getting kind of heavy. But what do you mean by when the clouds are too heavy?	I
58	Ali	The water vapour condenses then too much water vapour then cannot contain them that is why it falls down as rain.	R
59	Teacher	How come it cannot contain them? [Why is it that the cloud cannot contain the water vapour anymore?]	I
60	Class	(discusing amongst each other and students raise their hands)	–
61	Student D	There is more water vapour on the top so when it falls down it beats the water vapour coming up so it will fall.	R

Focusing on the quality of the questions asked by the students during the course of the lessons, the questions that arose were spontaneous and thought provoking in nature. An example is a question posed in turn 51 where a student casually asked, "How do you know when the clouds get too heavy?". This evidently sparked the curiosity of the whole class, which sustained the attention of the students throughout the course of the discussion, where the students were participating actively and were genuinely engaged. Moreover, the students were mainly leading the discussions while the teacher was present to guide them along when needed (turns 55 and 59). The students' responses were not only more than one word replies, but were rich in content as well.

The alternative form of interaction from the traditional IRF format helps to sustain the interaction in the classroom as the teacher prompted further to get the students to elaborate their point of view (turn 55–61). Extended interaction chains of dialogue are vehicles for sustained thinking to support students to elaborate their answers and support them to make explicit their thinking process (Thompson, 2008). It can be seen that students (as opposed to just the teacher) also initiated the sequence by posing a question (turn 51). This shows that students were genuinely engaged in the classroom conversations.

Organic processing & construction of knowledge

When the student-teachers were teaching and explaining certain processes in the class, the delivery was hesitant and broken. Referring to turns 70 and 72 (Excerpt 5), it can be seen that the interaction exchanges had several halts and were rather disjointed with abrupt interjections of 'Uhhmm's and 'Errr's.

Excerpt 5:

	Teacher	Mr Andrew! You are a teacher now. Can you explain to us how altitude influences temperature?	I
70	Andrew	So, every 1000 metres is decrease by the atmosphere the temperature will decrease by 6.5 degrees. Uhhmm… Example. I draw an example. This is a mountain. So imagine the surface has a temperature of 36.5 degrees celsius. So when it increases by a 1000 metres, the temperature will soon become 30 degree celsius. So… uhmmm…. If increase by another 1000 metre, then the temperature will drop to 23.5 degree celsius. There is also a radiation called the short wave radiation. It is caused by the heat short wave radiation from the sun. So when the shortwave radiation hits the ground it will not just dissipate it will be converted to long wave radiation. So the long wave radiation is denser than air, the ground absorbs more and the higher the temperature will be. Uhhhm… ya, that's all.	R
71	Teacher	What is altitude?	I
72	Andrew	Errr…. The altitude is errr….the elevation between the ground to the atmosphere.	R

The nature of the talk was sound choppy and incomplete but this is an expected outcome – the sudden jerks and changes in direction show that the student-teacher is engaging in deep thought and is thinking 'aloud' in class (Barnes, 1976/1992).

Authority and power

Referring to the excerpt from Excerpt 6 below, Tim took his role as a student-teacher very seriously and even paused to explicitly check for understanding during the course of his explanations (turns 80 and 82). When the teacher set up the environment for student-initiated talk in the classroom, it transferred some of the position of authority to the student-teacher. As the status of superiority is spread out (not placed entirely on the teacher), this created a non-threatening environment to discover and engage in dialogue. This is evidenced from the questions that students posed that were spontaneous in nature and which sparked genuine eagerness to learn more.

Excerpt 6:

	Teacher	Okay, Mr Tim! Come up and explain please. (How does cloud cover influence temperature?)	I
78	Tim	Hello class. Today we are going to talk about cloud covers. So we have the presence of clouds and the absence of clouds. During daytime, when there is clouds right, the sun actually produces short wave radiation. So during daytime, when the sun produces short wave radiation, some of them will be reflected from the cloud and… reflected back into space. While there are also some short wave radiation that passes through the cloud – that passes through some	R

		space in the cloud. Thus, the temperature is higher, as compared to the absence of cloud. Because when the… (pause)	
79	Class	(slight mumbling)	–
80	Tim	Oh wait. Lower, lower, lower… I meant lower, as compared to the absence of cloud because when there are no clouds right, short wave radiation passes through because there are no clouds causing the temperature to become higher. Do you understand? For the daytime? Understand ah guys? Understand or not?	R–I
81	Student A	Yes.	R
82	Tim	Now, for nighttime. During nighttime, short wave radiation will be converted to long wave radiation. Which longwave radiation from the ground will… err… reflect back into the space. So when there are clouds right… night time there is no sun, so the only heat that is radiated is long wave radiation. So at night when there are clouds right, the clouds will actually absorb the long wave radiation, that will cause the temperature to be higher. But when there are no clouds, the long wave radiation will directly go back to space. Which means, the temperature is lower. So that is the difference between the presence of clouds and the absence of clouds. Can understand or not?	R–I
83	Teacher	Mr. Tim, where does the long wave radiation come from?	I
84	Tim	The… actually the short wave radiation is converted to long wave radiation from the ground.	R
85	Student C	There are clouds in the nightime, why the temperature still higher? [Why is it that when there are clouds at night, the temperature will be higher?]	I
86	Tim	Cause the clouds during nighttime, they actually absorb heat from the longwave radiation. That's why the temperature is higher.	R
87	Student D	In the daytime, the clouds reflect shortwave radiation. Then how come nighttime the clouds do not reflect longwave radiation? [Why is it that the clouds do not reflect longwave radiation during nighttime?]	I
88	Tim	The reason being is that longwave radiation is already from the ground, thus it cannot be reflected back its just…	R

As the interaction chains extended, a shift can be observed in the classroom discourse whereby students started asking questions in a candid and spontaneous manner (turn 85 and 87) – no probing by the teacher was required. This shows high productive engagement and genuine participation in the class discussion.

Implications for Teaching and Learning

Intentionally set up student-initiated talk in the classroom

Introducing student-initiated talk in the classroom creates an avenue for teachers to ask questions to assess students' learning and at the same time create a safe environment that encourages students to give more elaborated responses. Moreover, student-teachers are seen to be more receptive to feedback given by peers and are more responsive to the comments made in class. Student-initiated talk in the classroom allows for spontaneity in asking questions in an organic manner. By appointing a student-teacher in the class, the teacher hands part of the responsibility of thinking back to the students by getting them to respond to the prior utterance. Through reflective tosses (Zee & Minstrell, 1997), it helps to bring the students' knowledge into explicit public view where various points of view are considered and the students are able to monitor their own thinking. This engages the whole class in the discussion where genuine curiosity is sparked due to the comfortable environment to ask questions spontaneously.

Inculcate a habit of 'thinking out loud' in class

According to Alexander (2008), the teacher's role is to manoeuvre classroom discourse to offer cognitive challenge for sustained thinking. In the geography classroom, students could be scaffolded to make connections with their own experiences and discuss areas where new content seems to clash with pre-existing knowledge. The teacher should intentionally provide opportunities for explicit 'student performances' of understanding by the student-teacher. Discussions and explanations led by student-teachers should be a central part of lessons in the classroom, where their formulation of geographical conceptions and thoughts are verbalised and further expanded upon (and self/co-corrected) during the lesson by the teacher and their peers. Students should be expected to ask questions as well as to be ready to answer the questions posed by their peers. Questions not only enable students to engage in productive thinking, but their verbalised thought processes also provide a valuable indicator to the level of comprehension of content and happenings in class.

Teacher modelling – teacher and student as learners

There is a need to shift away from the 'teacher as teacher' and the 'student as student' mindset and instead look beyond that to see teachers and students both as *learners* in the geography classrooms. It has been shown that talk amongst students is important and can make significant contributions to learning (Mortimer & Scott, 2006). However, research has shown that simply putting students together in groups to communicate to solve problems is insufficient to ensure they will use dialogue effectively (ibid). Hence, the teacher needs to be actively involved – but not as one holding full control and power to knowledge as a teacher, but occasionally as the position of a 'student' as well. An example can be seen in Excerpt 6 where the teacher becomes the

'student' and hands the position of the teacher to a student, Tim. Referring to turn 83 and 91, the actual teacher acting as a student effectively modeled to the class how they should be thinking critically and how they should be asking questions in class. The teacher can take a step down from his/her position as the 'head' of knowledge construction to be alongside with students to co-construct knowledge with students and model dialogic talk as a student.

Conclusion

This paper has examined the productive outcomes of dialogic talk in Singapore classrooms specific to geography. The inquiry approach of Singapore's geography curriculum is not a simple linear process. It is a dynamic experience, which aims to develop the skills to exercise reasoning and reflective thinking. This research is useful because the curriculum structure of inquiry-based learning may not necessarily translate into effective teacher questioning for authentic learning in the classroom. This paper has also examined how student versus teacher initiated talk led to different interaction patterns and focused on the effectiveness of dialogic teaching approaches.

A question that was posed at the start of this paper: How can a teacher create a classroom environment that actively engages students for deep learning and critical thinking? Introducing student-initiated teaching in classrooms will help to develop informed, concerned and participative students (and by extension citizens) where students develop the necessary skills set to engage in the inquiry approach of authentic learning. Dialogic talk is hence the way forward to develop critical and meaningful thinkers of the next generation.

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