THE DEVELOPMENT OF PROFESSIONAL ATTITUDES AMONG SECONDARY SCHOOL MATHEMATICS TEACHERS IN TEACHER EDUCATION

O Desenvolvimento de uma Postura Profissional do Professor Secundário de Matemática na Formação Docente

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ABSTRACT

This article explores the multilayered experiences of a secondary school mathematics education student within her teacher education program. A framework of educational journeys, explored through four key themes, was used to articulate her experiences. The significance of this paper is that it highlights the importance of pre-service teachers, and their instructors in secondary school mathematics teacher education programs, having rich educational journeys that foster an all-embracing professional attitude towards teaching.

RESUMO

Este artigo explora as experiências ocorridas em vários níveis da formação de uma aluna da educação matemática de ensino secundário. Uma estrutura de jornadas educacionais, explorada através de quatro temas centrais, foi utilizada para articular suas experiências. A significância deste artigo fica clara pelo fato dele destacar a importância de professores em pré-serviço e de seus instrutores nos programas de formação de professores de matemática para o segundo grau terem ricas jornadas educacionais que promovam uma atitude profissional abrangente em relação ao ensino.

INTRODUCTION

In an increasingly competitive global economy, our country is being forced to address its shortcomings in the area of mathematics education. The Third International Mathematics and Science

Study (TIMMS) shows that eighth grade students in only seven nations (out of 41) scored significantly lower than eighth grade mathematics students in the United States (STIGLER, J. & HIEBERT, J., 1999, p. 3). Focusing on mathematics in secondary schools, educational systems within the United States are attempting to improve mathematics scores through several avenues. These include the establishment of mathematics curricula by specialists, theoretical discussions on the subject of mathematics education, a focus on the basics of mathematics, intense criticism of present practices, maintenance of the status quo, and/or continual debate on the poor state of mathematics education (SCHWAB, 1969). At times, these attempts at improvement seem futile, as they often look for clear-cut fixes or engage in circular debates that produce minimal progress (SCHWAB, 1969).

VOCABULARY DEFINITIONS

This article asserts that the *professional attitude of the secondary school mathematics teacher* is at the heart of change (STIGLER, J. & HIEBERT, J., 1999; SCHWAB, 1969). In this context, a *professional attitude* is an awareness, understanding, and exploration of teaching as a cultural activity embedded in the space and time of the teacher and the students (STIGLER, J. & HIEBERT, J., 1999; SCHWAB, 1969). Thus, the "heart of change" or path to a solution is not found with one reform movement, instructional strategy, or theoretical discussion, due to the diversity of individuals, groups, and cultures involved. Rather, secondary mathematics teachers need individual awareness, the time and space to engage with others about teaching and learning, and to establish links with the specific realities of their own classrooms. This notion of a professional stance leads to a continual development of the profession that focuses on the teacher, or on the individuals most closely involved, discussing the teaching and learning of their students.

Ideally, the development of a professional attitude begins in secondary school mathematics teacher education programs (TEPs). The development of a professional attitude is an *educational journey,* or a pivotal experience within the TEP that changes the individual. Educational journeys often occur when individuals actively participate in dialogue, questioning, and experience (Ayer, 2001; Cochran-Smith & Lytle, 1999; Freire, 1970; Greene, 1997; Palmer, 1983) within the required mathematics content and professional education courses, the student teaching experience comprising secondary mathematics TEPs (cite programs from dissertation). Ultimately, both pre-service teachers and their instructors in secondary mathematics TEPs should have rich educational journeys that foster an all-embracing professional attitude towards teaching.

CONTEXT

Anna, a 27 year old secondary school mathematics education student, has a psychology degree from a liberal arts college, and two years' practical experience of teaching mathematics at an Eastern US charter school. Her teaching experiences prompted her to become a certified secondary school mathematics teacher and she entered a teaching certification and Master of Arts degree in Secondary Education at a large Appalachian land-grant university. The researcher was a doctoral candidate in mathematics education at the same university. The researcher has a certificate in mathematics teaching and Master of Arts degree in Secondary Education from a West Coast university, and extensive secondary mathematics high school classroom experience. In both Anna's and the researcher's programs of study, undergraduate mathematics content courses were required. Anna and the researcher first met as students in one of these mathematics content courses.

RESEARCH FOCUS

The focus of this paper is to investigate Anna's defining moments or *educational journeys* within her TEP, through her experiences and exploration. Bearing in mind that explorations of *educational journeys* are complex, the themes that were integral to Anna's journey in her TEP are explored for clearer interpretation of the experiences, though without intending to give finite answers. The salient themes for Anna are (a) a spiritual presence, (b) relationships based on respect, (c) facilitation through dialogue, and (d) a common context within which to connect and work with others.

To further explore Anna's defining moments or *educational journeys* that impact the development of her *professional attitude*, the following questions are posed:

1. What are Anna's educational journeys experiences, as expressed through components integral to Anna's education journey environments?

2. What are the broader implications of individual educational journey experiences, like Anna's, but articulated through components integral to journey environments for TEP in the development of a professional attitude?

The interpretation of Anna's educational journeys are articulated through data determined themes integral to educational journeys, based on a hermeneutical theoretical perspective.

METHODS

Theoretical perspective

The theoretical perspective of hermeneutics forms the basis of this study. A hermeneutical perspective allows the researcher to involve their interpretive influence on the returned work. This interpretation seeks to reveal the meaning of the experience described, within the contextual awareness and perspective of the researcher (ALVESSON & SKOLDBERG, 2000, p. 112). Integral to this process is the way in which the interactions between the observer and the observed affects these perspectives and a notion of incompleteness. The data can never be fully analyzed, but spirals in pre-understandings and understandings (ALVESSON & SKOLDBERG, 2000). Thus, the data becomes an object of inquiry again and again, each time with an increased understanding and a more complete interpretive account (BENTZ & SHAPIRO, 1998, p.110). Looking at Anna's educational journeys, the analysis process returned the previously mentioned components of a spiritual presence, relationships based on respect, facilitation through dialogue, and a common context within which to connect and work with others (BENTZ & SHAPIRO, 1998, p.111). These four components were then used as the basis for a wider study, transmitting Anna's experiences to the reader, whereby the reader adds their own understandings to the work. The hermeneutic circle is thus expanded to include a dialectic between the reader and the text, in order to develop further understandings (MOSS, p. 1994, p. 7).

Epistemology

The use of this hermeneutical theoretical perspective gives the researcher the freedom to define epistemology as the web of connections and understandings developed from the researcher's experiences with Anna and the data. It does not matter if things are "real" in the sense of having a factual existence independent of perceptions of experiences by the researcher, Anna, and later by the readers of this piece. Reality, in this case exists in the understanding of something in the context of all other things. In this case, truth and reality are found in the strength of the interpretative connections between the researcher, Anna, the data, the text, and ultimately, the readers of this work. Interpretations become more and more complex with more participants. Thus, a focus on individual, or at most, inter-individual relationships creates hermeneutically based validity (ALVESSON & SKOLDBERG, 2000). Therefore, data sources focused intently on the experiences of both Anna and the researcher were used. The data sources that were identified and used in this study include: reflective memos, written documents related to the program, state, and federal guidelines, and transcripts of interviews.

Data Analysis

Qualitative inquiry began with informal background research on program information at local, state, and federal levels. The researcher also used informal document analysis to explore reflective memos written over a span of two years. The memos focused on her experiences

as a teacher, doctoral student, mathematics educator, and student of mathematics content. The researcher and Anna met for three formal interviews, each lasting from two to four hours. Following the interviews, the dialogue was transcribed and analyzed. The constant comparative methodology (STRAUSS, 1987) was then used to refine the categories and summarize the themes. The recursive process involving both written and oral narratives allowed the researcher to critically explore the data, as well as build upon the narratives initially provided by the researcher and Anna. The analysis initially showed a theme of spirituality winding through Anna's childhood, educational experiences, and present realities. The researcher recognized the importance of respectfully letting Anna speak and share about her experiences, in order to truly capture her educational experiences. The importance of conversation emerged as Anna became more at ease and reflective during the interviews. Finally, the importance of mathematical context surfaced in the data, as the researcher encouraged Anna articulate her views on the discipline as a whole, and mathematics education. This initial analysis produced the aforementioned salient themes of Anna's journey.

The data is continually analyzed from the context of these themes. Therefore, this article uses an all-encompassing organizational framework with these four salient themes which are integral to the fostering of educational journeys within TEPs, in order to organize and communicate the complexities of exploring Anna's experiences.

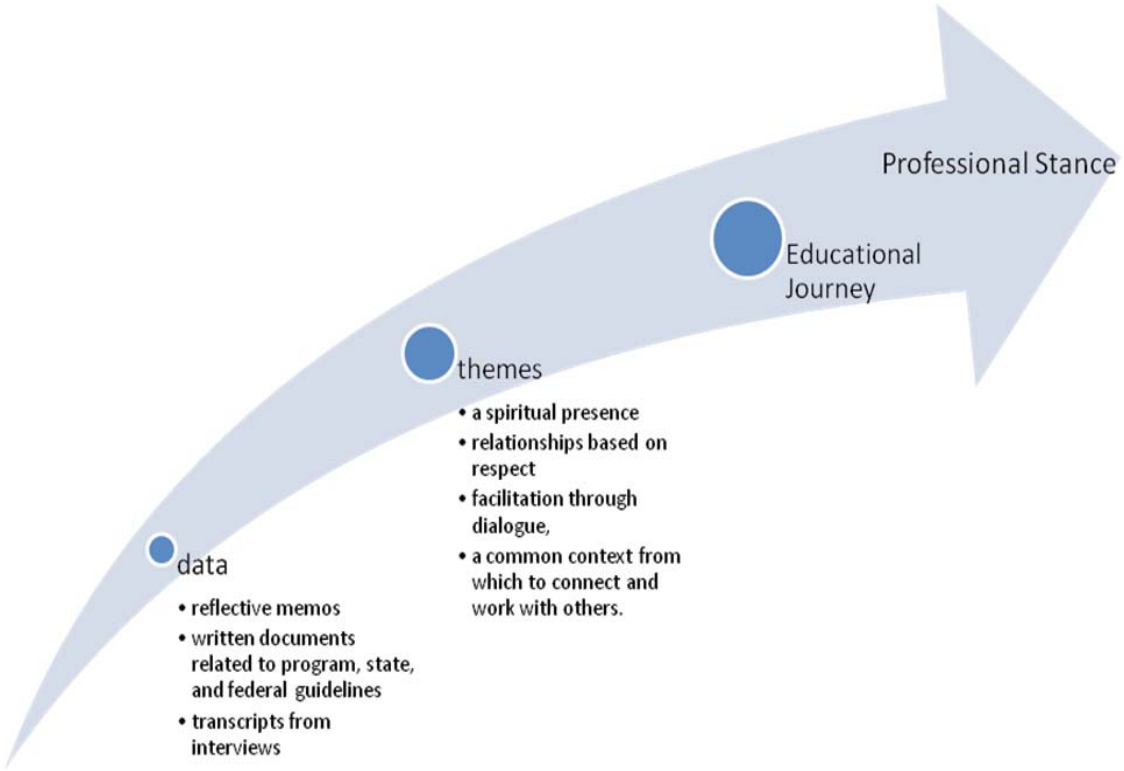

Figure 1. Relationship between the data, themes, educational journey and professional attitude.

The use of these themes enabled a clearer interpretation of Anna's educational journeys. Notably, Anna's conversations are hermeneutically interpreted through each of the thematic areas. The additional layers provided by the professors, mentor teachers, advisors, program administrators, etc. involved also form part of the overall analysis. However, they are not explored in this study, as this paper is fundamentally interpretations of Anna's experiences based on the researcher's inescapable personal understandings (BENTZ & SHAPIRO, 1999). It is therefore important for the reader to explore their own interpretations and connections to the work.

Findings

Anna's complex educational journeys within her TEP are explored based on each of the salient themes identified from the initial data analysis. Discussions of each theme are presented, in order to establish clear interpretations (not finite answers) of her experiences.

A SPIRITUAL PRESENCE

Spirituality is the way a person fundamentally thinks about themselves, others, and the world. The root of spirituality lies in the moral and ethical dimensions defined through introspection and acceptance of others', free of preconceived judgments. For some, religion guides spiritual experiences, while others find different pathways. Ultimately, spirituality is an important component in journeys, and facilitates a sense of open mindedness, freeing oneself from preconceived judgments. Universities and students must enter into learning experiences with humility, showing a readiness to engage with others. Paulo Freire so clearly articulates these sentiments, stating: "If I do not love the world - if I do not love life - if I do not love men - I cannot enter into dialogue" (FREIRE, 1970, p. 148). So, does Anna have a spiritual presence within her TEP? Below is an interpretation of Anna's spiritual presence.

SPIRITUALITY FELT THROUGH ANNA'S PRESENCE

Anna has a presence when she enters a room. She displays a vitality, independence, and intelligence. Descriptively, Anna notes similarities between her and her father, such as: a presence, authority, and level of confidence. In conversation, she seems reflective, open, and interested in what others have to say. Do these observable, outward traits show Anna's spiritual presence? Is she open minded, free of preconceived judgments and ready to enter learning experiences with humility?

Growing up, when Anna left the house, her mother would remind her of what she had been taught, calling out: "Let your light shine!" Anna explains the meaning of this phrase: "Within the Bible Jesus is often referred to as the light. Since he lives within each of us, people should naturally see and hear that goodness in her." (SPRING, 2008). Anna says she now has that phrase placed on her apartment door. She reads it before she leaves each morning, as a reminder of how she should conduct herself throughout the day. Anna further defines the way she views and approaches others:

> I am by no means without my prejudices or stereotypes, but at the same time, as I was discussing with a friend yesterday, I said, 'What gives you the right to call somebody "white trash" when you have this piece of clothing on right now—when somebody can look at you and say this is what you are? What allows you to say that about somebody?' And I think my mom has kind of given me a lot of her passion. You know, I've always seen her work with children, and she still works with children to this day in our church, and no matter what an adult could do to her it's like she has this infinite love for children and this desire to protect and encourage and to make them strong people. And I see children not in precisely the same way, but in that similar way, that they're just people who are really striving to become - hopefully - better people. And [what] if they don't have somebody in their life, like I had with my mom, to show them how to see everyone as beautiful individuals and yet find something similar within them so that they connect with. And I think that's the most important thing. (SPRING, 2008).

Speaking specifically about teaching mathematics Anna expressed the following passage. Her demeanor was heartfelt, passionate, and moving.

> I don't think they realize that this isn't just a profession. I say this in the fact of there are some people who get it because it's their passion—they want to teach, they want to learn how to learn, they want to learn how other people learn, they want to learn to teach those people how to learn, and they're passionate about their subject matter, and together this is the best course for their life. And then there are other people who are not passionate about it. They're just doing it because it's a profession. And I'm a firm believer that if you're not passionate about your profession it will always be nothing more than a job to you (SPRING, 2008).

It is evident, as Anna speaks, that her spirituality, guided by religion, plays a critical role in her life. She sees the oneness found in all humans. At the same time, it is difficult in today's complex world to truly approach everyone you meet with the dignity and respect they deserve. She openly

acknowledges her own "prejudices and stereotypes," which can be difficult to overcome in today's society. As an example of this, she still struggles to accept her boyfriend's non-religious spiritual pathway as an appropriate alternative perspective.

Anna's struggle exposes a lack of a true acceptance of spirituality found through pathways other than organized religion. Her comfort and desire for relationships built primarily around her church community makes one question the depth of her spiritual presence. If her spirituality is one dimensional, can she really open herself to others free of preconceived judgments, and does she truly enter into learning experiences with humility, showing a readiness to engage with others? Likewise, if Anna does not possess a true spiritual presence, then it will be difficult for her to engage in the work of educational journeys with others. While finite, black and white answers are difficult to extract from Anna's data, the result of this analysis is a thorough exploration of Anna on a range of different components, each which are integral to educational journeys.

RELATIONSHIPS BASED ON RESPECT

As one develops their spiritual presences, they must also consider the second component integral to fostering educational journeys: building relationships based on respect. University and public school colleges and teacher education students need to establish common, respectful learning relationships. Creating respectful relationships is difficult if intellectual hierarchies are created between faculty members and students, as these merely foster relationships guided by the dominance and power of the teacher (FREIRE, 1970; MONTESSORI, 1964; PALMER, 1983; GREENE, 1997; COCHRAN-SMITH & LYTLE, 1999) and the subjugation of the student. Faculty members whom lack a certain level of humility (akin to a spiritual presence) are not going to be able to establish true relationships based on respect with students. Similarly, students who lack confidence and are focused on the professors' authority will also have difficulty establishing a relationship based on respect. In order to learn as an individual and as a group, faculty and students must enter into learning relationships devoid of arrogance, showing a willingness to engage with others. Paulo Freire alludes to the need for relationships based on respect within educational journeys founded upon "love, humility, and faith" (p.149), in a horizontal relationship based on respect, as the basis from which to engage in educational journeys. So, does Anna establish relationships based on respect within her TEP? Below is an interpretation of Anna's experiences establishing relationships based on respect.

ANNA'S RELATIONSHIPS BASED ON RESPECT

Anna is aware of the connection of establishing relationships based on respect and her own learning. She states: "I have found that if I can't connect with a professor, whether they're teaching math or education, I find it very difficult even to connect with the subject matter" (SPRING, 2008). Anna linked her experiences on her mathematics content courses with fellow students, in professional education courses, and in the public school setting, with her ability to establish relationships based on respect within her TEP.

Anna's experience in her mathematics content courses were an excellent example of intellectual hierarchies, where relationships were guided by the dominance and power of the teacher (Freire, 1970; Montessori, 1964; Palmer, 1983; Greene, 1997; Cochran-Smith and Lytle, 1999) and the subjugation of the student. In particular, Anna describes a professor who tried to discourage her from taking the course based on her mathematical abilities.

> He wasn't really looking at it from perhaps the educational standpoint that I would in that maybe I'm not terrific at proofs but that doesn't mean that I can't teach fifth grade math. And so, kind of, who is he to weed me out? That should be my decision...So, because I think that was his philosophy, he just taught that way, and it was very hard for me to connect with him. (SPRING, 2008).

Conversely, Anna fondly recalls her relationship with the professor of an abstract algebra mathematics content course.

> She knew that she was teaching a difficult course, she knew that it was abstract, and she really tried to make abstract concepts very concrete, which is difficult to do and she really worked hard...

> her office was always open, she was never condescending, and that was a wonderful example of kind of my philosophy. You know, just because you're not getting it doesn't mean you're not smart, and she really combat people's frustration and really tried to be very encouraging. I think everyone responded to that kind of environment. (SPRING, 2008).

Overall, Anna struggles to remember examples of feeling connected and understood by her mathematics professors. She notes "...they just seemed to have that superior attitude" (Spring 2008) and with a few rare exceptions, her courses in the mathematics department lacked a:

> (...) personal connection that I know as a math teacher, that I realize if I want the children I'm going to be teaching – of whatever age - to relate to the subject matter, I am a representation of that subject matter and I must present it well, whether it's interesting, challenging, fun, whatever it is to that student, and that doesn't happen at the undergraduate or graduate level. (SPRING, 2008).

Turning to professional education courses Anna recalls one of the first courses she took in the school of education:

> I had Curriculum and Instruction in my first semester. And I loved Curriculum and Instruction with Dr. Headowland. I found her to be a kindred spirit, as Anne of Green Gables would say. (SPRING, 2008).

This was a relationship in which Anna established a relationship based on respect with her professor. The professor of the abovementioned course was also Anna's program advisor. Interestingly, the only other clear example of feeling connected to a professor in the education department was through the establishment of a relationship with an online instructor.

Overall, Anna did not experience numerous relationships based on respect within her TEP. Ironically, one of the first things Anna stated during these interviews was the importance of relationships and learning. Interpretation of these data from the interviews confirms Anna's awareness of the importance of establishing relationships based on respect within learning journeys, even though her success in creating these relationships were very limited in her TEP. Consider the influence of Anna, the professors, programmatic realities, and other factors as potential inhibitors to establishing relationships based on respect. Although Anna did not establish numerous relationships based on respect within her TEP, she has done so in other areas of her life, through different avenues. The researcher and Anna established a relationship of mutual respect. Also, Anna recalled numerous examples of the respectful relationship she has with her mother. In addition, she recalled a mentor she had met while working at a charter school, prior to returning to school

> They gave me an awesome, awesome, awesome educator. And she was my mentor all year long...[S]he had just been educating for so long, and [s]he was one of the rare and awesome examples of teachers that say, 'All right. How can I make this new this year? How can I make it applicable to my students this year? What do my students need?' Not, what have I been doing that's comfortable and easy? (SPRING, 2008).

Anna summarizes her beliefs about establishing relationships based on respect: "...I think it's more about who and where and when and how. I think it's a combination of a variety of factors, and I think I've had awesome mentors in my life whose personality, character, and way of seeing a person has enabled me to develop in that area" (Spring 2008). Thus, consider again the influence of Anna, the professors, programmatic realities, and other factors as potential inhibitors to establishing relationships based on respect within her secondary mathematics TEP, since she clearly has established relationships based on respect outside of her TEP.

FACILITATION THROUGH DIALOGUE

The third component of the organizational framework towards educational journeys is facilitation through dialogue. The heart of knowledge and learning is the dialogue surrounding common contexts within and between individuals (Freire, 1970, p. 147). Without the ability to dialogue there can be "no communication, and without communication there can be no true education (p. 150)." Dialogue can be verbal, written, synchronous, asynchronous, or even within one's own mind. Consider Anna's combination of spiritually present individuals, establishing relationships

based on respect, and add engaged meaningful dialogue. This combination provides the space for educational journeys. So, did Anna experience meaningful dialogues resulting in the space for educational journeys within her TEP?

ANNA'S FACILITATION THROUGH DIALOGUE

Anna is mindful of facilitation through dialogue as a necessary component within educational journeys. She states: "It's the discovery part, it's the conversation part, and it's the thinking out loud that really helps people of all ages to really understand the information" (Spring 2008). Anna summarizes her experiences within mathematical content courses, emphasizing a lack of dialogue.

> 'I'm going to say this. You're going to write it down. You're going to remember it, and when I ask, you will regurgitate it back.' And I find that's pretty much what happens. It's strict lecture. You know, they write proofs and proofs and more proofs, maybe ask a question, give you two seconds to think about - not even enough time for in-depth thought - and then they either answer it themselves or the smartest kid in the class blurts something out before anyone can really have that time to…really just absorb what happened over the last fifteen minutes, maybe think about it and give some sort of reasonable response—even if it's wrong, but at least they've thought about it. There's not a lot of thinking time in math classes, which I find discouraging, especially at this level. (SPRING, 2008).

Anna also recalled a pivotal educational journey based on an exchange between herself and an education professor, through a written dialogue.

> Weekly reflections made me realize that I had indeed learned something about the topics presented, but I could not always pinpoint when, where, or from who[m] I learned these things. I could conclude that my ideas and philosophy represented in my writings were a collage of life experience[s] as a daughter, aunt, student, teacher, friend, bully, co-worker, mentee, mentor, director, Christian, sister, and employee. However, I was never encouraged to think properly and explain these ideas, philosophies, and opinions until I was required to write an assignment. After I had written down my initial thoughts, and read my paper, it was then that I realized the fullness of my own understanding. From this course, I would venture to say that I had a 'learning' moment every week through the process of reflection and the responses from my professor. (SPRING, 2008).

Overall, within Anna's secondary school mathematics TEP, she did not experience extensive dialogue with professors, peers, and practicing teachers. Familiar with relationships based on respect, Anna is aware and capable, but her TEP did not offer many opportunities. Multilayered factors within Anna's TEP affected these opportunities to dialogue with others in an authentic way. One of these factors in authentic dialogue is a clearly-developed educational context for the subject being taught.

DEVELOPED EDUCATIONAL CONTEXT FOR THE SUBJECT THEY ARE TEACHING

Knowledge of mathematics teaching is not explicitly finite in form, but develops continually, through educational journeys, given an appropriate context for dialogue. Progressive and esteemed mathematics educators have succeeded in identifying many of the tangible universals of mathematics education as a base of dialogue. Traditionally, the field of mathematics education was constructed around the established cognitive structure of mathematics, as well as the separate, somewhat less established, structure of pedagogy. The layering of these two cognitive structures lacked a clear universal from which to inquire. As a result of this lack of structure, mathematics teacher educators have started the process to develop frameworks and principles that specify mathematics knowledge for teaching (Ball & Cohen, 1999; Hiebert & Morris, 2009) Expanding teachers' mathematical teaching knowledge as defined by Ball, Thames, Phelps (2008) lies at the core of this process. In addition, the process must pay particular attention to the following domains:

> 1) *specialized content knowledge*, or the unique mathematical understandings drawn upon in the act of teaching;

> 2) *knowledge of content and students*, including knowledge of how students develop mathematical ideas as well as common misconceptions students may develop; and
>
> 3) *knowledge of content and teaching*, including knowledge of how to effectively sequence the instruction, select appropriate tasks, and choose from among multiple models for a concept.

Some of the other fundamental goals focus on teachers' mathematical habits of mind as defined by Goldenberg, Shteingold, and Feurzeig (2003) including:

> (a) thinking about mathematical definitions,
>
> (b) making and justifying conjectures,
>
> (c) understanding what is convention and what is logical necessity,
>
> (d) analyzing tasks, strategies, and solutions, and
>
> (e) developing strategies for solving problems.

As these frameworks and principles have been developed and continually improved, Anna's experiences are investigated to assess the extent to which her TEP provided connections and conversations around the context of mathematical teaching knowledge.

ANNA'S EXPERIENCES:

The analysis of Anna's data presents her as lacking a clear mathematical teaching knowledge context. Her specialized content knowledge, knowledge of students and mathematics, and her mathematical habits of mind are never clearly articulated through the conversations. When asked about her personal connections between the discipline of mathematics and the teaching of mathematics from taking mathematics content courses, professional education courses, and student teaching within her program, she unequivocally responded with a solitary "No" (SPRING, 2008).

> She elaborates on the connections she made in her mathematics content courses:
>
> I don't think that an in-depth understanding of content necessarily means you have to take twenty different courses, and I think that that's where the confusion is right now. Give me a semester of calculus and then give me a semester of teaching (Spring 2008).
>
> ...I think the only thing is that I understand the reasoning for having a breadth of knowledge in your content area. But at the same time, I almost feel like we should go back to the beginning towards the end of our subject matter, depending on what you're going to teach. (SPRING 2008).

Based on the framework discussed and focused on these experiences within her TEP, Anna fails to develop a clear mathematical teaching context from which to engage in conversation that can lead to rich educational journeys. Consider a spiritual presence, relationships based on respect, and facilitation through dialogue within her secondary mathematics TEP could affect the development of a clear mathematical teaching context.

CONCLUSION AND SCHOLARLY SIGNIFICANCE

Conclusion of Anna's Experiences

This article utilizes the following evolving organizational framework with four salient themes: (a) a spiritual presence, (b) relationships based on respect, (c) facilitation through dialogue, and (d) a common context from which to connect and work with others within TEPs to organize and communicate the complexities of exploring Anna's experiences. Starting with a spiritual presence, Anna's struggle exposes a lack of a true acceptance of spirituality found through pathways other than organized religion. Her comfort and desire for relationships built primarily around her church community makes

one question the depth of her spiritual presence. If her spirituality is more one dimensional, she will potentially experience difficulty engaging in the work of educational journeys with others. Turning to establishing relationships based on respect, Anna did not establish numerous relationships based on respect within her TEP. However, she has done so in other areas of her life, through different avenues. Subsequently, the data showed Anna as cognizant of the importance of establishing relationships based on respect within learning journeys, even though her success in creating these relationships were very limited in her TEP. Finally, within her TEP Anna appears to fail to develop the clear mathematical teaching context from which to engage in conversation that can lead to rich educational journeys. She displays a lack of connection between her specialized mathematics content knowledge, knowledge of students and mathematics, her mathematical habits of mind, and her ability to articulate the context of mathematical teaching knowledge through conversations. As Anna continues the development of a professional attitude through educational journeys, or pivotal experiences that changes the individual the four salient themes to educational journey environments will continue to affect her experiences. Using Anna's own words, consider her journey within her education program:

> You need to find how you're going to connect that material to that person's personality, and I think that is where children learn. Anyone learns when they feel connected to it. I mean, you said it yourself, you feel like people learn more when they are reading something that hits their heart. People need to feel that connection with their heart. (SPRING, 2008).

Scholarly Significance

Significantly, this article explores experiences that foster the initial development of a secondary mathematics teacher professional stance. Ideally, the development of a professional stance begins in secondary mathematics teacher education programs (TEPs). Yet, the development of a professional stance is complicated and multilayered. The use of educational journeys explored through the four discussed salient themes articulates these complexities. This exploration shows improvement in secondary mathematics TEP (similar to the public school mathematics classroom) is not found with one reform movement, instructional strategy, or theoretical discussion because of the different individuals, groups, and cultures involved. Ultimately, both pre-service teachers and their instructors in the secondary mathematics TEPs should have rich educational journeys fostering an all-embracing professional attitude towards teaching.

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