

Recruitment of Future High Quality Urban Mathematics Teachers: A Process of Instrument Development

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Abstract

In this paper we share our approach and current progress in the development of a research-based recruitment instrument that will be used in selecting students for an initial preparation program. This instrument will facilitate the selection of future teachers of secondary mathematics who possess the potential to become high quality teachers capable of advancing the mathematical learning of urban students. A phenomenological stance was applied within focus groups interview in collecting and analyzing initial data. Through this process a list of characteristics of high quality urban teachers were determined and categorized.

INTRODUCTION

Our nation's schools are facing a growing and critical shortage of qualified teachers. Due to projected increases in student enrollment, the rate of teacher retirement, and the attrition rate of new teachers, it is anticipated that schools in the United States (US) will need to hire 2.2 million teachers over the next ten years. In high school mathematics the situation is especially despairing. Nationally, out-of-field teachers teach approximately 27% of high school students. The data show a significant impact on the need to hire mathematics and science teachers. Schools will need to hire over 240, 000 middle and high school mathematics and science teachers over the next ten years (Glenn Commission, 2000).

Further, the data is even more alarming for urban school districts. Ninety-five percent of urban school districts reported an immediate need for high school mathematics and science teachers (Glenn Commission, 2000). These teacher shortages come at a time when the expectations for what students should know in mathematics and science are rising and students across the US, especially those in urban areas, are performing poorly on measures of mathematics and science achievement. High-poverty urban schools face persistent hurdles in hiring the teachers they need, and across the nation there is a crucial need for many more teachers who reflect the racial and cultural mix of students in schools.

In the report, *No Dream Denied: A Pledge to America's Children* (2003), "highly qualified teachers" have been benchmarked by a set of criteria that are aligned with the Interstate New Teacher Assessment and Support Consortium (INTASC) and the National Board for Professional

Teaching Standards (NBPTS). The report has also indicated “American students are entitled to teachers who know their subjects, understand their students and what they need, and have developed the skills to make learning come alive” (p. 7). Despite these claims, the report states that the nation is far from providing every child with quality teaching -- particularly in urban school environments.

Even more challenging is the notion of having high quality urban mathematics teachers in those classrooms for improvement in K-12 student achievement. Goldhaber and Anthony (2003) suggest that teacher quality is the most important educational input predicting student achievement. They claim that teacher quality has historically been synonymous with personal traits, such as high moral character and intellectual curiosity while today it tends to encompass structured standards developed by INTASC and NBPTS. The National Council for the Accreditation of Teacher Education (NCATE), INTASC and NBPTS, though they differ in some respects, they share common themes about teacher quality. However, despite thinking of teacher quality as an immutable characteristic, Goldhaber and Anthony (2003, p.6) stated that it is possible that some teachers may do well in highly structured environments with explicit standards and accountability measures, while others have teaching styles that flourish in more flexible environments. This thought has further highlighted the need for the recruitment of future teachers into initial preparation programs who possess the potential to become high quality urban mathematics teachers. Therefore, our research is focused on producing a recruitment instrument for identifying such potential teachers. For the context of this paper, we share the process in developing this instrument.

Ultimately, our focus is to increase the number of high quality urban mathematics teachers who seek jobs in urban school districts and are committed to remain in urban classrooms. In that light, we need to understand what is necessary to be a high quality urban mathematics teacher, and how we prepare teachers to acclaim those qualities, remain and be committed to teach in urban schools. There is the need to identify characteristics of teachers who influence urban student achievement and possess the willingness, the stamina and longevity to remain in the urban classroom. A recruitment tool that can accomplish the task of identifying these characteristics within students entering initial preparation programs has the potential to address the numerous challenges related to the mathematics education of urban students. Therefore, the purpose of our research is to develop such an instrument. The research question is: *How can an instrument be developed to facilitate identification of potential high quality secondary mathematics teachers for urban environments?*

METHODOLOGY

For the context of our study, we chose to focus on individuals who had lived-experiences through which they had developed beliefs and perceptions with respect to the phenomenon of high quality mathematics teachers in urban environments. The participants are secondary mathematics teachers who teach in high need school districts. In these high need school districts; a large percent of teachers of mathematics do not hold even a minor in the field. In this study we refer to the participants interchangeably as participants and teachers. The student demographics in these schools are predominantly African-American and English as a Second Language (ESL) learners coming from low-to-middle level income families. Therefore, the nature of our investigations warranted the development of a research design that served as a vehicle for

collecting data on personal experiences with regard to the phenomenon under investigations. This led us to select a phenomenological approach that was implemented through focus group interviews.

During the focus group interviews, the participants were provided with wireless laptops to record their responses. Once they completed their responses, the participants were asked to send their responses via email attachments to the facilitators. Data were also recorded on audiotapes and notes were taken on chart paper during the focus group interviews.

Phenomenological Approach

Phenomenology is indeed a reasoned inquiry, which discovers the inherent essences of appearances. Researchers who use this framework are interested in showing how complex meanings are built out of simple units of direct experiences. That is, a phenomenological study follows the format of explicitly examining one particular phenomenon to allow carefully chosen participants to make meaning out of it (Creswell, 1998).

Focus Group

Focus group interview was the vehicle through which data were collected. In essence it is not a question-and-answer format of interview but it relies on the interaction within the group. The use of focus group allows for explicit interactions that produce data and insights that would be less accessible without the interaction (Morgan, 1988). This reliance on interaction between participants is designed to elicit more of the participants' point of view in the context of the views of others, which would be evidenced in the more researcher-dominated interviewing (Mertens, 1998; Patton, 2002). While focus group interviews allow opportunities for participants to hear the views of others, the context of our study maintained a phenomenological stance. As each group member listened to the personal experiences of others, he/she was stimulated to think more deeply about his/her personal experiences related to the phenomenon. Data were collected over two focus group interviews.

Procedures

We, the facilitators as researchers approached the phenomenological interview from a respectful stance, making clear to the participants that their individual understanding of the phenomenon was of paramount interest to us (Thomas & Pollio, 2002). The protocol for the focus group interview was designed to progressively advance the level of reflections of participants by providing opportunities for richer responses. We began by situating the participants in their experiences as learners of mathematics and gradually moved them to the context of their experiences as teachers of mathematics in urban schools. The initial interview question was designed to engage them in focusing on their personal experiences as a learner in the classroom of a teacher whom they considered to be a high quality mathematics teacher. This stage allowed for them to foster a level of comfort for interacting within the focus group. As we moved toward a deeper investigation of the phenomenon group members were more at ease to share their experiences. Below are the descriptions of the progressions of the focus group interviews.

Task I

The teachers were asked to think of themselves as learners of mathematics and to think of a teacher who had the most positive impact on their learning. They were asked to visualize the teacher and recall some adjectives that they would use to describe his/her classroom, methods of teaching, interaction with students, things that he/she did that personally impacted their learning, and any other factors that come to mind. Individually, the teachers were asked to use their laptops to record their adjectives and subsequently write a brief paragraph about the teacher they described (mainly 3-5 sentences). Participants were asked to email their responses to the facilitators.

Task II

To further stimulate the teacher generation of adjectives associated with their experiences as learners of mathematics the teachers were randomly placed in groups of two and asked to share and compile their lists. While doing so, the teachers were to extend this list if other adjectives came to mind. Next, the teachers shared their compiled lists with the whole group. In the final step of task II, the teachers emailed the list of adjectives to the facilitators.

Task III

In Task III, the focus was directly tied to the phenomenon under investigation. The teachers were asked to think individually of all that is required to teach students in urban school settings, and to think of the current conversations in the educational arena with respect to high quality teachers. They were further asked to describe what they believed are the characteristics of a high quality mathematics teacher in an urban school. All writing tasks were then emailed to the facilitators.

Task IV

In Task IV, participants were engaged in whole group discussion of their response to Task III. To stimulate rich engagement in the discussion, the facilitator asked these probing questions: (1) Describe what you believe are the characteristics of a high quality mathematics teacher in an urban school. (2) What does it mean to be a high quality urban mathematics teacher? (3) Is there anything more you want to add that will give us the true meaning of a high quality urban mathematics teacher? (4) What specific qualities would you look for in an urban mathematics teacher to consider him/her of high quality? (5) What are the experiences in a typical day for a high quality urban mathematics teacher? (6) Can you think of any of the experiences in a typical day for a high quality urban mathematics teacher? (7) What does the high quality urban mathematics teacher do differently from teachers in other settings? (8) How do you find the balance where you can at least get to where you want to be with the teaching of the content? Their responses during this segment of the focus group interviews were recorded on chart paper, and audiotape.

ANALYSIS/RESULTS

Analysis began within the focus group interviews. Once all adjectives, with respect to high quality urban mathematics teachers, were recorded on the chart paper, the participants were asked to categorize the adjectives. In focus group one; the participants categorized the adjectives as follows: disposition, knowledge of content, approach to teaching, and understanding the

nature of student-teacher interaction. In focus group two, the categories were defined as teaching strategies, personality, management, and student – teaching interaction. Through further analysis we refined the categories as follows: Disposition, Teacher Content Knowledge, Approaches to Teaching/Classroom Management and Understanding the Nature of the Student. Table 1 below shows the adjectives by categories. The bracketed numbers in the chart are indicative of the number of times the adjectives were repeated.

Table 1: *Characteristics of High-Quality Urban Mathematics Teachers*

Disposition	Teacher Content Knowledge	Approaches to Teaching /Classroom Management	Understand the Nature of the Student
Humorous Kind, Stern Clear Patient (3) Exuberant Trusting, Loving Firm Fair Caring (2) Sense of humor Quirky Friendly Positive Good disposition Respectful Professional	Smart Easy to follow Knowledgeable (2) Able to break down concepts in more than one ways Expert (2)	Challenging (2) Assertive Interesting Passionate about the content Interactive Organized (2) Good classroom management Easy to follow Firm and fair Innovative Structured Versatile Multiple teaching styles Consistent No-nonsense Technologically advanced	Understand the nature of student-teacher interaction Hyper-activeness Open-minded

Excerpts, from the transcriptions of the discussion during task III in which the teachers extended their list of adjectives, are presented to illustrate the richness of the focus group discussion:

Barbara, a Caucasian teacher of Algebra II added the adjective flexibility to the list, stating:

... *FLEXIBILITY. I have seen a greater need for adaptation within an urban school district. For one, there's generally more paper work and less efficient ways of completing documents, so you have to be able as a teacher to drop what you're doing to fill out a survey, data assessment, etc. Also, as a teacher you need flexibility and understanding to better serve the students. You've got to give a bit more time for internet research to be completed for the students, know that they may not have the means to buy necessary things for a project, etc. The*

characteristics of compassion, flexibility, and firmness are probably high-lighted more in an urban setting...

Vanessa, an African-American teacher stated:

..... we talked about being flexible because so many different things come up that interrupt ...our instructional day, making adjustments to your way of communicating with the student even though I may,, if I really want to connect with them, (I just talk like they talk. So theycan understand what I'm saying. "You know what I'm saying") → [slang].to work with that urban child, that's what I would do. I need to have that level of flexibility in my communication with them even though I watch movies that don't interest me because that's what they see and I want to be able to communicate with them and be able to make some kind of real world connection with them. I've never seen the movie Shrek but on my bulletin board I have a picture that says Shrek loves quality work because they identify with Shrek. to me I think that's a tremendous amount of flexibility that is called for in teaching children from an urban environment.

Marcella, an African-American teacher explained the approach that a teacher could take to become a high quality mathematics teacher in the urban environment:

.....Young people are able to tell when someone really does not care for them or when someone is insincere. (They also smell fear (!) so you cannot be secretly afraid of the students either.) You have to have good classroom management. The students will run over you if you are "too soft." You cannot have a boring classroom. You must be able to get the students interested in your subject. You have to be able to create "buy in." Above all, you have to really care about young people. In an urban environment, many children are starved for stability and love in their lives. Many get this from their teachers. You will even find children calling you "Mom" or "Mama _____." Many of the students need to know that someone cares for them. If they think you care for them, then they will begin to care about what you want

In pointing out what teachers needed to know, Vanessa said:

..... They[teachers] also need to be willing to grow themselves, they need to know, they need to be able to identify their own strengths and weaknesses and be willing to work with them knowing when to ask for help and be willing to share their successful experiences in the classroom with others. We don't have a lot of teachers who are willing to do that, sad to say. And they need to be able to utilize a variety of teaching methods and strategies. When one thing doesn't work pull something else, pull another trick out of the hat. And just because it works this year doesn't mean it's going to work next year. (Laughter). they [students] need patience. A A lot of patience. (Laughter)

It was evident that teachers were speaking from their own personal experiences when Dionne, an African-American teacher explained to the group that:

Everyday is different, I mean everyday of my teaching career has been different, you know I've never been able to like just say I got it down this is the way its going to be tomorrow. It almost exciting if you look at it in that light. You know I don't know what's going to happen today!

Having heard the characteristics, which teachers thought were important for a high quality urban mathematics teacher, as the teachers exhausted their reflections Nicola, an African-American teacher began to talk about “constructive noise” which re-opened the discussion. At this point, Carol who is also an African-American teacher interjected with another focus on the interaction in the urban classroom. She constructed the idea of “constructive hyperactiveness” in saying:

I think you would also see, beside constructive noise, constructive hyperactiveness. ...But the hyperactiveness is when they start standing and moving from group to group.And I think you will see constructive hyperactiveness more in the urban school versus ...a suburban school. A suburban school you would just see the constructive noise because they will keep their voices at a moderate level, pretty much sit in their seats, and they're talking to one another the way we are now, but in an urban school, depending on how urban it really is, some of the students because of their environment at home they tend to walk, or stand, or talk with their hands to get their point across...

With the addition of the adjective, constructive hyperactiveness, a unique perspective of high quality urban mathematics teachers was infused. Prior to this discussion the list of adjectives represented common themes that perhaps can be applied to a high quality teacher across any school environment. However, constructive hyperactiveness stood out as an outlier. Constructive hyperactiveness was recognized as student behavior that could be managed successfully only by high quality mathematics teachers.

NEXT STEPS

At the close of each focus group interview, we asked whether or not the group had exhausted all adjectives. In each focus group the response was they believed we would find more adjectives to add to the list. Based on this response, we have decided to conduct at least two more focus group interviews with the expectation to saturate the data. The adjectives in this list will be used to generate items for the recruitment instrument as we move into the next phase.

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