

## Teacher reflective practice to promote productive student talk in the subject classroom

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### Abstract

*This study looked at how teacher learning regarding classroom talk could promote productive student talk in the subject classroom. Two teachers, a Mathematics teacher and a Science teacher, from St. Andrew's Junior School worked collaboratively with members of the English Language Institute of Singapore (ELIS) Subject Literacy Team over seven months. The teachers and the ELIS team jointly participated in a process of reflective practice to enable productive classroom talk. The results for both subjects show that classroom talk changed over two lessons in ways that enhanced student participation and thinking. It is proposed that the reflective practice process positively impacted teachers' understanding of classroom talk and improved the quality of classroom talk.*

### Introduction

The authors were cognizant of the key role that English medium subject teachers had to play in facilitating classroom interaction and encouraging communication in the classroom. In the Singapore Primary Mathematics syllabus (Curriculum Planning and Development Division, 2013), communication is an important process related to reasoning and connecting ideas. In the Singapore Primary Science syllabus (Curriculum Planning and Development Division, 2014), teachers are encouraged to incorporate communication into their teaching strategies in order to further emphasise the learning of Science as inquiry. This study sought to find out how a reflective practice process would impact talk for learning in English medium subject classrooms.

### Literature Review

Teachers play a key role in helping students to engage in talk that can develop thinking and content understanding. Cognitive development is more likely when one is required to explain, elaborate, or defend one's position to others as well as to oneself. Striving for an explanation often makes the learner integrate and elaborate knowledge in new ways (Vygotsky, 1978). Crucially, 'how students think and consequently what they learn depend a lot on how their teachers respond to their students' responses' (Nystrand, 1997).

The 'Skilful Teacher' is one who is competent in using talk strategies, such as questioning, to achieve clarity of instruction (Saphier, Haley-Speca, & Gower, 2008). According to Walsh (2003), teacher interactional competence entails being able to make conscious decisions about how best to respond to their students to achieve instructional goals. Hence, teachers need to have a good understanding of the interactions in their classrooms. Walsh also noted that 'teachers of content

subjects like Science and Maths have been aware of the need to understand classroom communication for some time’.

Teachers can enhance their understanding of classroom talk through engaging in reflective practice. Reflective practice can allow for teachers’ ‘reflection-on-action’ (Schon, 1983) regarding their own classroom talk as they may not be fully aware of the thinking and beliefs underlying their moment-to-moment interactions with students. It is proposed that reflective practice could be more ‘principled’, ‘objective’ and ‘supported by collaborative discussion’ (Mann & Walsh, 2013). Hence, the process of reflective practice can include reflection on data of classroom talk, use of appropriate reflection tools and dialogue with a fellow professional.

Didactic and teacher-centred patterns of classroom talk occur frequently and persistently across subject areas (Kramer-Dahl, Teo, and Chia, 2007). Teachers need to be able to shift classroom talk between teacher-centred talk and student-centred talk according to planned instructional goals at different phases of a lesson. To enhance their understanding of classroom communication and competence in classroom talk, the teachers in this study engaged in a reflective practice process supported by the ELIS team.

## **Methodology**

### *Samples*

For this study, English was the medium of instruction. The Mathematics class in the study consisted of 38 Primary 4 students of average ability and the participating Mathematics teacher had been teaching for approximately eight years. The Science class consisted of 33 Primary 5 students of average ability and the participating Science teacher had been teaching for approximately two years.

### *Classroom Interaction Teacher Reflection Tool*

The Classroom Interaction Teacher Reflection Tool (CITReT) is a paper-based reflection tool. It was developed by the ELIS team based on analyses of transcripts presented in local and international literature on classroom discourse. CITReT was designed for use by the teachers to plan, analyse and reflect on their classroom talk in terms of four modes shown below, and corresponding teacher and learner interactional features:

#### **a) Managerial**

The teacher conveys information related to lesson management.

#### **b) Knowledge Transmission/Reproduction**

The teacher transmits content knowledge and evaluates learners’ understanding of transmitted knowledge.

#### **c) Facilitation of Knowledge Appropriation**

The teacher elicits, extends and synthesizes learners’ contributions in order to converge upon specific content knowledge.

#### **d) Facilitation of Knowledge Transformation**

The teacher elicits and extends learners’ contributions such that learners synthesize ideas and put knowledge to work in other contexts or forms.

Table 1 shows an extract of CITReT. Two modes which the ELIS team identified as common features of student talk in subject classrooms are ‘Knowledge Transmission/Reproduction’ (KTR) and ‘Facilitation of Knowledge Appropriation’ (KA). Table 1 also shows examples of interactional

features that characterise each mode. Green represents the teacher interaction feature and grey represents the learner interactional feature under the respective modes. Each interactional feature is assigned a code (e.g. T8 and S2). In total, there are 19 teacher interactional features and 13 learner interactional features across the four modes in CITReT. The coloured cells below the modes indicate the involvement of the teacher (green) and students (grey).

Table 1  
Extract of CITReT

Teacher Interactional Features	Knowledge Transmission/ Reproduction (KTR)		Facilitation of Knowledge Appropriation (KA)		Learner Interactional Features
T8: Evaluates learners' contributions					S2: Provides short answers without elaboration in response to teachers' questions
T15: Challenges learners in order to deepen their reasoning					S5: Provides justification for views

Excerpt 1 is an example of interactional features and the codes constituting the KTR mode in classroom talk.

Excerpt 1  
An example of a classroom talk segment with features of the KTR mode

Turn			Interactional Feature	Code
1	Teacher	What is the function of the human body's muscular system?		
2	Student	It helps different parts of the body to move.	The learner provides a short answer without elaboration in response to the teachers' questions	S2
3	Teacher	That's right!	The teacher evaluates learners' contributions	T8

This excerpt shows that in response to the teacher's question, the student provides a short answer without elaboration (Turn 2), which the teacher simply evaluates (Turn 3). When CITReT is used to analyse such a segment, the learner and teacher interactional features are coded S2 and T8 respectively.

## *Intervention and Data Collection*

The teachers participated in a half-day workshop conducted by the ELIS team, which introduced the teachers to the ideas underlying the tool and to reflective practice. During the workshop, the teachers practised analysing short transcripts from the literature using CITReT. After the workshop, the teachers participated in a process of reflective practice. Each teacher participated in two cycles of the reflective practice process.

The four stages of one cycle of the reflective practice process can be depicted as:

### **1. Lesson planning**

The teachers planned a one-hour lesson. In their plans, they indicated the intended mode(s) for different lesson segments.

### **2. Lesson implementation and data collection**

The teachers conducted their planned lesson. The ELIS team took running records of the classroom interactions. They also made audio and video recordings of the lesson. The audio-recordings were subsequently transcribed by an experienced transcriber.

### **3. Focused data analysis**

The ELIS team selected segments from the lesson transcripts to analyse. These segments were representative of the different modes. These lesson segments were emailed to the teachers for their reflection on the classroom talk. They analysed the lesson segments using CITReT. They further reflected on their analysis using reflection questions to deepen their understanding. These questions included ‘Where the discussion stagnated or switched to the KTR mode, why did it happen?’ and ‘How could I have interacted differently to encourage student contributions or help steer the discussion in a more purposeful way?’

### **4. Reflective dialogue**

The teachers discussed their analyses and reflections with the ELIS team, who prompted the teachers to describe, be critical of and be reflective about their classroom talk. Together, they also explored possible ways of creating more scope for the ‘Facilitation of Knowledge Appropriation’ mode in the following lesson.

## **Results**

### *Positive Changes in Students’ Participation in the Mathematics Classroom*

The Mathematics teacher’s lesson in the first cycle was with a Primary 4 class. The topic was the use of the unitary method to solve word problems on fractions. Classroom talk allowed students to use mathematical language (e.g. ‘parts’ and ‘whole’). However, closed teacher questions focusing on the performing of mathematical operations were frequent. This limited the scope for extended student explanation and reasoning, as exemplified in Excerpt 2.

Excerpt 2  
First Mathematics Lesson

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Maths Teacher	Gave away? Gave away why? So why did you shade 5 parts that gave away?
Student 1	Cos he gave away 5 parts
Maths Teacher	5 parts. Why 5 parts? 3 parts to?
Student 2	The neighbour.

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Following the first reflective dialogue on her transcript, the Mathematics teacher carried out another lesson with the same class in the second cycle of the reflective practice process. She reviewed students' solutions from a mock test and asked selected students to present and explain their solutions, which represented a range of heuristics. The teacher then asked the class to compare and evaluate the heuristics. The classroom talk that ensued allowed the teacher to prompt students to clarify and justify their viewpoints. It also allowed students to make explanations related to content knowledge. An excerpt of the classroom talk is exemplified in Excerpt 3.

Excerpt 3  
Second Mathematics Lesson

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Maths Teacher	Now the question is: I want to know why would you prefer the assumption method?
Student 1	Cos assumption method is faster.
Maths Teacher	What do you mean by faster?
Student 1	For assumption method, it's shorter than guess and check because you only need four steps.

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During the second reflective dialogue, the Mathematics teacher evaluated the classroom talk and felt that student participation in classroom talk across the two lessons had evidently improved:

*It's a shift in the mode. It's definitely less knowledge reproduction except for some segments. In the second lesson, the children take more ownership. They take a more proactive role in their learning. To me it's a significant difference.*

### **Positive Changes in Students' Thinking in the Science Classroom**

The Science teacher's lesson in the first cycle of the reflective practice process was with a Primary 5 class. The topic was the water cycle, and students were expected to apply the concepts of evaporation and condensation to describe it. Classroom talk was focused and the teacher directed classroom talk towards the reproduction of expected knowledge. However, this mode of talk limited the scope for the teacher to build student understanding of alternative perspectives and to address possible misconceptions. This is exemplified in Excerpt 4.

Excerpt 4  
First Science Lesson

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Science Teacher	I'm going to check on the paper after 10 minutes. Any pairs want to share your prediction?
Student 1	The exposed surface would evaporate.
Science Teacher	Do we talk about the surface evaporating?
Student 2	The water will go through the other side of the paper.
Science Teacher	Wait, we are building on [Student 1]'s explanation

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Following the first reflective dialogue around her transcript, the Science teacher carried out another lesson with the same class in the second cycle of the reflective practice process. She addressed the topic of features of inquiry and expected students to apply inquiry to deepen their understanding of plant reproduction. In a number of lesson segments, she enacted the 'Facilitation of Knowledge Appropriation' mode. Rather than directly instructing the students, she used discussion to address possible misconceptions. Excerpt 5 shows an example of the teacher enacting the 'Facilitation of Knowledge Appropriation' mode. This excerpt is from one lesson segment when the teacher followed up on an unexpected question, facilitated extended discussion over 38 turns and across multiple students, before consolidating the discussion by connecting it to content knowledge.

Excerpt 5  
Second Science Lesson

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Student 1	When they say plant X is unable to disperse its seeds effectively, does it mean it still can disperse just that it won't do it like the last time?
Science Teacher	What do you think [looking at Student 2]?
Student 2	The seeds will drop into the water.
Student 3	But then if there's no water, it just drops on the land.
Science Teacher	Now is that considered the seed being dispersed?

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During the second reflective dialogue, the Science teacher felt that engaging students in extended classroom talk would enhance their thinking skills:

*'It's the thinking process. Since we were doing this project, I thought it was a good opportunity, to engage these students in this kind of thinking process and train them to think.'*

## Discussion

The general improvement in classroom talk was attributed by the participants to the reflective practice process. According to the Science teacher:

*I feel we can see the effect quite instantaneously. We only did two lessons with you. But we can see a change in students and improvements in the teacher.*

Besides the improvement in classroom talk, teachers' understanding of classroom talk was also deepened (Tan & Lee, 2014). An example may be given of the Science teacher who reported that the first reflective dialogue prompted her to further her learning. This changed her understanding and belief about the pedagogical function of talk:

*I think my perspective of the main function of talk has definitely changed over these two lessons and with the talk with you all. I went to read up a bit. So it's not just about checking their understanding. It's about facilitating their discussion.*

Some aspects of the reflective practice process seemed to make a real difference. An example is the reflective dialogue that identified underlying reasons for classroom talk or potential solutions for improving classroom talk. A potential strategy to improve classroom talk identified by the ELIS team with the Mathematics teacher was to invite students to 'discuss the pros and cons'. The conversation between the Mathematics teacher and the ELIS team is shown in Excerpt 6. Following the reflective dialogue, the Mathematics teacher implemented the strategy to good effect in the second lesson.

Excerpt 6  
*First Reflective Dialogue with Mathematics Teacher*

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Researcher	But can you think of ways which you could have asked questions here which were not as closed?
Maths Teacher	I know one way is to ask for alternative solutions.
Researcher	Of course you could juxtapose different ways of solving and then see what the advantages are.
Maths Teacher	Just to clarify. One way to make this lesson more open-ended is to ask what other solutions they can come up with and discuss the pros and cons.

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That said, the outcomes cannot be attributed to any single part of the reflective practice process. Teacher reflection, mediated by a reflection tool, such as CITReT, and reflective dialogue, complements the enactment of classroom talk to impact student learning. In addition, both teacher reflection and classroom talk would be impossible without the teachers' commitment to investing time and effort in their professional learning for improving student learning through classroom talk.

## **Conclusion**

The results of this study support the idea that teacher learning regarding classroom talk improves student learning in the classroom. They also suggest that even though it was only over two cycles, the reflective practice process positively impacted teachers' understanding of classroom interaction and therefore improved the teachers' ability to facilitate quality classroom talk.

Future studies could consider the use of experimental and control groups in order to measure the effectiveness of teacher learning of classroom interaction on student learning through productive classroom talk. Additional studies could also consider focusing on the type and quality of student responses when students engage with one another.



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