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Teacher dependent discourse patterns: variations in student discourse roles in an International Baccalaureate school - a mathematics focus

Donna Pendergast, Shelley Dole and Damian Rentonule

The International Baccalaureate offers a consistent approach for curriculum and pedagogy. In this study, a critical discourse analysis of student experiences in a Middle Years Programme and a Diploma Programme was conducted in an international school, revealing inconsistencies in classroom discourse patterns between teachers of mathematics.

Findings posit that individual teacher's pedagogical preferences are an important determinant of student experiences of classroom discourse. Hence, the teacher, not the programme, determines a student's classroom experience suggesting that pedagogical intervention must target specific teachers for change.

Introduction

The International Baccalaureate (IB) is a curriculum provider for 3,461 schools in 143 countries offering three IB programmes to approximately 1,045,000 students from three to 18 years old (International Baccalaureate, 2012). Recently, Stobie (2005) questioned the degree of consistency across these three IB programmes, with Reimers (2004) highlighting a gap in the research relating to the alignment of pedagogical approaches between programmes and the effects of such differences on student experiences in the classroom.

Questions have therefore been raised regarding the degree of consistency between the three programmes, Primary Years Programme (PYP), Middle Years Programme (MYP) and Diploma Programme (DP). Examinations of degrees of consistency between IB programmes however are based on an underlying assumption that there is a consistent base of pedagogical practice within programmes from which such a comparison can be drawn. Clearly, the degree to which pedagogical practices within a programme align is an area in need of investigation.

There is currently a disjoint between educational reform and pedagogical shift. In an era of educational reform (Hammersley, 2002) change in the nature of the role of students in classroom discourse (Lam, Law, & Shum, 2009) has not kept pace with the changing pedagogical approaches being advocated in the various educational reforms (Zhang & Davison, 2008). The IB has released a number of publications with pedagogical directives since 2008 (International Baccalaureate, 2008a, 2008b, 2009a, 2009b, 2009c).

One of the ideas positioned at the center of the myriad of changes introduced to the IB pedagogical framework is the emphasis on the role of the learner in the teaching and learning process; students must be active participants and co-creators of their learning. Student ‘voice’ is a concept used by the IB associated with this active participation and co-construction of learning and was introduced by the IB in Towards a Continuum of International Education (International Baccalaureate, 2008b) becoming an explicit directive across the three IB programs; ‘the voice of the learner must be emphasized’ (p13).

Engaging student voice is a pedagogical issue, and schools have to adjust to different relationships between teachers and students (Lodge, 2008). This adjustment forms an important aspect of the paradigm shift for IB teachers called for by Bechel & Waterson (2003) when they declared that IB teachers needed to make a paradigm shift in how they operate in order to empower students to take greater control over their own learning in programmes that emphasize student construction of their own meaning.

The authors' observation that many teachers have been educated to be 'deliverers of content using formulaic, usually didactic methods' (Bechel & Waterson, 2003, p. 3) suggests that the students' experiences in IB classrooms may not be aligning with these emerging IB pedagogical directives to schools. This observation became the impetus for this study.

Method

The study was designed to ascertain the degree to which one IB school's pedagogical practices aligned with the intended IB pedagogy. It was anticipated that the outcome of this research project would be the development of an evidence-based pedagogical capacity (Dinham & Rowe, 2008) in schools through a better understanding of the relation of student classroom discourse and pedagogical practices.

In order to achieve this purpose the following research questions guided the study:

1. What range of competing student discourses exists in an IB Middle Years Programme and an IB Diploma Programme?
2. To what extent does the function of student discourse align with the IB vision/philosophy?
3. What inferences can be drawn about teacher pedagogy and student discourse?

The school is an international school in Tokyo with a student population representing over 70 nationalities and faculty representing 13. The school has been marked since its opening by continuous and rapid growth into a K-12 school of approximately 600 students. The school implements the three IB programmes, Primary Years Programme, Middle Years Programme and Diploma Programme. A case study research design was used to investigate...
student discourse patterns in the Middle Years Programme and Diploma Programme classrooms. The case study approach was the most appropriate for this study as it was a problem that the research sought to understand, not a specific causal relationship between variables (Creswell & Plano Clark, 2007).

The data
Teaching conducted in 100 classrooms between grade 6 and grade 12 across a range of subject areas in the Middle Years Programme and Diploma Programme was video recorded over a three-year period between May 2007 and May 2010. In all 33 teachers, including six mathematics teachers, were engaged in the study. The video recording was positioned to record student experiences of classroom discourse in the classroom episodes.

Theoretical frame
Critical discourse analysis examines language use from two perspectives. One relates directly to the uncovering of hidden power relationships, while the other relates to the attempt to describe, interpret and explain the relationship between the form and the function of language (Rogers, 2004). These dual perspectives were important in terms of coming to understand the social dynamics of the classrooms within which the student discourse was embedded.

Furthermore, as critical discourse analysis allows the differentiation of language form and language function as well as enabling semiosis, meaning making through language (Fairclough, 2001), it was chosen as a suitable theoretical framework for this study.

Analysis
Classroom observations were categorized in part according to the role of the student in the construction of knowledge claims in classroom discourse. Categories were based on ideas originating from the Queensland School Reform Longitudinal Study (QSRLS) (1999) and Aukerman’s (2006) concept of student as knower.

The concept of knower was selected due to its high degree of relevance to the IB’s description in curriculum documentation of learners as constructors of meaning. The concept of knower encapsulated more than active participation, specifically referring to the internal cognitive processes of which evidence can be collected through the direct observation of language in use.

These classroom episodes were broken up into ten-minute blocks. The categories described below were used to classify each block across 5000 minutes of 100 classroom episodes. The researcher used a predetermined rubric for the three discourse roles to classify each block and performed a follow up teacher interview after the videoed lesson and subsequent analysis to discuss classifications with the teacher. The primary validation of the process was achieved through a rich description of the data collected and the categories identified.

Role 1 - Teacher as primary knower: The voice of student not emphasized. Student passively constructing meaning evidenced through the origin of activity related knowledge claims in teacher-generated idea. Teacher scaffolds the discourse.

Role 2 - Student and teacher as possible knowers: There is a shared emphasis of voice. Student and teacher actively constructing meaning together evidenced through the origin of activity related knowledge claims in both student and teacher generated ideas. Students and teacher scaffold the discourse.

Role 3 - Student as possible knower: The voice of student is emphasized. Student actively constructing meaning independently evidenced through the origin of activity related knowledge claims in student-generated idea. Students scaffold the discourse.

The role of the student in the construction of meaning is specifically targeted in IB pedagogical guidelines for schools. For an international school which offered through the promises inherent in its written curriculum to provide students with opportunities to create meaning, where students actively engage in their own learning, the location of a high degree of events where the student was a possible knower would be a reasonable expectation if classroom practice were aligned with written curriculum.

Results
Overall, 51% of observed discourse events involved role one classroom discourse where the teacher was the primary knower. The remaining 49% involved role two or three discourse events where the student had at least some role in the construction of meaning.

![Figure 1. Summary of roles in discourse in all observations.](image-url)
These results suggest that although the incidence of role one discourse events is rather heavy, considering the emphasis on students actively constructing meaning in the IB pedagogical guidelines, there is a large bank of discourse events which more closely align with IB vision/philosophy that can be used as examples of good practice in order to facilitate a shift in teaching practice within the school community.

Within the sample 70 specific teaching strategies were identified, aligning with each of the roles, so in order to bring about pedagogical change this school would need to promote teaching strategies aligned with roles two and three, reducing specific teaching strategies aligned with role one. For example, while students were speaking in role one discourse events the most common teaching strategy being used was answering teacher questions in an IRE sequence (Beck & Cazden, 2003; Cazden, 1988). Instructions and explanations of upcoming tasks featured prominently in these instances.

On the other hand while students were speaking in role three discourse events, the most common teaching strategy used was students discussing a task with peers. In many cases students were using prior content to work through a task. Across the three different student roles in discourse, in many instances the purpose of the activity, such as understanding procedures for an upcoming task, were similar regardless of the role of the student.

This suggests that specific activities linked to role two and three discourses may be easily substituted for those linked to role one discourse events moving a school closer to an alignment of classroom practice and the written curriculum. The individual teacher however is key to this process. Consider the disparity in the roles within the teachers observed as part of this study displayed in Figure 2 below.

![Figure 2. Student roles in discourse across teachers.](image)

Of these 33 teachers involved in the lesson observations there was a large variance in the distributions of discourse roles. With ten teachers showing evidence of role one discourse events only, it is clear that any potential pedagogical intervention will need to target specific teachers for change. The teachers who showed evidence of disproportionately high concentrations of role two and three discourse are also potentially valuable targets, not for change, for support and celebration as they share ideas within the school community.

An interesting result from the study was that at the individual teacher level, often within the same grade and subject area teachers would use teaching strategies that required students to engage in very different discourse roles for similar types of activities. To take one subject area as an example, Figure 3 illustrates the distribution of discourse roles for teachers of mathematics.

![Figure 3. Student roles in discourse across mathematics teachers.](image)

In all grades and all subject areas evidence of role two and three discourse events were identified. Teachers were the only category explored where instances of 100% role one discourse was encountered. Similar variations in patterns of discourse between teachers were identified across most subject areas. In terms of a student’s opportunity to participate in a learning environment where classroom discourse aligns with the school’s written curriculum, it seems that the decision to place a child in a particular teacher’s class has a powerful impact on the type of discourse role that they will have an opportunity to participate in.

Another interesting result related to the distribution of discourse roles for mathematics teachers represented in Figure 3 was connected to the timing of discourse within the lessons. For the two mathematics teachers who demonstrated evidence of role two and role three discourse, a large amount of their role one discourse occurred in the first ten minutes of the lesson, however...
these teachers made the transition from this initial teacher-centered discourse to a more student-centered discourse.

In many cases this transition was enabled through the use of teaching strategies that had three distinguishing characteristics. First, the activities had structures that necessitated student-centered discourse. Secondly, these structures were already familiar with students allowing a transition into the activity with little need for teacher explanation. Thirdly, the structures were flexible enough to allow for the application of the activity to a range of mathematical concepts enabling the repeated use of the activity over time.

An example of one of these activities was a group-based problem solving protocol where students were assigned roles and worked through a mathematical word problem. Groups provided a written explanation in poster form, which was presented to the class. The presenters answered questions and justified their method. Structures included student roles in the working group, presentation format, audience’s questioning format and requirements regarding the use of mathematical terminology.

The four mathematics teachers shown in Figure 3, who demonstrated evidence of role one discourse only, also used teaching strategies with structures familiar to students that were flexible enough to be used with a variety of mathematical concepts. These structures, however, necessitated a passive role in the construction of meaning for students. An example of one of these strategies is the teacher demonstration of a problem on the board followed by students attempting practice problems, guided by a series Initiation-Response-Evaluation (IRE) sequences with the teacher.

All six mathematics teachers represented in Figure 3 used this IRE-based teaching strategy, which resulted in role one discourse, in the first ten-minutes of their lessons. The main difference evident was that the two teachers who demonstrated evidence of role two and role three discourses made the transition to alternate activities, suggesting that these two teachers were using a wider repertoire of teaching strategies. In this sense, a teacher’s pedagogic repertoire, or at least a teacher’s choice to use specific strategies from their potential pedagogic repertoire, had a powerful impact on the type of discourse role that students had an opportunity to participate in.

Discussion
This critical discourse analysis of student experiences of classroom discourse in 100 classroom episodes between grade 6 and grade 12 across a range of subject areas in the Middle Years Programme and Diploma Programme revealed inconsistencies in classroom discourse patterns between teachers of the same subject area and grade level. Results suggest that individual teacher’s pedagogical preferences are an important determinant of student experiences of classroom discourse, more important than grade level, IB programme or subject area.


What is clear from the study is that although there may be teachers who have been educated to be ‘deliverers of content using formulaic, usually didactic methods’ (Bechtel & Waterson, 2003, p3) these results suggest that this is pertinent to only some of the teachers observed with many teachers not requiring the paradigm shift suggested by Bechtel & Waterson (2003). However these teachers who demonstrate evidence of discourse aligned to IB vision/philosophy are still vital to any potential change process as they are the keepers of good practice.

A limitation to the study was that learning outcomes were not directly measured. For this reason, although it has been argued that a shift to a more student-centered discourse will align the school’s pedagogical practices more closely with IB vision/philosophy, the quality of identified role two and role three discourses in terms of learning outcomes has not been considered and this is a potential area that could be further investigated in order to guide schools in the process of pedagogical change.

References


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