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ABSTRACT

This study examined a fifth year teacher, who had participated in an original project assessing the effectiveness of metaphor within collaborative reflection to help prospective teachers define, explain, and challenge their beliefs about learning and teaching science. Results found that using metaphor as a tool for reflection helped the teacher articulate beliefs and put them into practice during student teaching. The study investigated, after 5 years, the extent to which he continued using an inquiry stance, metaphor remained part of his personal reflection, and other changes impacted his learning to teach. Results indicated that he had found a reflection tool in metaphor, and the inquiry stance to go with it, to help him systematically study classroom problems and possibilities. He continued collaborative reflection within learning communities of new colleagues, who shared similar philosophies of teaching and learning and with a peer and roommate, who shared the context of first year teacher. He also continued using metaphor as a tool to maintain a student-centered focus. After several years, some critical events led to his becoming a teacher leader (e.g., supporting a new principal whom he knew, and developing a math innovation). He began using metaphor to a greater extent within the classroom to help students learn new ideas by connecting to familiar circumstances. (SM)

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FIFTH YEAR TEACHER: FROM MENTORED TO MENTORING!

The habit of collaborative reflection began in the university setting and continued within new learning communities of colleagues. Finding metaphor to be a valuable learning tool for himself, this teacher used it to help his children learn. In addition, some critical events led this particular young man to become a leader and mentor among his staff.

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FIFTH YEAR TEACHER: FROM MENTORED TO MENTORING!

This article describes the continued examination of a now fifth year teacher who was a participant in an original research project that examined the effectiveness of metaphor within collaborative reflection as a means for prospective teachers to define, explain, and challenge their beliefs about learning and teaching science (Sillman, 1998). In that study, it was found that using metaphor as a tool for reflection helped a prospective teacher articulate beliefs and put them into practice within a student teaching field experience. A study of the teacher, Matt, conducted after his first year of teaching found that he was able to continue his stance of collaborative reflection, begun in the university setting, within learning communities of his new colleagues who shared similar philosophies of teaching and learning, and with a peer and roommate who also was a first year teacher (Sillman et al., 2000). The objective of the current study was to determine, after five years, the extent to which Matt continued to employ an inquiry stance, metaphor continued to be a part of his personal reflection, and other changes impacted his development of learning to teach, in general, and science, specifically.

Theoretical Underpinnings

These studies of learning to teach elementary science emerged from a concern in teacher education that prospective teachers do not find their teacher preparation courses particularly helpful in their development as teachers (Calderhead & Robson, 1991; Kagan, 1992). Prospective teachers typically enter a science teacher preparation program holding primarily didactic pedagogical conceptions that are resistant to change (Northfield, Gunstone, & Erickson, 1996). Previous studies have suggested that until extant beliefs about learning and teaching science are made explicit, it is unlikely that they will mature within a prospective teachers' preparation program (Kagan, 1992; Treagust, Duit, Fraser, 1996). Therefore, they need to undergo a process of pedagogical conceptual change themselves (Stofflett, 1994).

Prospective teachers construct their own meanings of learning to teach through varying amounts of reflection, both individual and with mentor teachers, university personnel, and others. Reflection is one way to help make beliefs explicit and several studies have suggested that metaphor can be a means by which preservice teachers come to terms with experience (Bullough & Stokes, 1994; Tobin, Tippins, & Hook, 1994). Lakoff and Johnson (1980) concluded that the value of metaphor is understanding a new experience in terms of a more familiar one. They argue the human conceptual system is defined and structured metaphorically, and human thought processes are largely metaphorical. Similarly, teachers' thought processes also are largely metaphorical, suggesting that metaphorical conceptions of learning and teaching may need greater attention in teacher education programs.

Many teacher educators have questioned the impact of teacher preparation. As prospective teachers observe, question, experiment, and reflect on the work of others, their teacher identities are produced and reproduced through the social interactions and particular contexts that occur within the classroom (Vinz, 1995). While student teachers' growth may be shaped by unanticipated but significant events (Fairbanks & Meritt, 1998), this growth is also fostered by mentors through a supportive relationship that includes professional dialogue. This provides the means by which the student teachers begin the transition into a community of practice (Lave & Wenger, 1991). Mentor teachers share the wisdom of their experience, and prospective teachers learn from the stories they tell (Fairbanks et al., 2000).

Collaboration is one way to take teacher development beyond personal reflection to a point where teachers are learning, sharing, and developing their expertise together (Lieberman & Miller, 1986). An extension of the collaborative process among teachers is expressed through the construct, inquiry as stance (Cochran-Smith & Lytle, 1999), which describes the positions teachers in inquiry communities take toward knowledge generated and operationalized within practice. Prospective and practicing teachers who take an inquiry stance tend to work within inquiry communities teaching, and learning from teaching, by interpreting and theorizing what they are doing. Together, teachers generate local knowledge by questioning their practice, engaging in problem solving, and counting on each other for alternative viewpoints on their work.

In general, teachers encounter some similar phases or stages as they begin and continue their career pathways. Huberman (1989) describes an initial period of survival and discovery with a second phase between the fourth and eighth year of teaching characterized by stabilization in pedagogy (feeling at ease in the classroom, shaping a routine, differentiating instruction) and a strengthened commitment to the profession. However, teacher development must be thought of in relationship to institutional change and culture building as Fullan (1993) comments, "change is a journey, not a blueprint" (p. 24).

In addition, Connelly and Clandidin (1988) note that "the kind of teacher we are reflects the kind of life we lead"(p. 27). This was a prevalent theme in Bullough's 10-year longitudinal study of Kerrie as he noted, "the story of one's quest to become a teacher is embedded in the story of one's life" (Bullough & Baughman, 1997, p. 34). Kerrie's changing beliefs and practice were reflected in her changing metaphors, and in her fifth year of teaching, "her focus was sharply on student learning...Warm and caring relationships, and a class that would be 'like a family' were still highly valued, but student engagement mattered most of all" (Bullough & Baughman, 1997, p. 88). Her earlier mothering metaphors had weakened as she became more comfortable in her teaching and as her own children grew older. Because learning to teach occurs over an extended period, longitudinal studies can provide deeper understandings.

Design and Procedure

This interpretive case study (Patton, 1990) focused on Matt's developing and changing beliefs, as identified through his metaphorical conceptualizations of teaching young children. The study was guided by tenets of phenomenological inquiry (Patton, 1990), focusing attention on the meaning Matt was making of his learning to teach experiences. Data were collected over the Fall 1997 and the Spring 1998 semesters as the participant progressed through ten-week, twice a week pre-student teaching and sixteen-week student teaching field experience as a part of a four-year undergraduate elementary teacher preparation program. Data collection resumed at the end of the 1998-1999 school year after Matt had been a first year practicing teacher in a second grade classroom, then again towards the end of the 2002-2003 school year after Matt's fifth year of teaching in the same school and classroom. Primary data sources included transcripts of over fifteen formal and informal interviews, twenty reflective journals, and twenty documents such as lesson reflections and philosophy statements. Secondary data sources included a researcher's journal, field notes of observed lessons, and videotaped teaching episodes. An inductive approach to data analysis was employed, using an additional researcher, Tom, to increase the validity and reliability of the findings.

The researcher's role changed as the study evolved. At the beginning of the original study, Kate was the science methods instructor and the participant was a prospective teacher in her class. Early in the semester, metaphor was introduced as a tool for reflection and Matt was purposefully selected for the original study because he valued metaphor as a reflection tool. As Matt entered his student teaching experience, Kate became more of a collaborator, observing and interviewing him in the field several times. As Matt entered his first year as a practicing teacher, Kate became solely a researcher as Matt was interviewed after the completion of his first year as a practicing teacher. Then, four years later, Matt again was observed and interviewed towards the end of his fifth year of teaching.

Last Year of Teacher Education: Learner as Excited Child!

After experiencing a conceptual change lesson in his science methods class early in 1997, Matt began to undergo a conceptual change in how science was learned (Sillman, 1998). After a lesson on density, Matt crafted the metaphor of *learner as excited child* and explained: "For one time in my life, I was allowed the freedom to test materials in my own way and wasn't embarrassed to show my excitement or enthusiasm!" (Interview, 9/97). Through this metaphor, Matt expressed the safe, risk free environment he felt he needed to learn science.

He also crafted *learner as light bulb*: "Somebody made a comment and I could feel the light bulb going off in my head. I was making the connections of volumes and masses which I was

previously in the dark about" (Interview, 9/97). Here, Matt expressed his beliefs of how learners make connections through hands-on experiences and through social interactions with others.

As Matt attempted to use his developing concept of density within the science lesson, and explain the position of an object in a mixture of liquids, he was *learner as amazed*: "I was amazed at this because although I heard about this separating many times, I had never experienced it" (Interview, 9/97). Through this metaphor, Matt emphasized the power of experiencing a concept over just hearing about it. In summary, Matt's developing philosophy of learning and teaching science included the need for an environment where one felt safe to experience a concept through hands-on activities and make connections between already existing knowledge and new information through the social interactions with others.

These new beliefs were reinforced through the creation and implementation of his own conceptual change teaching project within his field experience near the end of the Fall 1997 semester. Matt crafted two metaphors for teacher. The first metaphor was *teacher as runway*: "I think of myself as the base. I think a lot of teachers would think, 'Well, I'm the plane; I fly the students,' but I prefer to be the *runway*. They'll use me to go to other places" (Interview, 10/97). Matt felt that the teacher provided support, guidance, and direction for the learners; in other words, a foundation for their learning. Through his second metaphor of *teacher as proud parent*, Matt expressed the need for positive encouragement for learners to feel safe to learn: "I was just guiding them, saying positive remarks. I can give them the activities, but they're the ones who do it. It's their learning; they have ownership of it" (Interview, 10/97). Matt seemed to be ascribing to the idea of constructivism through his two metaphors of *runway* and *parent*. He was beginning to value a student-centered approach where he seemed to focus on individual students in an effort to help them feel comfortable to learn and express themselves.

Just as Matt had come to value a safe, risk free environment created by the teacher who provided a feeling of support through encouragement, he was placed for student teaching with a mentor teacher who provided that safe atmosphere for him to learn to teach (Sillman, 1998). To express his developing flexibility, Matt crafted the metaphor for *teacher as gear shifter*. With reflective thinking experience, Matt became more effective at thinking on his feet and following students' interests and learning needs. In addition, Matt came to view a teacher as being a lifelong learner, and not a finished product at the completion of student teaching, or even after several years as a classroom teacher. Through his metaphor of *teacher as one of the students*, he expressed his student-centered approach as he felt teachers were lifelong learners for the improved learning of their students. In Matt's case, he had found a tool to help him learn how to teach. Matt used metaphor to purposefully reflect on and help him interpret his beliefs: "A lot of those things are so personal and embedded in you and you don't pull them out to examine them, and I think we should do that. This has really helped me examine my own teaching and helped me be a better teacher"

(Interview, 5/98). As he completed his last year of formal teacher preparation, Matt was both collaboratively and independently using metaphor as a learning tool he had found useful for his personal reflection.

It seemed Matt was becoming an expert learner. Metacognitive processes of expert learners include being strategic, self-regulated, and self-reflective (Ertmer & Newby, 1996). Independently using a learning tool was an indication that Matt was becoming an independent learner. For lifelong learning to occur, one of Matt's goals for himself and his learners, he felt one must become an independent learner and one must continue learning throughout one's career. In learning to teach, Matt had really learned how to learn.

First Year of Teaching: *Teacher as Collaborator*

As Matt completed his first year of teaching, he felt he was successful. He attributed that perception of success to two main factors, which he expressed through metaphor (Sillman et al., 2000). First, Matt was able to obtain a position in a school that coincidentally shared his philosophy of learning and teaching – the need for an intellectually safe learning environment. Second, Matt felt he was able to be *teacher as collaborator* during his first year of teaching. He continued purposeful reflection, with fellow faculty at his school and with his roommate, also a first year teacher. These supportive learning communities that Matt was a part of seemed to be operating with an inquiry stance construct (Cochran-Smith & Lytle, 1999). Matt and his colleagues felt comfortable asking questions about and seeking solutions to everyday curriculum, instruction, and assessment practices. Their stance toward questioning practices and systematically seeking data to find solutions, seemed to provide a sense of professional support and guidance in this critical first year of teaching. While all this seemed to help Matt continue to grow personally and professionally, it also seemed to help him more fully develop his philosophy of learning and teaching. Making sense of his teaching experiences through metaphor as his reflection tool helped reinforce and deepen the beliefs he had been articulating throughout his teacher preparation program.

Because Matt felt safe and confident as a learner of teaching, he was able to talk with other teachers, especially those in his second grade team, and ask for help, guidance, and ideas when he felt he was in need. He crafted the metaphor, *teacher as collaborator*, to express his dominant metaphor during his first year as a practicing teacher. His view that good teachers never stop learning and that seeking guidance was not a weakness but a strength is highly consistent with his collaboration metaphor. Matt also learned from purposefully reflecting with his roommate. They were sharing a similar experience, the first year of teaching, and could reflect on what works and what could be better.

Matt's discussions with his grade level team and his reflective conversations with his roommate are excellent examples of a learning community taking an inquiry stance (Cochran-Smith & Lytle, 1999; Dana, Yendol-Silva & Snow-Gerono, 2002). As the teachers reflected, they were essentially generating local knowledge by questioning their practice, problem solving, and listening to each other's perspectives. Just as Cochran-Smith and Lytle described this process as relational with beginning and experienced teachers engaging in similar intellectual work, so Matt felt respect from his colleagues as they discussed the most effective strategies to help students learn.

Fifth Year of Teaching: Teacher as Leader / Mentor

The most obvious change in Matt's teaching after five years was his development as a teacher leader. The head of numerous committees, Matt had also become the grade level team leader and the building technology coordinator. He had also mentored three student teachers, and was completing the requirements to become a principal. Some key events occurred after his first year of teaching that led to his leadership roles. First, during the 2002-2003 school year within his second grade classroom, Matt developed a Math Cart that he was particularly proud of and that exemplified a conceptual approach to learning and teaching math, and a new approach for his school. This became an excellent learning tool and Matt received positive attention from fellow teachers and the administration regarding its success, including requests to present his innovation at conferences. Matt planned to expand the approach to science in the next school year. In addition, the year before brought some changes to the building administration and his reactions to those changes helped set the stage for his becoming perceived as a building leader. Last, Matt continued to use metaphor throughout his teaching, not as much as a tool for reflection, but rather to relate content within his classroom to help his children learn.

Toward the end of his fifth year of teaching, one of Matt's proudest accomplishments was his development of a Math Cart. Actually a bookcase offered to the school by a local business (unlimited quantity for a nominal fee), Matt used his creativity to develop an interactive math center for daily use. The cart contained a variety of manipulatives that Matt used daily to review the key concepts in math that he had introduced throughout the year. For example, Matt asked students to predict on paper, which of two sets of small items weighed more. Later in the review, he had students come to the cart and weigh the items and compare actual numbers and percentages of students who had predicted correctly. In general, students developed true math statements and explored probability, estimation, time, number lines, fractions, measurement, money, and were constantly predicting and generating explanations for each concept. While children used each of these concepts daily, Matt emphasized, "I taught place value, adding, subtracting, measurement...and that was it" (Interview, 1/03).

The greatest value of the cart for learning that Matt identified was that the children are seeing the connections from the day before and then progressing daily to a greater depth with each concept, and "they are getting this every day, which is a big difference; not teaching measuring this week then we're done with it" (Interview, 1/03). The results? Matt sees a difference: "I am seeing they're learning big time, more so than ever before. These little guys can do more things math-wise than any of my students have ever been able to do before and at this point in the school year" (Interview, 1/03). How did Matt come up with this innovation? He looks to his own understanding of math and mathematics learning when he commented: "I think that I started seeing a lot of the connections myself (time, money, fractions) that I really never thought about before; I looked at them as separate entities" (Interview, 1/03). As Matt continued to be an expert learner (Ertmer & Newby, 1996), making connections in math, he became more creative in developing learning opportunities for his students to develop similar understandings.

In addition to an increased understanding of mathematics over his five years of teaching, Matt identified a major change regarding his use of metaphor, "In my first year of teaching, the metaphors were only about me and my performance...now I see them linked to my expectations for the kids" (Interview, 1/03). For example, Matt considered his daily morning meeting an *amusement park* and each part of it a *ride*. He explained that the purpose was to "get the kids to open up, share, allowing freedom in their learning, to go other places, be risk takers" (Interview, 1/03). He believes strongly in his *amusement park* because he has seen results: "My first couple of years, I didn't do anything like this. We didn't have formal opportunities to share...now, I see a big difference in terms of kids going out on a limb, trying something, or making a prediction" (Interview, 1/03). Matt is continuing to provide that safe, risk-free environment that he has long valued for children to learn and become confident.

Other examples of metaphor that Matt used with his students within his fifth year of teaching were in the areas of writing. He compared their writing processes to an *assembly line* in a car factory. As they wrote, he commented, "We have to make it a shiny new letter" and then when they finished, he commented, "The letter is now ready to be sold!" (Observation, 1/03). Matt also dons a tool belt and distributes "Tool Belt Writing" booklets, which he developed and which include student resource materials for the writing process. Teachers in his grade level team have all adopted the booklets and look to Matt for advice on teaching writing.

Matt emphasized he doesn't currently use metaphor "the way we talk about them" in reflection; rather, he is "constantly dreaming about the next metaphor for the kids, to show them something" (Interview, 1/03). Matt referred to one he developed a previous day for punctuation when students weren't reading for punctuation. He connected his metaphor to the students' art class of painting, and said to them, "You know when Ms. E. has you paint? Every time you dip your brush into new paint, that's when you take your pause. You take your breath, and you decide,

'what am I going to do with this next stroke?' Those marks are the same as dipping your brush into the paint. You stop for a minute. How am I going to read this sentence?" (Interview, 1/03). Matt uses metaphor with his students because he feels it enhances their learning.

Besides developing confidence regarding learning and teaching of math and using metaphor to help children learn better, what other changes impacted Matt's professional life as a teacher? Within his five years as a teacher, Matt clearly emerged as a leader in his school and in the district. A critical event that occurred was a change in principals at Matt's school. While he had been hired by a principal who trusted her staff to be the teachers she knew they were, Matt was supportive of the new incoming principal. Matt happened to know this principal who was a teacher for years in another school in the district. Some of his fellow teachers were resistant to the change in principals. Matt commented to them, "This is going to be great...It's going to be a change, but it's going to be great" (Interview, 1/03). As Matt reflected, he said, "I just felt from that point on, I was going to stick with [the principal]" (Interview, 1/03). Matt saw the value in not letting a new principal derail the good work he and his colleagues were doing. He knew that forging ahead and adapting to new turns in the road was important for the sake of the children in the school.

He exhibited a similar reaction when his colleagues questioned why he wants to become a principal. Matt identified his main reason: "Probably the key motive is hearing that principals can't change things or make a difference" (Interview, 1/03). His reaction, Matt explained, is not to be stubborn; rather, it's because he thinks it can be done. He commented, "If I think it's good for kids, then I am going to try it whether people say it's impossible or not" (Interview, 1/03). Matt's reaction is to make the most of a situation that others would rather avoid. His reaction to other teachers' perceptions of possible change regarding the new principal was critical in Matt becoming a leader in the school.

Another example of leadership that Matt exhibited was when he became the technology coordinator in his school. When his biggest collaborator and grade level colleague suggested he take that role on when she saw technology moving in a direction she didn't feel she could adequately handle. Matt initially refused, but because he felt he was "okay with computers but that's just one tiny part of technology" (Interview, 1/03). However she responded, "Why not? I think you'd be good. You're a leader. Give it a shot!" and he responded, "and so I did!" (Interview, 1/03). This role has led to Matt taking the lead at integrating technology in teaching and presenting applications of technology at various conferences.

Does Matt recognize his role as a leader? When asked who his mentors are, he responded, "I guess I don't have one. I am a mentor...to two new teachers, three students teachers...to the teachers here in my building with technology and as grade leader..." (Interview, 1/03). Without hesitation, he identified his role. Did he decide he wanted to be a leader? Matt gave another immediate response, "It just happens. The way you act and react with your colleagues...I keep

things light...balanced...I was always really good at understanding how other people feel and knowing what to say and when" (Interview, 1/03). He summarized the characteristics of an effective leader: "You have to really know people...when you can push...and when you can't... bringing a situation, a tense situation down to a light situation....really listen to what they have to say" (Interview, 1/03). For Matt, being a leader was just being himself.

Connelly and Clandidin (1988) said, "the kind of teacher we are reflects the kind of life we lead"(p. 27). This comment seems to explain Matt in his professional life. Matt has been able to operationalize his philosophy of a safe environment where children feel free to become confident learners, both for his students and for himself as a learner. When describing his use of the Math Cart, he commented, "I love the Math Cart. If I were a kid, I wouldn't be able to keep my hands off that thing...everything is me...morning meeting...all the things that I like to do...I really enjoy challenges, greeting people...our creed" (Interview, 1/03). He also feels that he possesses some key characteristics of getting along well with others and being an effective leader. How Matt teaches is connected to and reflective of how Matt leads his life.

Summary

Does teacher preparation have an impact on becoming an effective teacher? Can the process of becoming that effective teacher be enhanced through the development and maintenance of an inquiry stance and collaborative reflection? How does one become a teacher leader? Matt had found a reflection tool in metaphor, and the inquiry stance to go with it, to help him systematically study classroom problems and possibilities. He was able to continue this habit of collaborative reflection, begun in the university setting, within learning communities of his new colleagues who shared a similar philosophy of teaching and learning, and with a peer and roommate who shared the context of a first year teacher. He also continued to use metaphor as a tool to maintain a student-centered focus.

After a few years, some critical events led to this particular young man becoming a teacher leader among his staff. He chose to support a new principal whom he knew, and this gained him the respect of his colleagues. Soon afterwards, he had the opportunity to become the technology leader, grade team leader, and a mentor to new teachers and student teachers. In addition, as Matt's understanding of mathematcis grew, so did his confidence, creativity, and ability to teach math. This led to his development of a math innovation. With his Math Cart, Matt saw enhanced student learning and confidence within his students. Others saw this, too, and he was encouraged by his colleagues and administrators to present this innovation at a professional conference. He had already started attending and presenting at various conferences because of his role of leader in technology. Also, Matt's use of metaphor had changed. While he had found metaphor to be a

valuable reflection tool, he now used metaphor to a greater extent within his classroom to help his children learn new ideas by connecting to circumstances familiar to them.

Several implications emerged from this longitudinal study for teacher preparation and working with teachers in their early years of teaching. For teacher preparation, this includes the importance and long-term effects of helping prospective teachers to develop personal tools for meaningful reflection such as metaphor, and providing a more personalized teacher preparation program in attempts to accomplish this. Overall, if we question the impact of teacher education, this study seems to suggest that one contribution we can make is to provide prospective teachers with a reflection tool and an inquiry stance to help them continue to question and make sense of classroom actions after entering their careers as practicing teachers. Here, metaphor generation and analysis seemed to be an effective tool to analyze classroom actions within reflection.

It is also important for teachers to continue collaborative reflection as part of their professional development. Formed early in a teacher education program, the habit of purposeful and collaborative inquiry and reflection can be most helpful to a first year teacher who is entering a new, confusing, and sometimes overwhelming experience. More specifically, developing or joining a learning community that takes an inquiry stance is beneficial as beginning teachers struggle to learn even more about curriculum, instruction, and assessment. In this study, it seemed that metaphor as a tool enhanced Matt's inquiry stance. Regardless of the specific tool, it seems that if a reflective tool is developed and used within teacher education and found to be personally valuable, prospective teachers will more likely continue to use it during the first years of teaching to guide the metacognitive reflective processes necessary to improve their practice. For Matt, a transition in the use of his reflective tool of metaphor occurred. While he had used metaphor as a reflective tool, it became more of a teaching tool used within his classroom to help children learn.

In addition, Matt became a leader within his building. Through collaboration, he knew his colleagues and they knew him. He possessed characteristics of a leader and was able to use those characteristics to gain confidence and take on leadership roles in technology, as a grade level leader, and as a mentor to new teachers and student teachers. His confidence in teaching math and his creativity also led him to develop his innovative Math Cart, which he was especially proud of and he was given the opportunity to share this with others at conferences. Within five years, Matt had gone from being mentored to becoming a mentor!

As this longitudinal study continues, some questions emerge for the next phases of our research on the benefits of holding an inquiry stance and becoming a leader. First, how will Matt continue to evolve? What will be his next phase? How will his philosophy of learning and teaching continue to develop? Where will his current leadership roles take him? These questions will be explored in Matt's future years as he continues to be an effective and productive member of our profession.

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