CMSI University-based Programs:

Teacher Associates and Faculty Offering University Math and Science Courses

Report, 2008-2009

Executive Summary

This report builds on previous evaluation reports by the PRAIRIE Group including a May 1, 2009 data brief addressing the views and experiences of Teacher Associates. This report focuses on findings from a survey of CMSI university course instructors and addresses the following key questions: 1.) What is the role of the Teacher Associate in the university-based endorsement courses? 2.) How does the role of the Teacher Associate relate to roles that faculty typically play?

Survey respondents. With 46 faculty members and 68 courses offered, the response to the survey included 21 faculty representing all seven universities (46% response rate) and 31 courses (46% response rate). Responses included sixteen courses in science, 13 in math, and 2 in other fields. Of the math respondents, those teaching in the Algebra Initiative responded most frequently (7 of 14).

Context. Instructors responded to items regarding the characteristics of their courses. On average for these courses, the faculty agreed or strongly agreed that teachers were *engaged* in their courses. However, they were less positive about teachers' preparation for the *rigor* of the courses as well as the level of rigor of the courses themselves. In terms of teachers' performance in the courses, instructors indicated that the majority of teachers received A's, B's, or Pass grades.

Major Findings

Faculty utilization of Teacher Associates. Among the 31 courses for which surveys were completed, faculty reported that 10 (33%) of these had Teacher Associates (across seven unique faculty). Four of these are CMSI Teacher Associates and six appear to be individuals who faculty call "teacher associates" but who were not part of the CMSI Teacher Associate program formally. Faculty that did not have a Teacher Associate indicated either that 1.) they did not know there was a Teacher Associate program and that it was an option or 2.) they were open to having an associate but a qualified one was not made available to them.

The Teacher Associate role. Faculty members with Teacher Associates indicated that teachers in their courses responded favorably to the TAs. These faculty wanted another TA for future courses and most reported collaboratively planning with their TAs at least once a week. Faculty found TAs helpful in modeling teaching strategies and they were least likely to see the Teacher Associates as helpful in providing information on math and science content. Instructors also rated modeling teaching strategies and providing in-depth topic content as activities they, the instructors, were highly likely to do.

Teacher Associate activities. The most often mentioned and time-consuming activities according to faculty were TAs' work to create classroom materials (including lab exercises) and working with teachers one-on-one or in small groups during class. The TAs were only occasionally leading whole class lectures or discussion on their own and almost never grading teachers.

Course activities. The majority of faculty with and without Teacher Associates had the teachers in their courses working in small groups, watching demonstrations of problem solving procedures, and working individually. Very few faculty members required lesson plans, assessment, or portfolio development in their courses. Faculty indicated using manipulatives or other data collection tools in 100% of courses with TAs. In contrast, faculty indicated using manipulatives or other data collection tools in only 61% of classes without TAs.

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A Report for the CPS Office of Mathematics and Science
Prepared by the PRAIRIE Group, UIC College of Education

October 2, 2009

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Introduction

This is a report for the external evaluation conducted over the 2008-2009 school year by the PRAIRIE group, in order to examine the systemic educational reform underway as part of the Chicago Math and Science Initiative (CMSI) supported by the CPS Office of Math and Science (OMS). The aim of the evaluation is to provide OMS and other key stakeholders with a deep, nuanced understanding of the processes and outcomes of the CMSI. These studies build upon the PRAIRIE Group's external evaluation of various facets of the CMSI from 2003 to 2008.[2] As with past evaluations, the 2008-2009 evaluation studies are based on rigorous data collection and analysis that are conducted in such a way as to provide timely and useful feedback to the audiences including the leadership team of the OMS, the Chief Educational Officer of CPS, and the CPS Department of Program Evaluation, as decisions are made about the allocation of resources in the effort to continually improve math and science teaching and learning.

One such effort is OMS' support of university-based credentialing programs for CPS teachers of math and science. The district provided partial tuition for teachers to take specially designed courses. In 2008-2009 OMS provided universities with "Teacher Associates" (TAs) to help connect university course content to classroom-level instructional practice. Implicit in OMS' support of the TA role is a program theory that the combined knowledge and skills of the faculty and TA would yield a stronger impact toward high quality instruction of math and science in the teachers' classrooms. The logic of this theory would resemble Figure 1.

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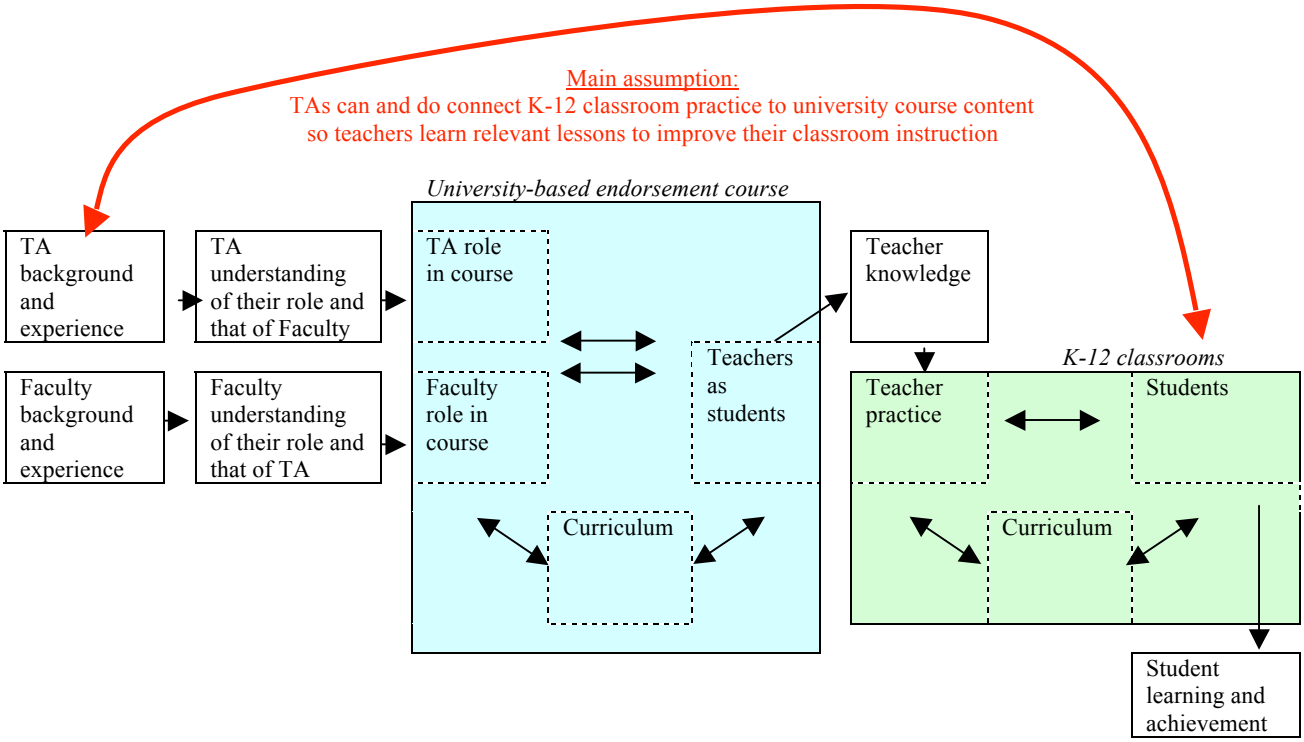
[1] Authors produced this report collaboratively. They share responsibility for its contents. The conclusions drawn in this report reflect the viewpoints of the authors. While there are many potential viewpoints, these reflect a systematic analysis of data by external evaluators. The hope is that these findings can facilitate improvement of this and related programs through open discussion and consideration of data-driven understandings. For further information, please contact Stacy Wenzel at swenzel@luc.edu or (773) 508-7330.

[2] The numerous reports of findings from this external evaluation are available on the CPS Department of Program Evaluation websites at https://research.cps.k12.il.us/resweb/pe, and http://www.prairiegroup.org/evaluationreports.html.

Figure 1: Program Theory of Teacher Associate influence on university-based endorsement courses and impact on teachers in the courses



Methods

This report builds on previous evaluation reports by the PRAIRIE Group including a May 1, 2009 data brief addressing the views and experiences of Teacher Associates.[3] This report addresses the following key questions:

1. What is the role of the Teacher Associate in the university-based endorsement courses?

2. How does the role of the Teacher Associate relate to roles that faculty typically play?

The May 2009 data brief drew on interviews with the five Teacher Associates who supported courses between summer 2008 and spring 2009. This report adds insights based on a survey of university faculty members teaching CMSI district-supported courses between summer 2008 and spring 2009. According to OMS records, during this period of time, 46 unique faculty members offered 77 sections of CMSI-supported math and science courses at 7 different universities. Some courses were taught more than once

[3] The findings elaborated in the May data brief on Teacher Associates are not repeated in this report. We advise readers interested in the Teacher Associates to review that data brief as a companion to this report (Please see http://www.prairiegroup.org/evaluationreports/cpsmathandscience.html to access this report).

during this period. In addition, some faculty taught more than one section of a course, taught more than one course, and/or taught at more than one university. The 46 faculty instructors were invited to take a web-based survey between July 22, 2009 and August 5, 2009. In courses taught by more than one faculty member, only the first listed faculty member was surveyed. If a faculty member taught more than one course, he or she was asked to complete a separate survey for each. If he or she taught more than one section of a course, the teacher was only asked to answer questions about the most recent section – making the sampled number of courses 68 once the duplicated sections were removed.

With 46 faculty members and 68 courses offered, the response to the survey included 21 faculty (46% response rate) and 31 courses (46% response rate). Responses included sixteen courses in science (16 of 24 or 67% response rate), 13 in math (13 of 36 or 36%), and 2 in other fields (psychology, student learning) (2 of 6 or 33%). Of the math respondents, those teaching in the Algebra Initiative responded most frequently with 7 of 14 or 50% responding compared to 6 of 22 or 27% of the other math courses. Faculty from all seven universities responded and the response rate per university varied from 25% to 100%. Of the 12 faculty who taught between two to four courses, 6 or 50% responded to the survey.

Data from the surveys were statistically analyzed to offer descriptions of faculty responses. Because the number of responses was fairly small with 31 courses, there is likely a low level of statistical power. Thus, tests for statistically significant differences within this report are only suggestive of differences and should be used as just one tool to look at the data.

Context

While we do not have descriptive characteristics of the population of 46 faculty reported to be offering these CMSI-supported courses, we do have information about the 21 faculty completing our survey who taught 31 courses. A description of their backgrounds follows in Table 1. We report this across the 31 courses rather than by unique faculty in order to better describe what type of instructor CPS teachers are likely to work with across the range of courses.

Table 1:
Faculty background across a sample of 31 university-based CMSI-supported courses

Instructor characteristic	
Doctorate as highest degree	65% (n=20)
Masters as highest degree	35% (n=11)
Highest degree in math or science	68% (n=21)
Highest degree in math ed or science ed	7% (n= 2)
Highest degree in education	6% (n=8)
Tenured faculty	32% (n= 10)
Non-tenured on tenure track	3% (n=1)
Not tenured nor on tenure track	61% (n=19)
Have taught in a K-12 setting	42% (n=13)

* Some data are missing. Thus, sums may not equal 100%

In addition, we have general information about the courses in the sample in terms of how faculty assessed teachers' engagement in the course and the course's rigor. On average for these courses, the faculty agreed or strongly agreed that teachers were *engaged*. However, they were less positive about teachers' preparation for the *rigor* of the courses as well as the level of rigor of the courses themselves. Table 2 offers a summary of these findings.

Table 2:
How university faculty across a sample of 31 university-based CMSI-supported courses assessed course rigor and teacher preparation

Survey question	Mean response			
	1 Strongly Disagree	*2 Disagree*	*3 Agree*	*4 Strongly Agree*
Teachers in this course are engaged		3.7		
Teachers who are registered for this course attend regularly		3.6		
The teachers in this course complete their out-of-class assignments		3.6		
This course is at least as rigorous as other college level courses I teach		3.1		
The teachers in this class are prepared for the rigor of the course's content		2.9		

Across these courses, teachers were assigned letter grades in 17 courses (58%) and another 10 courses (32%) used Pass/Fail grades. (Three courses did not indicate their grading scales.) In 12 (70%) of the courses using letter grades, instructors assigned all of their students A and B grades. Only one course of this type gave teachers an F grade. Of

the Pass/Fail courses, five of the ten (50%) gave some teachers Fail grades. In all, of the 27 courses reporting grades, six (22%) reported that some teachers did not pass their course.

Reflection Questions:

- *Are the faculty members' backgrounds what the district expects? Are teacher engagement, attendance and completion of assignments in the courses at acceptable levels to the district paying some tuition support?*

- *Faculty indicate concern for the preparation of the teachers in their course and some disagree that their course is as rigorous as other college level courses they teach. Yet teachers on average engage in and attend the courses, most earning A, B or Pass grades. What are district expectations for course rigor and teacher preparedness? How might faculty be engaged in addressing rigor concerns?*

- *Some teachers fail the courses or get grades lower than a B. Are the success rates of teachers supported in these courses at the level that the district expects? Why or why not? What specific procedures and supports will the district implement to improve teacher success in 2009-2010?Will the district continue to support teachers who receive unsatisfactory grades?*

Findings

Teacher Associate Perceptions of their Role

When the population of five Teacher Associates was interviewed by evaluators for the May 2009 data brief, they reported that they saw their main goal as helping the teachers in university courses translate the math and science content they learned into how they teachers taught their own K-12 classes. According to Teacher Associates, they did this through offering information to and addressing questions from the teachers. At times they formally taught or co-taught with the faculty. Often the science Teacher Associates led lab activities. All Teacher Associates created or modified course activities to help align them to the types of content the teachers would be covering in their own classrooms. Specifically Teacher Associates tried to strengthen the university courses in terms of how they covered:

- The types of math and science misconceptions common to students
- Strategies for planning K-8 lessons
- Alignment of content with its placement within CMSI-supported K-8 curriculum materials

Teacher Associates also spoke of working hard to foster teachers to grow in self-confidence and comfort as both instructors and learners of science and math.

Prevalence of Teacher Associates Among Surveyed Faculty

Among the 31 courses for which surveys were completed, faculty reported that 10 of these had Teacher Associates (across seven unique faculty). Thus, seven of 21 faculty (33%) reported having Teacher Associates. Two of these were CMSI Teacher Associates (from among the five) whom we interviewed previously, two appear to be new CMSI Teacher Associates who came into the program after our interviews and six appear to be individuals who faculty call "teacher associates" but who were not part of the CMSI Teacher Associate program formally.[4]

Eight of the 21 faculty respondents (38%) noted, when asked why they did not have a Teacher Associate, that they did not know there was a Teacher Associate program and that it was an option. Another five faculty (24%) noted that while they were open to having an associate, a qualified one was not made available to them. These five respondents did not elaborate on this response on the survey, thus further inquiry would be required to determine what was meant by their perception of the lack of a qualified candidate.

Reflection Questions:

- *How does the scale of the Teacher Associate program align with district goals and capacity?*
- *Does the district hope to support more or fewer TAs in the future? Are there new strategies for finding qualified TAs for faculty who want them? How can all instructors be made aware of the TA program?*

Faculty Reported Perceptions of Teacher Associates and Their Role

Faculty members with Teacher Associates all agreed or strongly agreed that their students responded favorably to the TAs and the faculty wanted another TA for future courses. Most (in 9 of 10 courses) faculty reported collaboratively planning with their TAs at least once a week.

Faculty agreed that Teacher Associates helped them carry out many key activities. Faculty most strongly agreed that they found TAs helpful in modeling teaching in ways that could be used and applied to the teachers' K-8 classrooms. They were least likely to see the Teacher Associates as helpful in providing information on math and science content. Table 3 describes these findings from the survey.

[4] Evaluators have requested an updated list of Teacher Associates from OMS in order to further clarify this issue. It is known though that some university partners have a history of hiring teacher associates for their program who are different that those who are participating in the recent OMS hiring of TAs.

Table 3:
Faculty on their Teacher Associate's contribution to the course

Survey question	**Mean response (n=10)**			
In this course my Teacher Associate does the following:	***1*** *Strongly Disagree*	***2*** *Disagree*	***3*** *Agree*	***4*** *Strongly Agree*
Models classroom teaching practices in this course that could be used in K-8 classrooms		3.8		
Provides specific instructional strategies for the teachers to use with their students		3.4		
Uses examples from K-12 curricular materials in this course		3.4		
Discusses misconceptions that K-12 students may have about math or science content		3.2		
Uses examples of student work in this course		3.0		
Provides teachers with information about CMSI and CPS in this course		2.9		
Provides the teachers in this course with in-depth math or science content information		2.6		

Faculty Reports of Use of Teacher Associate Time

In addition, faculty described how their Teacher Associates spent their time in various types of activities. The most often mentioned and time-consuming activities according to faculty were TAs' work to create classroom materials (including lab exercises) and then working with teachers one-on-one or in small groups during class. All faculty members had Teacher Associates working one-on-one or with small groups of teachers. Many Teacher Associates (in 8 of 10 courses) were engaged in creating class materials. According to instructors, all of the Teacher Associates in science courses worked to lead activities like laboratory sessions.

Co-teaching and leading discussion and activities also took time. The TAs were only occasionally leading whole class lectures or discussion on their own and almost never grading teachers. Table 4 describes survey findings.

Table 4:
Percent of time Teacher Associates spend doing various activities, according to their faculty partner

Activity	n	Mean
Creating class materials (e.g., labs)	9	41%
Working with small groups of teachers	10	22%
Working one-on-one with teachers**	8	18%
Co-teaching with me	4	20%
Leading activities and/or labs	5	17%
Leading whole class discussion	3	10%
Leading whole class work (lecture)	4	9%
Working with teachers outside of class	2	5%
Grading	1	5%

**Note: Because this item was only mentioned as a TA activity in 4 courses it is out of order in terms of percentage of time spent.

Reflection Question:

- *How does the enacted work of the Teacher Associate program align with district goals and capacity?*

Relationship Between the Instructor Role and the Teacher Associate Role

We next examined whether or not the presence and work of the Teacher Associates related to the type of work done by faculty. All faculty members rated modeling classroom practices as one of the most common things they, they instructors, did. This was also the top rated type of activity that those with Teacher Associates reported their Teacher Associates having done. Another top activity among all instructors was to provide in-depth content knowledge—the activity faculty found their Teacher Associates least able to do.

Table 5 displays faculty reports of activities carried out by the *instructors themselves* in courses with and without TAs. Our tests of statistical significance yielded no significant mean differences.

Table 5:
Extent to which classroom practices were carried out
By faculty with TAs and faculty without TAs

Survey question	Courses with TAs (n =10)		Courses without TAs (n = 21)	
In this course I do the following:	***1*** *Strongly Disagree*	***2*** *Disagree*	***3*** *Agree*	***4*** *Strongly Agree*
Model classroom teaching practices in this course that could be used in K-8 classrooms	4.0		3.6	
Provide the teachers in this course with in-depth math or science content information	3.9		3.6	
Provide specific instructional strategies for the teachers to use with their students	3.8		3.6	
Discuss misconceptions that K-12 students may have about math or science content	3.6		3.4	
Use examples from K-12 curricular materials in this course	3.4		3.3	
Provide teachers with information about CMSI and CPS in this course	3.1		2.6	
Use examples of student work in this course	2.7		2.7	

Activities Within University Courses

Table 6 offers the faculty descriptions of exactly the types of activities in which the teachers in their courses engaged. Given that faculty explained that the top role for both themselves and for their Teacher Associates was to model classroom practices that might be used by teachers in their classrooms, faculty choice of course activities may offer some clues as to the vision faculty had of good instructional practices for K-8 classrooms.

The majority of faculty with and without Teacher Associates had the teachers in their courses working in small groups, watching demonstrations of problem solving procedures, and working individually. There were fewer faculty members engaging teachers in the use of technology and books other than textbooks. Around 60% of the faculty had teachers demonstrate solutions to math or science problems. Very few faculty members required lesson plans, assessment, or portfolio development in their courses.

While there were no statistically significant differences in classroom activities between these two groups of classes (courses with and without Teacher Associates), likely due to the small sample sizes, there is one pattern that bears noting in terms of practical significance. Faculty indicated using manipulatives or other data collection tools in100% of courses with TAs. In contrast, faculty indicated using manipulatives or other data collection tools in only 61% of classes without TAs.

Table 6:
The extent to which activities pertaining to K-12 classroom practices occurred in Course taught by faculty with TAs and faculty without TAs

Survey questions	Courses with TAs (n=10)	Courses without TAs (n=21)
Teachers in this course do the following:	*Percent of courses in which activity occurred*	
Work in pairs or small groups on math or science exercises, problems, investigations, or tasks	100%	94%
Work individually on exercises, problems, investigations, or tasks	100%	78%
Use manipulatives (e.g., geometric shapes or algebraic tiles), measurement instruments (e.g., rulers or protractors), and data collection devices (e.g., surveys or probes)	100%	61%
Watch demonstration how to do a procedure or solve a problem	90%	83%
Take a quiz or test	90%	72%
Take notes from lectures or the textbook	80%	61%
Complete computational exercises or procedures from a textbook or a worksheet	80%	72%
Use computers, calculators, or other technology to learn math or science	70%	67%
Present or demonstrate solutions to a math or science problem to the whole class	60%	61%
Read about math or science in books, magazines, or articles (not textbooks)	50%	67%
Develop lesson plans	30%	44%
Maintain and reflect on a math or science portfolio of their own work	30%	22%
Develop assessment tools	20%	39%

Reflection Questions:

- *How does the enacted work in the classroom of the Teacher Associate align with district goals and capacity?*
- *How does the enacted work in the classroom of the university faculty align with district goals and capacity?*
- *Given that instructors indicated the importance of modeling classroom practices, and that those with Teacher Associates reported that the Associates engaged in modeling in their courses, how might Teacher Associates be trained and utilized to maximize their contribution to this activity?*

General Conclusions

As reported by instructors, both teachers and faculty who have Teacher Associates perceived TAs favorably. These faculty also indicated that they would like to have TAs in the future. In a survey completed by teachers in university courses at the end of the 2007-2008 school year[5], many teachers indicated that they would like for the courses to include more hands-on activities that relate directly to their classrooms. This year's survey revealed that the items most highly rated by instructors as being part of the TA role were practical in nature. These items were:

- Models classroom teaching practices in this course that could be used in K-12 classrooms
- Provides specific instructional strategies for the teachers to use with their students
- Uses examples from K-12 curricular materials in this course

In addition, the findings of this survey suggest that courses with TAs may be more likely to include the use of manipulatives and data, both of which ostensibly speak to teachers' desire for more hands-on course work. Also, one of the activities occupying the bulk of TAs' time was that of creating classroom materials (including lab exercises). Such materials, particularly lab exercises, are also likely hands-on in nature.

The above items reflect a focus on strategies, materials, and activities that are likely to be applicable in a classroom. Thus, survey data suggest that TAs provide a set of skills that help to fulfill needs expressed by teachers in university courses, and that instructors see TAs as useful both to them and to their teachers.

[5] Please see http://www.prairiegroup.org/evaluationreports/cpsmathandscience.html to access this report.