PROJECT AAIMS: ALGEBRA ASSESSMENT AND INSTRUCTION – MEETING STANDARDS

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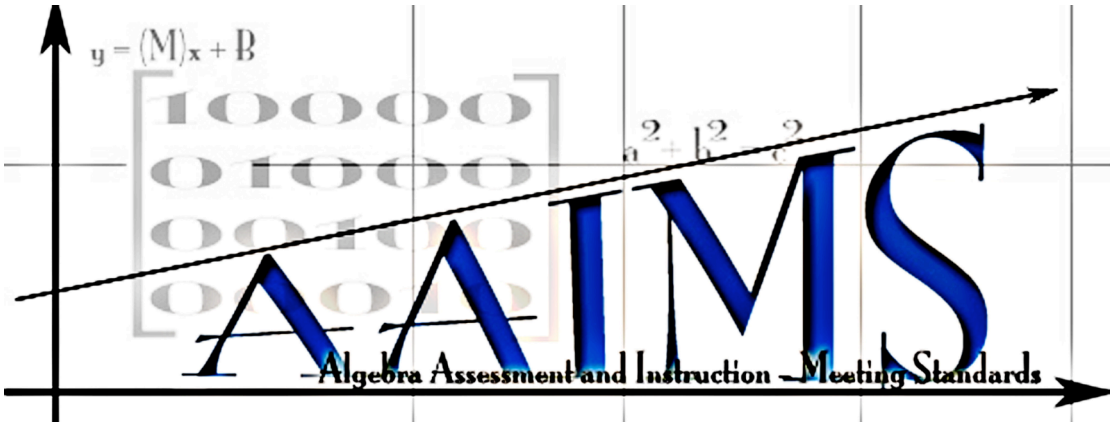

Classroom Observation Data for District B:

Anecdotal Observation Results

Technical Report #8

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Executive Summary

This report documents the results of anecdotal observations conducted in District B during the fall of 2004. It describes the algebra topics addressed during our observations, the expected tasks (class activities), teacher actions, and student actions in four Algebra IA classes and two Algebra IB classes in this district. We looked at the algebra curriculum for students in these beginning algebra classes, the ways that class periods were structured in these classes, the kinds of instructional approaches that were used, and students' responses to these instructional approaches.

Student with and without disabilities were all enrolled in general education beginning algebra classes in District B; therefore they completed the same curriculum. The two Algebra IA teachers moved through the textbook at slightly different rates, but students were exposed to basically the same content. One teacher taught both of the Algebra IB classes, and her lessons concentrated on the same topics for each class. The most common expected task varied by teacher. Teacher 1 taught one section of Algebra IA and two sections of Algebra IB. In her Algebra IA class, the most typical task was checking homework, in Algebra IB, it was leading a review. Teacher 2 taught three sections of Algebra IA where the most prevalent expected task was teacher-led instruction. The most typical instructional approaches that we observed in District B were providing individual student assistance and modeling as the teacher showed how to solve algebra problems or reviewed for an exam in both courses. Completing assignments was the most typical productive student action in both courses, with listening observed just as often in the Algebra IB classes. Off task behavior was the most common nonproductive student action, and it was the most often observed student action in District B.

Overview

Access to general education curriculum has become a major emphasis in the education of students with disabilities since the 1997 reauthorization of the Individuals with Disabilities Education Act (IDEA 1997). Access includes having meaningful participation in and sufficient opportunities to make adequate progress toward the district and state standards (Baker, Gersten, & Scanlon, 2002). Although this access does not necessarily require that instruction be delivered in general education settings by general education teachers, a growing proportion of students with disabilities are receiving a large proportion of their math instruction in this manner. One of the objectives of Project AAIMS is to examine the alignment of algebra curriculum, instruction, and assessment for students with and without disabilities. This report summarizes one portion of our efforts to further explore this issue.

To determine the extent to which algebra[1] instruction, curriculum, and assessment for students with disabilities is aligned with that of their non-disabled peers, the research activities imbedded in Project AAIMS included multiple means of gathering data. Two types of classroom

[1] Throughout this report any time we refer to algebra, we mean beginning algebra classes such as Algebra I or Algebra IA.

observations were conducted concurrently. The first type used a systematic, momentary time sampling observation system, while the second type used an anecdotal observation form to document aspects of instruction that may not have been captured with the former system. In addition, interviews were conducted with teachers, administrators, and curriculum specialists to gather additional information about curriculum, instruction, and assessment at the district, building, and classroom level. Finally, school district documents related to instruction and assessment were reviewed as an additional source of information. Eventually, all of these sources will be integrated to develop a case study of each of the three participating districts.

This report documents the findings from the anecdotal observations conducted in District B during the fall of 2004. The following research questions are addressed:

1) How are beginning algebra class periods structured?
2) How similar is the algebra curriculum for students with and without disabilities?
3) What kinds of instructional approaches are used to help students learn algebra in general and special education?
4) How do students with and without disabilities respond to these instructional approaches?

METHOD

Setting and Participants

Setting

District B serves a large town of slightly more than 25,000 people. The senior high school has an enrollment of approximately 1,230 students; about fifteen percent of these students receive special education services. Approximately 32 percent of the district's students are eligible for free and reduced lunch, and twelve percent are of diverse backgrounds in terms of race, culture, and ethnicity.

Six units of mathematics credits are required for graduation from District B; this is equivalent to three years of mathematics courses. An algebra class is not required for graduation; nevertheless, approximately 70% of District B's students take at least one algebra class before they graduate. At the time of this study, District B's high school offered two alternatives for initial algebra instruction. Students could choose between Algebra I or Algebra IA and Algebra IB. Since District B uses block scheduling,[2] students in Algebra I take one-half of an academic year to complete the course, and students in the IA/IB option can spread their algebra instruction over a full year; however, students are not required to take Algebra IA and Algebra IB consecutively. (In fact, some students never take Algebra IB after completing Algebra IA.) This slower pace is intended to allow students additional time to master the concepts of algebra. While the majority of general education students take Algebra I or IA in ninth grade, there were some 10^{th}, 11^{th}, and 12^{th} grade students enrolled in the algebra classes we observed.

[2] Students usually take four classes each semester that meet for 90 minutes each day.

Participants

The participants in this study included general education teachers, as well as general and special education students. Two teachers from District B consented to participate in this study. Students in these general education teachers' algebra classes were invited to participate in project activities. Parent and student consent were obtained for the use of individual scores and demographic information that were analyzed for other technical reports. However, since this report focuses on group data gathered during observations of public behavior, our observations were not limited to only those students for whom both parental and student consent were obtained.

Teachers. Of the two participating general education teachers, one held an initial Iowa teacher's license, and the other held a standard Iowa teacher's license. Both of these teachers held 7-12 mathematics endorsements and had earned Bachelor's degrees. One teacher was a first-year teacher, while the other had 15 years of teaching experience. The experienced general education teacher had taught algebra for seven years. (Two special education teachers were also part of the project; however, they did not teach stand-alone algebra classes, so we have not included information about them in this particular study.)

General and Special Education Students. Student participants included youth in the ninth through twelfth grade who were currently enrolled in a beginning algebra course. Since neither of the participating teachers taught an Algebra I class during the semester these observations were conducted, this report only includes data from Algebra IA and Algebra IB classes. Ninety-nine students were enrolled in Algebra IA and 36 students were enrolled in Algebra IB. Of the 135 students taking algebra, about ten percent were special education students. All of the special education students received algebra instruction in general education classes.

Data Collection Procedures

A primary objective of this study was to describe what happened during our observations of different algebra classes. Each class was observed three times over the course of a month and a half at the end of the first semester and the beginning of the second semester. With block scheduling, District B has four semesters each academic year. (See Table 1 for the details of the observation schedule.) At least two observers were present for each observation. One observer recorded data using the SOS-AAIMS instrument (See AAIMS Technical Report #4) while the other took handwritten notes on an anecdotal recording form. (See Appendix A for a copy of this form.)

Table 1. Observation Schedule

Observation	Alg IA Teacher 1 Period 1	Alg IA Teacher 2 Period 2	Alg IA Teacher 2 Period 3	Alg IA Teacher 2 Period 4	Alg IB Teacher 1 Period 3	Alg IB Teacher 1 Period 4
Obs 1	10/19/04	10/19/04	10/19/04	10/26/04	10/26/04	10/19/04
Obs 2	11/18/04	11/18/04	11/18/04	11/18/04	11/22/04	11/22/04
Obs 3	11/22/04	11/22/04	11/22/04	11/22/04	11/30/04	11/30/04

There were several major differences between the two observation techniques. The first difference was the length of the observation intervals. With the momentary time sampling

procedure, the intervals were only 15 seconds, while the anecdotal observation segments were five minutes long. The second difference was the codes that were assigned to the data. Whereas the momentary time sampling procedure used predetermined codes for teacher behavior, student behavior, instructional organization, and task format, the codes for anecdotal observations were developed after the observations occurred. Finally, the researchers could use more than one code for each category of interest (expected tasks, teacher actions, and student actions) for each segment of the anecdotal observations, while only one code could be chosen during the momentary time sampling observations.

The AAIMS Technical Report #4 (Olson & Foegen, 2006) includes the findings from the momentary time sampling observations conducted in District B. This report addresses the findings from the anecdotal observations. As we indicated earlier, the observers used the anecdotal recording form in Appendix A to note what was going on in the beginning algebra classes that were included in this study. This form had observer instructions, a column to record the times for each five minute interval, and a column for anecdotal notes. The instructions directed observers to focus on academic content, teacher actions, student actions, and classroom activity. We determined that ninety minutes was too long for the observers to concentrate without taking some kind of break; therefore, the observers using the anecdotal form would usually observe the class for 25 minutes, then take a five-minute break, observe for another 25 minutes, take another five-minute break, and then observe for 25 more minutes. These handwritten notes were transcribed into Word files which were printed to start the coding process.

We started developing the coding system for the anecdotal observations as a part of our analysis for AAIMS Technical Report #3 (Olson, Foegen, & Lind, 2007), which used observation data from District A. We began by developing a hierarchical coding system using constant comparison methods (Blank, 2004; Richardson & Richardson, 1995; Tesch, 1990). This iterative process began with the principal investigator, the project coordinator, and a research assistant gathering to discuss possible codes for the data we had collected based on our observation experiences. During this meeting we brainstormed some potential codes for each of three categories of interest: expected task, teacher actions, and student actions. Expected tasks were the activities that the teacher intended during a particular time period. As one might guess, teacher actions were what the teacher did during a segment and student actions were the activities students participated in or the behaviors they displayed during a segment. (See the Project AAIMS Anecdotal Observation Manual in Appendix B for the final set of codes and their definitions.)

After some discussion, we decided that teacher actions and student actions would have at least two levels of coding. First, we would determine whether or not a teacher action was instructional or non-instructional. Then we would note the specific teacher action. For student actions, we first considered whether the action was productive or nonproductive. In other words, did the student actions contribute to their understanding of that day's algebra topic (productive) or not (nonproductive)? Next, we assigned a more specific code reflecting the observed student behavior. With this preliminary list of codes in hand, each member of the research team independently examined the same set of two observation reports to verify that the codes we had brainstormed would work for the data we had collected. We wanted to ensure that our codes would be applicable for both general education and special education classes so we selected one

observation report from a general education class and another from a special education class. (District A had separate general education and special education algebra classes.)

At our next meeting we discussed new codes we decided were necessary and changed some of our initial codes. We also determined that we needed an additional level of codes for teacher actions related to teaching new skills or procedures. In addition, we discussed specific intervals where we disagreed about code assignments, which helped us refine the definitions for each of the individual codes. We determined that we could use more than one code for each category of interest for each five-minute segment because it was not possible for the coder to determine the most prevalent behavior during an interval from the observation reports.

We repeated the process with the new codes and decision rules. The level of code agreement among the three members of the research team ranged from 53% to 88% for this round. Once again, we discussed why we disagreed about the codes we assigned to particular text segments in the anecdotal observations. These discussions led to even more precise code definitions. After three rounds of code refinement using different sets of observations, the team concluded that we had sufficient agreement (at least 95%) to begin the final round of coding. The research assistant recoded all of the previous observations using the current list of codes. After coding all of the anecdotal observations for District A, the research assistant began coding the observations for District B and District C to see if any additional codes were necessary. It turned out that we did need to add a few new codes to cover all of the expected tasks, teacher actions, and student actions in all three districts. (See Appendix B for the finalized list.) The project coordinator spot checked each completed set of coded observations.

The final set of codes included eight codes for the expected task. For example, E-WU was used to indicate a warm up activity, E-TLI was used when teacher led instruction was observed, and E-NM was marked when a non math activity occurred (i.e. playing a game of hangman when a class assignment was completed).

As we described earlier, teacher actions were first sorted into instructional and non-instructional categories. There were six teacher actions that were considered instructional. These ranged from checking homework to leading a review or teaching a lesson. The teaching a lesson category was further subdivided into four more specific teacher actions including explaining, modeling, questioning, and providing individual or small group assistance. There were four teacher actions that were deemed non-instructional. These included behavior management, task management, being out of the room, and doing something that was not related to algebra.

The team generated eight codes for productive student actions and three codes for nonproductive student actions. Some examples of productive student actions were asking questions, participating in guided practice activities, and working on assignments during class time. Nonproductive student actions included being off task, working on an assignment or studying for a different class, and being disruptive.

Once the research assistant had hand coded the printed observations, the next step was to transfer the hand coded data into an electronic form for additional analysis. We chose to use a qualitative analysis software program called Qualrus from The Idea Works (www.qualrus.com)

to analyze the data from the anecdotal observations. To do this we imported each observation as a separate source document so that its individual character could be maintained even when all the observations for a specific course were grouped together. All of the possible codes were added to the software. The codes for each five-minute segment were entered by highlighting the text for each interval and selecting the appropriate ones for that particular interval. Very often more than one code was assigned to an observation interval to describe the teacher or student behavior during an interval. However, this was not often the case for a segment's expected task. In addition, the research assistant added the topic being addressed during a particular class period as an additional code, if this was noted in the anecdotal record. Any content information was coded as content-topic (e.g., content-percent and proportions or content-calculating slope). Our analysis was completed by using the "statistics" option from the "QTools" menu. This tool allowed us to see the number of times different codes appeared, as well as the frequencies for any paired combinations of codes.

Results

In all, 2258 five-minute segments from observations of eighteen algebra class periods (three each for six classes) were analyzed. The database included an average of 43 segments for a single class across the three observations. The course with the fewest segments had only 37 intervals, the class with the most had 46. It is important to note that the findings we report in this document are based on a limited number of observations at the end of the first semester and the beginning of the second semester of the academic year. Nevertheless, they do illustrate what curriculum and instruction are like for beginning algebra students in District B.

Algebra IA

There were four Algebra IA classes included in this study. One general education teacher (Teacher 1) taught one section during first block (8:20 – 9:50 AM) and a second general education teacher (Teacher 2) taught three sections during second block (9:57 – 11:27 AM), third block (11:34 AM – 1:34 PM, with 30 minutes for lunch included), and fourth block (1:41 – 3:11 PM). A total of 99 students were enrolled in the Algebra IA classes we observed. Class sizes ranged from 23 to 27 students. There were fourteen students with disabilities enrolled in the Algebra IA classes we observed in the Fall of 2004.

Algebra IA Content

All of the Algebra IA (and Algebra IB) classes used the same textbook, *Algebra I*, which is published by McDougal Littell (Larson, Boswell, Kanold, & Stiff, 2001). During the fall semester the two Algebra IA teachers progressed through the content at slightly different rates. During the first observation Teacher 1's class was reviewing skills and concepts from chapter 3, which addresses solving linear equations. As one can see from Table 1, two of Teacher 2's classes were observed on the same day (second and third block). The students in these classes were exploring how to graph linear equations, which is a topic from chapter 4. The fourth block class was observed the following week (on the last day of the first semester) learning how to find the slope of a line, another skill from chapter 4. All four Algebra IA classes were observed on the same day for our second observation. On this day, Teacher 1's class was studying functions and relations from chapter 4, while Teacher 2's classes were reviewing what they had learned

from chapters 1 through 3. We were also able to complete our third and last observations of all of the Algebra IA classes on the same day. All of the classes were learning about topics from chapter 5 during this observation. Teacher 1's students were writing linear equations in slope-intercept form (Lesson 5.1), while Teacher 2's students were writing linear equations given the slope and a point (Lesson 5.2).

Algebra IA Expected Tasks

The expected tasks in the Algebra IA classes varied by teacher. Each class period we observed in Teacher 1's class had a different set of expected tasks, while the activities in Teacher 2's classes followed a basic pattern for all of the days we observed. (See Table 2.) During our first observation the first fifteen minutes in Teacher 1's class was spent working on and checking daily review problems, this was followed by fifteen minutes devoted to checking homework, then twenty minutes of a review with guided practice, and then fifteen minutes for a quiz. During the guided practice activity students used white dry erase boards that they held up when they had solved a problem so the teacher could check their work. On our second visit the class began with twenty minutes devoted to checking homework, which was followed by an hour for completing an in-class assignment that was designed as a review activity. When we made our final observation of this Algebra IA class, the first expected task was going over a test that the students had taken earlier. This activity took twenty-five minutes. The next forty minutes were spent learning new content with opportunities for student to participate in additional guided practice activities. Students worked on their homework assignment for the last fifteen minutes of class on this day.

Table 2: Expected Tasks in Algebra IA Courses in District B

Expected Task	**Algebra IA (combined)** (172 segments)		**Teacher 1 Algebra IA** (45 segments)		**Teacher 2 Algebra IA** (127 segments)	
	#	%	#	%	#	%
Assignment	55	32%	13	29%	42	33%
Review	19	11%	7	16%	12	9%
Teacher Led Instruction	42	24%	7	16%	35	28%
Checking Homework	30	17%	8	18%	22	17%
Warm up	26	15%	3	7%	23	18%
Taking a quiz	8	5%	5	11%	3	2%
Non-math task	5	3%	4	9%	1	1%
No assigned task	11	6%	6	13%	5	4%

The expected tasks for the three Algebra IA classes that were taught by Teacher 2 were basically the same when we looked across the different sections with only slightly different amounts of time spent doing each of the activities. During all but one of the observations the

class began with a warm up activity. This was followed by five to ten minutes of checking homework during two of the observations. A twenty to forty minute lesson was the typical third activity in the 90 minute blocks. This was followed by time for students to work on assignments for fifteen to twenty five minutes. On the second day that our observations were conducted the lesson and homework time were replaced by a review activity and returning a test to the students.

When we looked at the data from all four of the Algebra IA classes, we found that the most common expected task (teacher-intended activity) was working on an assignment (55 segments). The next most typical expected task was teacher led instructions (42 segments). The third most prevalent expected task was checking homework (30 segments). Doing a warm up was the fourth most frequently observed expected task (26 segments) and participating in a review was fifth (19 segments). The three types of expected tasks with the lowest frequencies were times when there was no expected task (11 segments), when a non-math task was observed (5 segments), and when it was time to take a quiz (8 segments). (Table 2 includes the frequencies and percentages for the expected tasks we observed in District B.)

Our next step was to examine the expected task data for each teacher. Although the most common expected task was the same for both teachers (working on an assignment), there were no other rankings that matched. Twenty-nine percent of the segments observed in Teacher 1's Algebra IA class were devoted to working on assignments. The next most typical activity was checking homework (18%). Two expected tasks were observed for sixteen percent of the observation segments in Teacher 1's Algebra IA class – review and teacher led instruction. There was no expected task during thirteen percent of the segments in this class, and students spent eleven percent of the observation segments taking a test or quiz. Non-math tasks were observed during 9% of the segments and warm up activities occurred during 7% of the segments in Teacher 1's Algebra IA class.

Our examination of the expected task data from Teacher 2's Algebra IA classes revealed very similar results for the classes during block 2 and block 3, because these classes were all observed on the same days for similar time periods. The block four class was observed for fewer intervals and the first observation was conducted on a different day; consequently, there was more variation in the frequencies for the each expected task. Nevertheless, when we looked at the combined data for all three of Teacher 2's Algebra IA classes, we found that one third of the segments (33%) were devoted to working on assignments. Teacher led instruction was the second most common expected task with this code entered for 28% of the observation segments in these classes. The third most typical expected task was doing a warm up activity (18%), and the fourth most prevalent expected task was checking homework at 17%. Nine percent of the segments in Teacher 2's Algebra IA classes included time for review. No assigned task was the code given to four percent of the observation segments, and two percent of the segments were labeled "taking a quiz". There was only one segment when a non-math task was noted.

Algebra IA Teacher Actions

Teacher actions will be the second category that we will examine. Table 3 includes the number of segments when only instructional teacher actions were observed, when only non-instructional teacher actions were observed, and when both types of teacher actions were observed. It also includes the percentages of time when each category of teacher actions were noted. Looking across all the sections of Algebra IA, we found that instructional teacher actions

were observed most frequently (49%). This was followed by segments when both instructional and non-instructional teacher actions were recorded (45%). Segments with only non-instructional behaviors occurred infrequently (6%).

Table 3: Teacher Actions in Algebra IA Classes in District B

Course	Instructional		Non-instructional		Both		Total*	
	Segments	%	Segments	%	Segments	%	Segments	%
Algebra IA (combined)	84	49%	10	6%	78	45%	172	100%
Algebra IA Teacher 1	20	44%	5	11%	20	44%	45	99%
Algebra IA Teacher 2	64	50%	5	4%	58	46%	127	100%

*NOTE: Due to rounding, some totals may not add up to 100%.

Examining the percentages for the two different Algebra IA teachers, we found that they each had a slightly different pattern of instructional and non-instructional actions. Teacher 1 had equal percentages of segments with only instructional actions observed and segments when both instructional and non-instructional teacher actions were noted (44%). This teacher had almost three times the number of segments (11%) when only non-instructional segments were recorded as compared to her colleague (4%). Teacher 2 spent half of the observation segments engaged in only instructional teacher actions, forty-six percent of the segments exhibiting both kinds of teacher actions, and four percent of the time displaying only non-instructional actions.

Next, we considered the specific teacher actions that were observed (Table 4). We started by looking at the instructional teacher action data across all four sections of Algebra IA. Teaching a lesson was by far the most prevalent teacher action in District B (73%). Checking homework was the second most typical teacher action (17%), while academic monitoring was the third most common (13%). Conducting a warm up activity and leading a review were both observed during eight percent of the segments. As one might guess, administering a test or quiz was the teacher action that was observed least often (2%).

When we looked at the data for each of the teachers separately, we found that both of the participating teachers in District B spent a majority of their time engaged in teaching a lesson during our observations. Teacher 1 was engaged in such behaviors for 78% of the observation segments, while the percentage for Teacher 2 was 72%. The two teachers had different rankings for all of the other teacher actions. For Teacher 1, the second most common action was academic monitoring (24%). This was followed by checking homework (18%) and then leading a review (9%). Teacher 1 spent four percent of the time we observed administering a test or quiz and only two percent of the time conducting a warm up activity. Teacher 2's second most common teacher action was checking homework (17%). Her third most typical action was conducting a warm up activity (13%). Similar amounts of time were spent doing academic monitoring (9%) and leading a review (8%) in her classes, and Teacher 2 spent the least amount of time administering a test or quiz (1%).

When we looked at the segments that were given the "teaching a lesson" label, we found that the most typical more specific teacher action was providing individual student assistance.

This behavior was noted in 40% of the observation segments across all of the sections of Algebra IA. The second most frequently observed teaching a lesson action was modeling or showing students procedures for solving algebra problems (33%). Providing an explanation and asking questions occurred during six percent of the observation segments each.

Table 4: Specific Teacher Actions in Algebra IA in District B

Instructional Teacher Actions	**Algebra IA (combined)** (172 segments)		**Algebra IA Teacher 1** (45 segments)		**Algebra IA Teacher 2** (127 segments)	
	#	%	#	%	#	%
Checking homework	29	17%	8	18%	21	17%
Conducting a warm up activity	14	8%	1	2%	16	13%
Academic monitoring	22	13%	11	24%	11	9%
Administering a test/quiz	3	2%	2	4%	1	1%
Leading a review	14	8%	4	9%	10	8%
Teaching a lesson	126	73%	35	78%	91	72%
Modeling	56	33%	14	31%	42	33%
Providing individual student assistance	68	40%	21	47%	47	37%
Providing an explanation	10	6%	2	4%	8	6%
Asking Questions	11	6%	4	9%	7	6%
Non-instructional Teacher Actions						
Behavior management	50	29%	14	31%	36	28%
Task management	52	30%	13	30%	39	31%
Non math activity	8	5%	4	9%	4	3%
Out of the room	5	3%	1	2%	4	3%

The rankings for the specific "teaching a lesson" teacher actions were basically the same for the two Algebra IA teachers. Both spent the most time providing individual student assistance (47% for Teacher 1 and 37% for Teacher 2). Modeling was the second most common teaching a lesson action (31% for Teacher 1 and 33% for Teacher 2). Teacher 2 spent the same percentage of time providing explanations and asking questions (6%), while Teacher 1 spent more time asking questions (9%) than providing explanations (4%).

As we considered the percentages of time teachers spent engaged in non-instructional teacher actions, we found very similar percentages for task management and behavior management (30% and 29%, respectively) when we examined the data for all of the Algebra IA classes. On the whole, teachers spent very little time engaged in non math activities (5%) or being out of the room (3%).

Teacher 1 managed behavior slightly more often than she managed tasks (31% and 30%, respectively). This pattern was reversed for Teacher 2, with task management occurring during 31% of the observation segments and behavior management observed during 28% of the segments. Teacher 1 engaged in more non math activities than did Teacher 2 (9% as compared to 3%). Both teachers were rarely out of the room during an observation (2% for Teacher 1 and 3% for Teacher 2).

Algebra IA Student Actions

Our third category of interest for the anecdotal observations was student actions. We looked at the percentage of segments when only productive student behaviors were recorded, when only nonproductive student actions were noted, and when the observer saw both kinds of student behavior (Table 5). During sixty percent of the observation segments both kinds of behavior were present when we combined the data for all four sections of Algebra IA. This percentage stayed the same when welooked at the results for individual teachers as well. Only productive student actions were observed in 39% of all the Algebra IA sections, in 38% of the segments of Teacher 1's Algebra IA class, and in 39% of the intervals in Teacher 2's Algebra IA classes. Observation segments with only nonproductive student actions noted were very rare. In all of the Algebra IA sections, such behavior was recorded during 1% of the segments, while it was observed during two percent of the segments in Teacher 1's class and during one percent of the segments in Teacher 2's classes.

Table 5: Student Actions Across Algebra IA Classes in District B

Course	Productive		Nonproductive		Both		Total	
	#	%	#	%	#	%	#	%
Algebra IA (combined)	67	39%	2	1%	103	60%	172	100%
Algebra IA Teacher 1	17	38%	1	2%	27	60%	45	100%
Algebra IA Teacher 2	50	39%	1	1%	76	60%	127	100%

Table 6 presents a more detailed accounting of student actions during our observations of Algebra IA classes in District B. We examine the percentages for productive student actions for all of the Algebra IA classes first. Students spent the greatest amount of time completing assignments (48%). The next most typical productive student action we observed was participating in guided practice activities (22%). Checking homework was the third most common student action at 18%. Listening and answering questions were both ranked fourth at 13%. Students were observed taking notes during 8% of the observation segments. Four percent of the segments included time when students were taking a quiz or test, and during 3% of the observation segments, they worked with a small group.

Separating the data for the two teachers, we found that the three most common productive student actions were same for both of the Algebra IA teachers. The most typical student behavior for both teachers' classes was completing assignments (33% for Teacher 1 and 53% for Teacher 2). Participating in guided practice activities was the second most frequently observed student action (27% for Teacher 1 and 20% for Teacher 2). The third most common

student action was checking homework (18% for Teacher 1 and 17% for Teacher 2). Answering questions was recorded during the same percentage of segments (13%) for both teachers' classes; however, this behavior was ranked fourth for Teacher 1 and fifth for Teacher 2. During our observations, students spent much more time taking a test or quiz in Teacher 1's Algebra IA class than in Teacher 2's classes (11% as compared to 2%). The sixth most common student behavior in Teacher 1's class was listening (9%), while this student action was ranked fourth for Teacher 2 (15%). The students in both teachers' classes spent very little time asking questions (2% for Teacher 1 and 3% for Teacher 2). The observers did not indicate that students took notes or worked in groups in Teacher 1's class; however these behaviors were observed in Teacher 2's classes. Taking notes was the sixth most common student action in Teacher 2's classes (11%), and working with a group was the seventh most typical student behavior (4%) in her classes.

When we looked at nonproductive student actions, we found that off task behaviors were observed more frequently than any other student action (including productive student actions). This was the case when we combined the data from all of the Algebra I classes, as well as when we separated it by teacher. Off task behaviors were observed during more than half of the segments (59%) for all of the Algebra IA classes. Non math actions were recorded during 5% of the segments and disruptive behavior occurred during 1% of the intervals.

Table 6: Specific Student Actions in District B

Productive Student Actions	**Algebra IA (combined)** (172 segments)		**Algebra IA Teacher 1** (45 segments)		**Teacher 2 1st Period** (127 segments)	
	#	%	#	%	#	%
Checking homework	30	17%	8	18%	22	17%
Completing assignments	82	48%	15	33%	67	53%
Participating in guided practice activities	37	22%	12	27%	25	20%
Working with a group	5	3%	0	0%	5	4%
Listening	23	13%	4	9%	19	15%
Asking questions	5	3%	1	2%	4	3%
Answering questions	22	13%	6	13%	16	13%
Taking notes	14	8%	0	0%	14	11%
Taking a quiz/test	7	4%	5	11%	2	2%
Nonproductive Student Actions						
Off task	101	59%	25	56%	76	60%
Non-Math	9	5%	4	9%	5	4%
Disruptive	1	1%	0	0%	1	1%

Considering the percentages for each teacher, we found that off task behavior was exhibited during 56% of the segments in Teacher 1's class, and 60% of Teacher 2's Algebra IB classes. Non math student actions were exhibited more than twice as often in Teacher 1's class (9%) as compared to Teacher 2's classes (4%). No disruptive behavior was recorded in Teacher 1's class, while there was one disruptive incident during our observations of Teacher 2's classes.

Interactions Between Teacher Actions and Student Actions in Algebra IA

When we looked at the interactions between teacher actions and student actions, we found very similar patterns for the two Algebra IA teachers. (See Appendix C for frequency data for teacher action and student action combinations.) Teacher 1 had two combinations of an instructional teacher action with a productive student action that occurred most often. The first was teaching a lesson while students completed their assignments, while the second was teaching a lesson combined with small group work. Teacher 1 provided individual student assistance during all of the segments with the first combination. When students worked in small groups the teacher modeled how to solve problems about half the time and spent the other half of the time providing individual student assistance. The third most common pairing was checking homework for the teacher and the student. Looking at the most frequent combination of an instructional teacher action with a nonproductive student action, we found that students displayed off task behavior most often when Teacher 1 was teaching a lesson. Most of the time, off task behavior occurred when the teacher was providing individual student assistance; however students also displayed a fair amount of off task behavior when the teacher was modeling how to solve an algebra problem. There were two non-instructional teacher action and productive student action combinations that were observed most frequently in Teacher 1's Algebra IA class. These were behavior management when students were completing an assignment, as well as task management when students were completing an assignment. We were not surprised to find that the most common non-instructional teacher action and nonproductive student action pairing was behavior management with off task behavior.

For Teacher 2 there was just one instructional teacher action and productive student action combination that occurred most frequently. This combination was teaching a lesson when students were completing an assignment. The specific teaching a lesson behavior observed most often during these segments was providing individual student assistance. The next most common pairing was checking homework for both the teacher and the student. Teaching a lesson with small group was a very close third. Modeling was the specific teacher action observed when students worked in small groups. When we considered combinations of instructional teacher actions and nonproductive student actions, we found that teaching a lesson teacher actions were paired most often with off task student behaviors, with providing individual student assistance being the predominant "teaching a lesson" teacher action in these pairings and modeling occurring second most often. Looking at the combinations of non-instructional teacher actions and productive student actions, we found that Teacher 2 most often engaged in task management as her students completed assignments. She also managed behavior during many of the segments when students worked on their assignments. The non-instructional teacher action and nonproductive student action combination that occurred most frequently was behavior management with off task behavior.

Algebra IB

In addition to teaching one section of Algebra IA, Teacher 1 also taught two sections of Algebra IB during block three (11:34 AM – 1:34 PM, with 30 minutes for lunch included) and block four (1:41 – 3:11 PM). A total of 36 students were enrolled in Algebra IB. The size of these classes ranged from 10 to 26 students. Nine students with disabilities were enrolled in this course.

Algebra IB Content

As we noted earlier, all of the beginning algebra classes used the same textbook, McDougal Littel's *Algebra I* (Larson, Boswell, Kanold, & Stiff, 2001). While Algebra IA addresses the first six chapters of the text, the last six chapters are addressed in Algebra IB. When the two Algebra IB classes were observed on the same days, they studied the same topics. This was the case for our second and third observations because our first observations of the two Algebra IB classes occurred during two different weeks. The block four class was observed first (See Table 1) and was learning about graphing quadratic functions, one of the topics in chapter 9 which focuses on quadratic equations and functions. One week later the block three class was simplifying radical fractions, another topic from chapter nine. During our second observation both classes were working on factoring $x^2 + bx + c$ and $ax^2 + bx + c$, a topic from chapter 10 which addresses polynomials and factoring. Both classes were reviewing chapter 10 during our final observation.

Algebra IB Expected Tasks

The expected tasks followed a different pattern each day we observed Algebra IB classes. If both classes were observed on the same day, the students were expected to do the same activities for similar amounts of time. Class periods began with a warm up, a review problem, or housekeeping activities such as returning homework or passing out progress reports. These activities were following by time to check homework, play a review game using small groups, or do an individual review activity using white boards and dry erase markers. During three of the six observations (once in third block and twice in fourth block) the last half of class was used to teach a lesson. During three other observations the last ten to forty minutes of the class periods were devoted to working on individual assignments. During one observation a quiz was given.

Four expected tasks were observed during more than twenty percent of the observation segments in Algebra IB. A review was the most prevalent expected task in this class (29%). Teacher led instruction was the second most common expect task at 26%. Working on an assignment and checking homework were observed for almost the same amount of time (22% and 21%, respectively). The remaining four expected tasks were observed much less frequently. No assigned task was coded during 8% of the Algebra IB segments, while taking a quiz and doing a warm up were observed during 6% of these segments. A non-math task was noted during only one segment.

Algebra IB Teacher Actions

Next, we report our findings regarding teacher actions in the Algebra IB classes. As one might recall from our discussion of teacher actions in Algebra IA, we first divided teacher actions into three categories. Some segments had only instructional teacher actions, others had only non-instructional teacher actions, and many segments included both kinds of teacher

actions. During our observations of Algebra IB more half of all the observation segments (57%) included only instructional teacher actions. Instructional and non-instructional teacher actions were observed during slightly more than one third (35%) of the segments, and only non-instructional teacher actions were noted during 8% of the Algebra IB segments.

Teaching a lesson was by far the most common teacher action in Algebra IB classes. This teacher action was noted during almost three quarters (73%) of all the observation segments for this course. The second most typical instructional teacher action was leading a review at 28% of the segments. This was followed by academic monitoring (21%). Fourteen percent of the segments included times when the teacher was checking homework as a large group activity. The Algebra IB teacher conducted warm up activities during only 6% of the observation segments. During one interval (1%) the teacher gave students information about a quiz they were about to take.

An examination of the specific "teaching a lesson" actions displayed by the Algebra IB teacher revealed that she modeled procedures for solving algebra problems most often (42% of all the observation segments). The second most typical "teaching a lesson" behavior was providing individual student assistance (23%). Asking questions was ranked third at 12%, and "providing an explanation" was the label used for 5% of the observation segments.

Looking at both instructional and non-instructional teacher actions, the second most prevalent teacher action was task management. Task management includes activities such as taking attendance or returning papers. This teacher action was the most typical non-instructional teacher action. The second most common non-instructional teacher behavior was behavior management (16%). The teacher engaged in a non math activity during one segment and was out of the class during one segment.

Algebra IB Student Actions

As with teacher actions, we categorized student actions broadly at first, and then used more specific categories. Some segments included only productive student actions, some included only nonproductive student actions, and many included both kinds of student actions. For Algebra IB both productive and nonproductive student actions were displayed during a majority (51%) of the observation segments. Only productive student actions were noted during 44% of the segments, and only nonproductive student actions were recorded during 5% of the segments.

The most typical productive student actions exhibited in the Algebra IB classes were completing assignments and listening (24%). Participating in guided practice activities was observed for nearly the same proportion of time (23%). During 19% of the segments the observers witnessed students working in groups. The students were engaged in checking homework for the same amount of time. Taking notes ranked sixth at 14%. Students asked questions during 11% of the Algebra IB observation segments and answered questions during 9% of the segments. Taking a quiz or test was the productive student action observed for the five observation segments (6%).

Off task behavior was the most frequently observed student action, with 47% of Algebra IB observation segments including some form of off task behavior. Students were engaged in

non-math activities during 13% of the observation segments, and there was no disruptive behavior noted during the Algebra IB classes.

Interactions Between Teacher Actions and Student Actions in Algebra IB

Our last analysis of the data from the Algebra IB observations was to look at the interactions between teacher actions and student actions. (See Appendix C for frequency data for teacher action and student action combinations.) The most frequent pairing of an instructional teacher action with a productive student action was leading a review while students worked in small groups. The second most common combination was students listening when the teacher was modeling how to solve specific algebra problems. When we looked at combinations of non-instructional teacher actions and productive student actions, we found that the most frequent pairing was the teacher managing tasks while students completed their assignments. Considering instructional teacher action and nonproductive student action combinations, the most common mix was "teaching a lesson" actions with off task behavior. This was especially true when the teacher modeled how to solve algebra problems, as well as when the teacher was providing individual student assistance. The non-instructional teacher action and nonproductive student action that occurred most often was task management and off task behavior. The second most typical pairing of this type was behavior management with off task behavior.

Discussion

As we pointed out at the beginning of this report, this study was designed to answer four research questions:

1) How similar is the algebra curriculum for students with and without disabilities?
2) How are beginning algebra class periods structured?
3) What kinds of instructional approaches are used to help students learn algebra in general and special education?
4) How do students with and without disabilities respond to these instructional approaches?

We address each of these questions in this section of the report, beginning with the curriculum in the beginning algebra courses in District B.

The fourteen students in Algebra IA and the nine students in Algebra IB with disabilities were enrolled in the same beginning algebra classes as their general education peers; consequently the curriculum was the same for both groups of students. Occasionally, a special education teacher would work with a small group of students with disabilities in a different classroom to reinforce their algebra skills, but this did not change the required course content for Algebra IA or Algebra IB.

Each of the participating teachers from District B structured their beginning algebra class periods in their own way. Teacher 1 used a variety of expected tasks in her Algebra IA class and in her Algebra IB classes. On the other hand, Teacher 2 used the same basic pattern of expected tasks each day in her Algebra IA classes. Teacher 1 spent the most time checking homework, and nearly as much time reviewing, and engaging in teacher-led instruction in her Algebra IA class. Teacher 2 spent more than one quarter of the observation time engaged in teacher-led

instruction, which was followed by leading a warm up activity, and checking homework in her Algebra IA classes. The greatest amount of time was spent reviewing in Algebra IB, and the next most frequent expected task was teacher-led instruction.

Almost three quarters of the observation segments in all of the Algebra IA and Algebra IB classes had teacher actions that were related to teaching a lesson. The most typical instructional approaches that we observed in District B were providing individual student assistance and modeling as the teacher showed how to solve algebra problems or reviewed for an exam.

The anecdotal observations did not note if observed behaviors were exhibited by students with or without disabilities; consequently, we cannot report which instructional approaches were more effective either group of students. However, we did find that students displayed both productive and nonproductive behaviors during a majority of the observation segments in the Algebra IA and Algebra IB classes. Off task behavior was the most frequently observed student action in both courses. Completing assignments was the second most typical student action in both courses, with listening observed just as often in the Algebra IB classes. The next most typical student action in both courses was participating in guided practice activities.

Student achievement data will be reviewed as a part of the next phase of this study, which will be the creation of a case study of beginning algebra curriculum and instruction in District B. This case study will be based on the findings from this report, the data from Technical Report #4 (Olson & Foegen, 2006), as well as interviews with district personnel and district documents.

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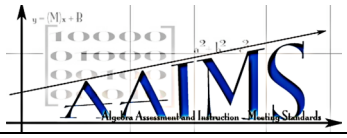
Appendix A

Project AAIMS Anecdotal Recording Form



Teacher _____ Period ____ Date _____ IEP LA

Project AAIMS Anecdotal Recording Form

Observer instructions: As you observe the classroom you will need to focus on the academic content, the teacher's actions, the student's actions, and the classroom activity. Your anecdotal notes should focus on what type of activity is occurring in the classroom (direct instruction, cooperative groups, etc.) as well as the actions of both the students and the teacher.
Please be very specific in your recording of your anecdotal notes

Five-minute interval	Anecdotal notes

Appendix B

Anecdotal Observation Coding Handbook

Project AAIMS
Anecdotal Observation Coding Handbook

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May 2005

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Project AAIMS
Anecdotal Observation Coding Handbook
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Code Generation

Codes for Project AAIMS anecdotal observations were developed through an iterative process that began with principal investigator, the project coordinator, and a research assistant meeting to discuss possible codes for the data we had collected. During this meeting we brainstormed some potential codes for each of three categories of interest including: expected task, teacher actions, and student actions. We also decided to also note the particular algebra topic or topics that were addressed during an observation. With this preliminary list of codes in hand, each member of our research team independently examined the same set of two observation reports to verify that the codes we had brainstormed would work for the data we had collected. We wanted to ensure that our codes would be applicable for both general education and special education classes so we selected one observation report from a general education class and the other from a special education class. At our next meeting we discussed new codes we decided were necessary and changed some of our initial codes. In addition, we discussed specific segments where we disagreed about code assignments, which helped us refine the definitions for each of the individual codes. We determined that we could use more than one code for each category of interest for each five-minute interval because it was not possible for the coder to determine the most prevalent behavior during an interval from the observation reports that were completed by different observers. After three rounds of code refinement using different sets of observations, the team concluded that we had sufficient agreement (95%) to begin the final round of coding. The research assistant recoded all of the previous observations with the finalized list of codes. This work was spot checked by the project coordinator.

Coding begins by noting the content being addressed during the class period that was observed. Next, the researcher considers the expected task, the teacher's actions, and the students' actions for each five-minute observation segment.

Expected Tasks

The first step is to identify the expected task for the observation interval. Identify the type of activity or activities the teacher expects to occur during a particular five-minute interval. There are eight possible expected tasks. These include warm up activities, teacher led instruction, checking homework, reviewing, working on an assignment, participating in group work, or no assigned task. Code all the expected tasks that are evident from the observation notes. If available, be sure to note the source of an assignment such as textbook or worksheet.

Expected Task Codes:

- warm ups (**E-WU**)
- teacher led instruction (**E-TLI**)
- checking homework (**E-CH**)
- assignment (**E-A**)
- test/quiz (**E-TQ**)
- non-math (**E-NM**)
- no assigned task (**E-NAT**)

Teachers' Actions

As you examine each observation interval decide if the noted teacher actions are instructional or non-instructional. In other words, do the actions promote algebra learning or not? Once you have decided if a teacher action is instructional or non-instructional, note this code. Then, determine what category of instructional or non-instructional actions is being demonstrated and record the appropriate code.

Instructional activities include conducting warm-ups, checking homework, academic monitoring, administering a test or quiz, leading a review, or teaching a lesson. If the teacher is teaching a lesson, list an additional code such as questioning, modeling, or explaining content if these can be distinguished. Providing individual or group assistance is also considered "teaching a lesson."

Non-instructional teacher actions are subdivided into task management (general non-instructional classroom tasks), behavior management, being out of the room, or non-math content.

Teacher's Action Codes:

<u>Instructional</u>
- conducting warm-ups (**T-WU)**
- checking homework (**T-CH**)
- academic monitoring (**T-AM**)
- administering a test/quiz (**T-TQ**)
- leading a review (**T-LR**)
- teaching a lesson (**T-TL**)
    - questioning (**T-Q**)
    - modeling (**T-M**)
    - explaining content (**T-E**)
    - providing individual/ small group assistance (**T-ISA**)

<u>Non-Instructional</u>
- task management (**T-TM**)
- behavior management (**T-BM**)
- out of the room (**T-OR**)
- non-math content (**T-NM**)

Students' Actions

The students' actions are first classified as productive or nonproductive behaviors and then further subdivided just as the teacher's actions were. Productive student actions include: guided practice, verbally answering questions, asking questions, seatwork (working on an assignment), group work, checking homework, or listening (use only when this seems to be the predominant student activity during a five-minute interval). Nonproductive student actions can be subdivided into disruptive, off task, or non-math. As with the other categories, more than one label can be used during an observation segment.

Students' Action Codes:

Productive	vs.	Nonproductive
- guided practice (**S-GP**)		- disruptive (**S-D**)
- verbally answering questions (**S-VQ**)		- off task (**S-OFF**)
- asking questions (**S-AQ**)		- on task non-math (**S-NM**)
- seatwork (**S-S**)		
- taking a test/quiz (**S-TQ**)		
- checking homework (**S-CH**)		
- group work (**S-GW**)		
- listening (**S-L**)		
- taking notes (**S-TN**)		

Glossary

Expected Tasks

E-A (assignment) – homework or class work given to the students by the teacher to complete.

E-CH (checking homework) - correcting a completed assignment.

E-NAT (no assigned task) – students are not given an expected task.

E-NM (non-math) – a non-algebra related task is assigned such as a game or reading the newspaper when an assignment is finished.

E-R (review) – students are going over previously learned or corrected material.

E-TLI (teacher led instruction) – teacher is teaching a lesson.

E-TQ (test/quiz) – students are taking a test or quiz.

E-WU (warm ups) – students are solving puzzles to prepare their minds for a lesson.

Teacher Actions

T-AM (academic monitoring) - teacher is walking around the room answering students' questions, listening to their responses, and/or watching as they complete their work.

T-BM (behavior management) - teacher's actions designed to maintain classroom order by redirecting extinguishing negative behavior or .

T-CH (correcting homework) – teacher is helping students check homework as a class or grading individual student papers.

T-E (explaining content) - teacher's verbal explanation of material during a lesson.

T-ISA (individual/ small group assistance) - teacher is providing personal instruction to an individual or portion of the class.

T-LR (leading a review) – teacher is reviewing previously covered or corrected material.

T-TM (task management) - teacher performs activities that are non-instructional yet related to learning math such as preparing for a lesson, passing out papers, or cleaning up materials.

T-M (modeling) - teacher demonstrates how to solve particular problems or concepts during a lesson.

T-NM (non-math content) – teacher is involved in non-math related ideas or activities such as discussing the day's current events, facilitating a non-math game, attending to mechanical errors, or speaking with visitors at the door or on the phone.

T-OR (out of the room) – teacher is not in the classroom

T-Q (questioning) – type of teaching strategy in which the teacher asks students questions during a lesson to assess their understanding of the material.

T-TL (teaching a lesson) – teacher is presenting a math related lesson.

T-TQ (administer test/quiz) – teacher is explaining a test or quiz for students to complete during class.

T-WU (conducting warm-ups) – teacher is discussing or correcting warm-up activities.

Student Actions

S-AQ (asking questions) – students are asking the teacher math related questions during a lesson.

S-CH (checking homework) – students are correcting assignments

S-D (disruptive) - any out of control behavior, such as throwing objects, fighting, or yelling by a student, that interrupts another student from the assigned task.

S-GP (guided practice) – students solve problems during a lesson with feedback and direction from the teacher during a lesson either at their seats or on the boards.

S-GW (group work) – students are on task working with other peers to complete the expected task.

S-L (listening) – the students are attentive to instruction. Use this only if no other on-task student behavior is specified.

S-NM (on task non-math) – students are performing an expected task that is not math related without distracting others. These tasks include waiting quietly for class to begin, working on other subjects if allowed to do so, or playing an approved non-algebraic game.

S-OFF (off task) – students are not participating in the expected task.

S-S (seatwork) – students are working at their desk on an assignment, warm up, or other assigned task.

S-TN (taking notes) – students are taking notes

S-TQ (taking a test/quiz) – students are taking a test or quiz.

S-VQ (verbally answering questions) – students are responding to math related questions or verbally interact with the teacher during a lesson.

Appendix C

Interaction Frequencies of Teacher Action and Student Action Pairs

Teacher Action and Student Action Codes

Teacher Actions

TI – instructional
T-CH – correcting homework
T-WU – conducting warm-ups
T-AM – academic monitoring
T-TQ – administer test/quiz
T-LR – leading a review
T-TL – teaching a lesson
T-M – modeling
T-ISA – individual/ small group assistance
T-E – explaining content
T-Q – questioning

TN – non-instructional
T-BM – behavior management
T-NM – non-math content
T-TM – task management
T-OR

Student Actions

PSB – productive student behavior
S-CH – checking homework
S-S – completing an assignment
S-GP – guided practice
S-GW – group work
S-L – listening
S-AQ – asking questions
S-VQ – verbally answering questions
S-TN – taking notes
S-TQ – taking a test/quiz

NSB – nonproductive student behavior
S-OFF – off task
S-NM – on task non-math

Interactions Between Teacher Actions and Student Actions for Teacher 1's Algebra IA Class

	TI	TCH	TWU	TAM	TTQ	TLR	TTL	TM	TISA	TE	TQ	TN	TBM	TNM	TTM	TOR
PSB	40	8	1	11	2	4	34	14	21	2	4	24	14	3	13	1
SCH	8	8	1	1			5	4		1	1	4	3		2	
SS	12						12		12			9	4	1	4	1
SGP	12	1	1	7		4	12	7	6	1		3	3		1	
SGW																
SL	4						4	4			3	2	1		1	
SAQ	1	1					1	1				1			1	
SVQ	5	3	1	1			4	3		1	3	2	2	1	1	
STN																
STQ	5			4	2		3		3			5	2	1	4	
NSB	24	4	1	4		3	20	7	13	2	3	19	14	3	8	1
SOFF	23	4	1	3		3	20	7	13	2	3	16	13	1	7	1
SNM	1			1								4	2	3	2	

Interactions Between Teacher Actions and Student Actions for Teacher 2's Algebra IA Class

	TI	TCH	TWU	TAM	TTQ	TLR	TTL	TM	TISA	TE	TQ	TN	TBM	TNM	TTM	TOR
PSB	121	21	16	11	1	9	91	42	47	8	7	62	35	4	38	4
SCH	22	21	3	1			10	5	3	1	1	11	4		7	
SS	62	7	14	8		3	46	10	36	2	5	41	20	3	29	4
SGP	25	2	3	2		4	20	15	6	1	1	12	9	1	6	1
SGW	5			2			3	1	2		1	2	2		1	
SL	19				1		18	15	1	3	1	3	3		1	
SAQ	4	1		1			2	1	1			2			2	
SVQ	16	2		2		6	11	9	2	1	3	5	2	1	4	
STN	14					3	11	8	2	2	1	4	4		1	
STQ	2						2		2							
NSB	73	15	4	5	1	5	56	26	33	2	3	49	34	2	25	2
SOFF	72	15	4	5	1	5	55	26	33	2	3	48	33	2	24	2
SNM	5					1	3	1	2			5	3	1	4	1
SD	1						1		1			1	1			

Interactions Between Teacher Actions and Student Actions for Teacher 1's Algebra IB Class

	TI	TCH	TWU	TAM	TTQ	TLR	TTL	TM	TISA	TE	TQ	TN	TBM	TNM	TTM	TOR
PSB	78	12	5	17	1	24	62	36	19	4	10	33	13	1	25	1
SCH	15	10				1	15	8	7		1	5	2		5	
SS	20	3	2	3		1	17	3	15			15	5		13	
SGP	20			11		19	16	12	1	1	3	7	4	1	5	
SGW	15	2	3	1		4	9	1	8			9	1		9	
SL	21	3		1		1	18	14	1	3	4	5	4		1	
SAQ	7	2					7	3	4			5			5	1
SVQ	8			4		4	8	4			3	1	1		1	
STN	12	1					12	9		1	5		1			
STQ	5				1	1	2		2			2			2	
NSB	42	3	2	8		11	35	17	15	1	8	28	11	1	22	1
SOFF	40	3	1	6		11	33	17	13	1	8	22	10	1	17	
SNM	6		1	3			4		4			9	2		7	1
SD																