The Dissertation and Graduation: Not Just a Black and White Process—

Mountain Climbing, Middle Passage, and Learning as a Postdoctoral Fellow[1]

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The Dissertation and Graduation: Not Just a Black and White Process— Mountain Climbing, Middle Passage, and Learning as a Postdoctoral Fellow

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Abstract: The purpose of this narrative essay was to share my experiences as a postdoctoral fellow in the Center for Curriculum Materials in Science. Data used to write this article came from two interviews, an on-line survey, and notes from a reflective journal collected during postdoctoral tenure. My experiences as a postdoctoral fellow have been rewarding in a number of ways. However, common to other postdoctoral experiences, I have experienced some challenges. I discuss the entire postdoctoral experience in terms of activities and responsibilities, building and maintaining relationships, and negotiating the process as a postdoctoral fellow toward a junior faculty position in academia. I encourage potential postdoctoral fellows to navigate their positions with creativity, focus on developing academic credentials, and maintain strong relationships with senior faculty, other postdoctoral fellows, and graduate students. I also share three professional development activities that graduate students and postdoctoral fellows can do to focus and develop a research agenda. (Contains references)

INTRODUCTION

I came into the postdoctoral program not exactly certain of what a postdoctoral position (appointment, fellow, fellowship, trainee, apprentice, visiting professor) was. Because I was a science major, I knew of "postdocs" in the sciences but was uncertain of a postdoctoral appointment in education and what that appointment would entail. I imagined that in an educational postdoctoral position, I would work closely with a mentor, or senior faculty member, on an educational project and then have this mentor work closely with me on my particular research interests. While doing the background research for this paper, I became more knowledgeable of the postdoctoral appointment across other areas including education, science, nursing, business, and psychology. My experiences compared to other postdoctoral appointees were similar and also very different.

At various stages of my postdoctoral experience, I was interviewed twice and completed an on-line survey by independent evaluators from Horizon, Inc. Upon my request, the director of the evaluation team sent me their interview notes and my responses from the on-line survey. I had an informal document, similar to a journal, where I wrote about my postdoctoral experience, my learning, and thinking during this time. This data helped me to reflect more on my postdoctoral appointment. I have prepared this paper using the sources above, my reflections after several

months out of my postdoctoral appointment and into my first year as an assistant professor at Teachers College, Columbia University.

There is little research or literature that discusses postdoctoral appointments in education or offer first hand accounts of such a position. Thus the purpose of this paper is to share my experiences and to offer information and encouragement for advanced graduate students who are considering postdoctoral appointments as they transition from graduate education to permanent academic positions. I talk about many aspects of my postdoctoral appointment in the Center for Curriculum Materials in Science[1] (CCMS, the Center) at Michigan State University. Particularly I discuss activities and responsibilities, building and maintaining relationships, and negotiating the process as a postdoctoral fellow. I also provide some background information regarding the postdoctoral appointment in general and some strategies for professional development during the postdoctoral tenure in preparation for the "post" postdoctoral appointment, or a junior faculty position in academia.

What is a Postdoctoral Appointment?

Traditionally, the postdoctoral position was developed over a century ago in science and engineering for the purpose of PhD researchers in supplementing their skills and experience (National Academy of Sciences [NAS], 2003). Today the postdoctoral experience has as a main purpose to "broaden and deepen the research and other skills that are required for a significant contribution to society and satisfying, professional employment" (NAS, 2003, p. 1). The purpose of the postdoctoral appointment is for appointees to improve their capabilities or move into new areas of interests (Henry, 2004). They are considered to be the "stepping-stones" for industrial, government, and especially academic fields (Murray, 2001).

In an article citing a report by the Association of American Universities, Schneider (2003) wrote that the number of postdoctoral fellowships offered in the United States has more than doubled over the past 20 years. This trend means that more and more areas are requiring a postdoctoral experience as critical to a permanent position in education, industry, or government. A postdoctoral appointment is a virtual prerequisite for those wishing to carry out long-term, independent research in the sciences with a growing number of other fields, such as nursing, psychology, business, and education desiring candidates with postdoctoral experiences. Over recent years, more fields are expecting graduates to do a postdoctoral fellowship (Schmidt, 1999). For example, the number of postdoctoral appointees in the United States has more than doubled in the past two decades, encompassing more than 52,000 in all fields in 1998 (Committee on Science, Engineering, and Public Policy [COSEPUP], 2000; Murray, 2001). Therefore, the experience of a postdoctoral appointment can increase greatly the potential for employment in government and non-governmental organizations (NAS, 2003).

In a research report prepared by COSEPUP, researchers presented a number of criteria for defining the postdoctoral position. They noted that institutions may use some or all of these criteria in defining persons who make up the "invisible university" or the postdoctoral appointee:

- The appointee has received a PhD or doctorate equivalent, including the MD, DDS, DVM, or other professional degrees in science and engineering.

- The appointment is viewed as an apprenticeship—a training or transitional period in preparation to a long-term academic, industrial, governmental, or other full-time research career.
- The appointment involves full-time research or scholarship.
- The appointment is temporary.
- The appointee is expected to publish (and receive credit for) the results of research or other activities performed during the period of the appointment. (2000, p. 43)

In my particular situation, I fit all of the above with one additional criterion; I was also expected to teach two elementary science methods courses within the College of Teacher Education—one undergraduate course during the spring and one graduate level course during the fall. My appointment, contracted for two years from June 2003 to June 2005, began immediately after completing my PhD in Science Education at Florida State University, May 2003. If someone is interested in a postdoctoral position, what is the process like for application?

Come In: Opening the Doors to Academia

Lorden and Matalon (2002) explained that there are no standards for admission to postdoctoral training nor established procedures governing the process. This was however not my situation. In my particular case, I applied for a tenured-track position at Michigan State University, yet was contacted and recruited to accept the postdoctoral appointment, a position that I did not know was open. I had submitted an application to the university, with a formal letter of application, a current curriculum vita, and four letters of recommendation from faculty members at Florida State University—three from my dissertation committee and one former professor in my program. I had a telephone interview with one of the two Co-PI's of the Center and the Teacher Education department chair. Several days later, the Co-PI came to Florida State to meet with me in person to discuss the position further and to make me an offer. I accepted the position after much consideration and advice from faculty members at my graduating institution.

The duties of my appointment were discussed in terms of my teaching of two sections of elementary science methods for 25% time and the remaining 75% time working within the Center on different curriculum projects. My position was approved by the Provost and President of Michigan State, similar to the process for a tenured faculty appointment. Different from faculty members hired at MSU, I did not participate in the "job talk" that consisted of a series of formal and informal interviews and presentations of my research and teaching open to the entire college. However, I presented in a colloquium my dissertation work to the department chair, faculty members and students in Science Education. This presentation occurred three months into my position as an introduction of my research interests and the department.

I was considered a full-time faculty member with many of the responsibilities and benefits that this position held. In some institutions, postdoctoral appointees are not classified as students, or faculty, or staff and thus do not receive the benefits and protections of any of these positions (COSEPUP, 2000; Raven, 2004). When I arrived at MSU, I spent the first couple of months working on curriculum research projects, participating in activities sponsored by the Center, and getting acclimated to the university, the college, and the elementary program where my teaching responsibilities were expected. I attended the university new faculty orientations, department

faculty meetings, and leadership team meetings of the Center. My postdoctoral position was essentially a faculty position.

What are Your Responsibilities and Expectations?

Somewhere in the Middle

The postdoctoral appointee assumes in a junior role the responsibilities of the senior (supervising, advising, mentoring) faculty member, who often is called the Principle Investigator (PI) under a funded grant project. The "junior researchers" or the postdoctoral fellows are pursuing further training in research and work with the principal investigator(s). Some of the responsibilities assigned to postdoctoral fellows are conducting research, training graduate students, writing research papers, and presenting work at conferences (Singer, 2000). These activities were consistent with my responsibilities in the Center and in the college.

Fulfilling the responsibilities of a postdoctoral appointment can be challenging and uneasy. I felt like the "middle-woman"—not quite a full faculty member but more advanced than a graduate student. I worked within the boundaries of particular projects yet did not feel like I was advancing my own interests. My time was spent predominantly on three of four curriculum projects in the Center. It was challenging and frustrating to manage these responsibilities—meeting weekly for each one, and teaching, planning, and conducting research in my methods courses. I was in an uneasy position of not feeling overwhelmed because overall I enjoyed my work, but I did feel frustrated. I was not spending sufficient time on writing from my dissertation, developing my own ideas and research goals, and doing the intellectual thinking that I hoped the postdoctoral experience would afford me. I was very invested in the curriculum projects and felt a sense of loyalty to remain working on them, yet I wanted to analyze data and write articles from my dissertation. As a result, my personal work and interests became secondary to the many responsibilities I had in the Center, working on curriculum projects.

I learned that being in the middle is a transitional period. The concern with being in this middle position is creating an environment that is conducive, stimulating, and supportive of personal agendas, while still fulfilling the responsibilities of the appointment. Realizing through research, this is a challenge for postdoctoral appointees in general. Postdoctoral fellows have to go into a postdoctoral position with a focus on developing and connecting their personal research agendas and interests along with responsibilities of the appointment. Creating this environment and blending these responsibilities requires effort, persistence, and creativity. For example, the match between my interests with the Center and teaching activities became better aligned the second semester of my appointment. During the second semester, I was teaching and conducting my own research within my courses, and I was promoting my interests within the various curriculum projects. I felt more like a faculty member and less like a graduate student during this second semester. Teaching allowed me to put into practice what I was thinking and to develop research options of my own.

Thus, to reconcile this middle position, I treated the postdoctoral appointment as on opportunity to learn as a graduate student and to think like a researcher. From the various curriculum projects I was assigned, I looked at these experiences and projects in terms of researchable learning. I

considered the things I were doing as connected to some kind of research question that I could potentially gather data and write about during my postdoctoral time. I could use this information and carry with me to a tenure-track position. I used my preservice courses as sites for research to expand my thinking, to connect what I learned from my dissertation, and to fulfill my responsibilities in the Center. However, getting to this point was again challenging, and it required a great deal of creativity and management of time and resources.

Working in the Middle Passage

During the second semester, I used the middle position to my advantage or viewed it more as an opportunity. I used it to learn more about topics that were new to me and then to play with these ideas in my teaching. As a result, I was more successful at managing my time and integrating my interests into the curriculum projects and my teaching. I made several contributions to Teacher Education and the Center, and I started a path toward personal scholarship. First, in the Teacher Education department I planned a program of study for preservice teachers based upon issues of diversity. I focused on the "diverse learner", and preservice students discussed how students' diverse backgrounds influence their planning and teaching of science as teachers. I used alternative teaching approaches in teaching science such as Book Club where we had discussions around race, class, gender, language, power, and equity in science education. I worked with interns and preservice teachers in using the American Association for the Advancement of Science (AAAS) Project 2061Analysis Criteria[2] for curriculum development to broaden preservice teachers' understanding of issues of diversity in planning and assessing science lessons. Additionally, I sponsored a curriculum development project with an emphasis on technology in planning and teaching of science with one of my preservice elementary students. The data I collected from the methods sections were used to write research papers for a conference presentation and journal submissions.

Working in the middle passage was an opportunity for me to development and extend interests in diversity. Diversity was one of the five guiding principles of CCMS[3]. Diversity was of great interest to me considering my background in science (Moore, 2003). I felt that understanding issues of diversity should be emphasized more within the Center. Therefore, my second contribution was advancing the research agenda on diversity within the Center. I became more focused on diversity issues, and I tried to build an active research agenda in this direction with my personal interests and the goals of the Center. For example, I initiated the Diversity Group so that a small, concentrated number of us could talk about diversity in curriculum materials, teacher education, and professional development. I connected my teaching of preservice teachers, my research interests, readings, and conversations with other Center postdoctoral fellows and graduate students around diversity and curriculum materials. With an emphasis on diversity, the Diversity Group planned two interactive sessions for the annual summer CCMS Knowledge Sharing Institute (KSI)[4].

Therefore, the middle position was conceived as a transitional position with tensions that I felt both emotionally and professionally. I was frustrated because I was not being as productive as I wanted to be in doing my own research. This middle position however was a common feeling among other postdoctoral fellows in the Center. This feeling lead me to believe that perhaps this is the nature of a postdoctoral fellowship—to feel somewhere in the middle, in transition,

somewhat uneasy and frustrated. The uneasiness of being in the middle was resolved as I saw this position advantageous for learning and developing as a young scholar. I took advantage of the opportunity to pursue my personal interests, while escaping the additional responsibilities that a full faculty position would entail.

Building and Maintaining Relationships

Please, Help Me: Faculty Mentoring

Lorden and Matalong (2002) wrote, "The ideal postdoctoral experience gives a young investigator the opportunity for intellectual growth and the development of independent credentials that permit a transition to permanent employment, whether in academia, industry, or government" (p. 49). However, creating an environment in which this is possible can be very challenging, as pointed out in the previous section. Lorden and Matalon also noted that it is fundamentally the task of mentors to create a positive, stimulating, intellectual learning environment. The institution itself may also help. I admit that not having the mentoring to help my "intellectual growth" was the most disappointing part of my postdoctoral experience. After completing my dissertation work on poststructuralism and power relations in science teaching and teacher professional development, I had only scratched the surface of developing an understanding of these concepts relevant to science education. I expected senior faculty to work closely with me in thinking about my dissertation work and to direct me in building upon ideas from my dissertation. I thought the senior faculty would help me build a personal research agenda towards this. Having senior faculty members guiding me and supporting my personal research agenda through mentoring was not my experience. For me, the creation of the intellectual environment by a mentor around my interests was not a major objective of my postdoc.

In general, Sandler (1989) indicated that women graduate students have less formal contact with male faculty and male classmates, and women receive less encouragement, guidance and support. Dowling (1999) lamented, "But we are losing [women postdocs] from the academy—from our research colleges and universities—and this is unfortunate, for science and for academe" (p. 94). The National Council for Research on Women (2001) cites several challenges that women postdoctoral candidates face in science. One in particular is the lack of mentoring. At the university, I was one of ten faculty members in the College of Education, and in the science education program, I was the only person of color. Being the only African American women in a science education program was a position that was not uncommon for me (Moore, 2003). I had learned throughout my academic career to work with many different people, but also to work independently.

One of the most important things that postdoctoral appointees can do to enhance their professional development is to develop strong mentoring relationships with senior faculty, other postdoctoral fellows, and graduate students. At all three levels, there is important learning that can be gained from these relationships. Ideally, having a mentor and other persons to talk about your research ideas in your area is advisable; however, postdoctoral appointees should not limit themselves to searching for mentors only in their subject area. Good mentoring can come from persons from within and outside your department, college, or university, and can be very

influential for students of color in matriculating in the academy (Davidson & Foster-Johnson, 2001). Mentoring should be an everyday experience of meeting the needs of women and students of color (Tapia, 2000). Postdoctoral appointees must be proactive in seeking out good mentors that are supportive in many aspects of academia—research methods, grant writing, teaching, and emotional support. Good mentors are genuinely interested in helping others not only to survive but to excel in academia, and securing a mentor relationship with an experienced faculty member should be a goal (Bowie, 1995).

Move Mountain!

There are many who talk of frustrations during the postdoctoral experience and some have documented the plight of those who find themselves in less than desirable environments (COSEPUP, 2000; Ferber, 1999; Lorden & Matalon, 2002; Schneider, 2000). In the worst of situations, telling the mountain to move may seem impossible. However, looking at mountains and obstacle as opportunities for change and development presents a more proactive stance on learning and negotiating the postdoctoral experience.

Padilla (1994) discussed that ethnic students in education face a major dilemma in research—"deciding whether they should be 'mainstream oriented' in their scholarly interests or whether they should be *ethnic* researchers with clearly specified professional interests in ethnic-related scholarship" (p. 24). In my second interview with Horizon, I responded, "It's been like climbing a mountain to get people to think about it [diversity]." For example, I was very disappointed when I sent out a two-question survey about diversity. Only 2 people responded. I asked two members of the leadership team to encourage all CCMS members (about 45 members) to respond, and I sent the two questions out again. Unfortunately, no responses were returned.

I felt marginalized in talking and thinking about issues of diversity. Talking about diversity and getting others to understand the complexities of addressing diversity issues was my mountain. Because of my positionality (an African American woman in science, from a working class, southern rural, Christian background) and the cultural climate of academia (White, middle-class, predominantly male), and because of where I was (a large, predominantly White, mid-western, research university), I was not terribly surprised that diversity was on the margins. In a way, I preferred it to be that way, knowing that those most interested in the topic would engage in critical and meaningful conversations for intellectual productivity. Rather than moving the mountain, I gathered like-minded individuals to help climb the mountain with me. I started seeing obstacles or mountains as opportunities to learn, and this was a good way to view my postdoctoral appointment in the second semester. I learned to navigate around the mountains and to generate opportunities and possibilities that lead to further exploration and advancement toward my personal and professional goals. In working closely with members of the Center, the relationships that best supported me professionally were with other postdoctoral fellows in CCMS; these were my mountain climbing partners!

Postdoctoral Support

As stated earlier, it is basically the task of the senior faculty mentors to create an environment that is conducive to intellectual growth (Lorden & Matalon, 2002). When there is little

mentoring, or mentors are not able to meet the needs of postdoctoral fellows, then building and maintaining relationships with others becomes a major priority for support and advancement. Support in the form of teams research projects and developing relationships with other postdoctoral fellows were very supportive.

First, a very beneficial aspect of my postdoctoral experience was the research done on curriculum development using the team approach. The team consisted of faculty members, graduate students, and classroom teachers on the development, implementation, and revision of curriculum materials. In conducting research in academically, culturally, and economically diverse high school science classrooms, the learning from this experience added to my thinking about diversity in curriculum materials, student learning, and professional development. The research aspect, simply from the aspect of curriculum design and data collection, was re-enforced during my postdoctoral experience. Several months were spent on planning, writing lessons, implementing the curriculum, collecting classroom data, and discussing the curriculum development process. Using many of my strengths helped in working on the teams by providing perspectives and insights that were unique to my experiences of learning science, teaching, and working with science teachers.

Second, the relationships that I made, nurtured, and maintained with two postdoctoral fellows within the Center, one at MSU and the other at University of Michigan, were extremely supportive during my appointment. These two colleagues were my partners in crime, my co-mountain climbers, around understanding diversity in curriculum materials, teacher education, and teacher professional development. Our conversations about issues of diversity were critical, insightful, and encouraging of individual interests and collective work within the Center. We shared a commitment to make diversity a central focus in the Center and an essential part of our personal research agendas.

Maintaining a relationship with these two colleagues—my friends—was extremely important to me. We have maintained our collegial relationship beyond my physical presence at Michigan State and my on-going work in the Center. For example, we planned a Tea Time Chat[5] hosted by Center members at University of Michigan in November, 2004. I returned to Michigan in order to attend the chat. During this session I was able to share with current and new graduate students and postdoctoral fellows and members of the CCMS leadership team my current work around diversity in teacher education at Teachers College. My postdoctoral colleagues also shared their insights and engaged the group in critical conversations about diversity and curriculum materials.

Additionally, the two postdoctoral fellows and I have monthly phone meetings via three-way phone communication. We discuss further the entanglements of looking at issues of diversity in teacher education, professional development, and curriculum development. We discuss teaching loads, job searches, and research ideas. I shared with them my transition to New York and New Jersey, my emerging research interests, and the responsibilities of a first year professor. We are extremely supportive of our positions in the Center, and the intellectual, professional, and personal conversations have allowed us to grow in many ways. Therefore, the relationships I have maintained with members in the Center were developed from our mountain climbing brought about from shared interests and frustrations. My postdoctoral colleagues have helped

me in my personal and professional development in academia. I realized that everyone will be dispersed in a few years, so staying connected to them and our shared interests around diversity is important professionally for establishing a network of support over our developing careers.

Learning During the Postdoctoral Experience

Knowing Your Strengths and Weaknesses

It takes time to understand the goals and expectations of the postdoctoral appointment. It takes time to learn new environments and the expectations of doing academic research. It takes time to find one's niche and to match responsibilities with personal interests. Part of this time should be dedicated to learning about yourself—citing areas for growth and using strengths to develop areas needing more growth. Because I tend to look at things with hopeful optimism, which is one of my strengths, I used this view throughout my postdoctoral experience. I was proactive in working on my weaknesses and tried to develop them. For example, I find it challenging to think about one major issue and to hone in on it because I am a divergent thinker—able to see connections among seemingly non-complimentary objects, ideas, or facts. Nevertheless, I challenge myself to be more focused in my thinking. Engaging in collaborative conversations helps me to do this more effectively. It is important that I maintain collegial supports where I feel comfortable to share my thinking, either in verbal or written communication, so that I can narrow and focus my thinking, when I deem it to be necessary. In the postdoctoral experience and even more now as a first year faculty member, seven months and counting, I am finding that focusing my thinking, without losing connections, flexibility, and creativity, is highly advantageous to professional growth and participation in a community of learners. I was able to gain experiences with this by working with teams of people on the different curriculum projects in the Center. Still, narrowing my focus to one or two major areas of interest is challenging for me. I keep adding more!

Professional Development for the "Post"-Postdoctoral Position

Before knowing what educational research entailed, I made a decision to become a science educator before entering my doctoral program. Conducting research and writing were enjoyable activities for me that I realized during my doctoral program. I like asking questions and finding unique ways to answer them. I enjoy helping teachers and students to learn science and to see its applicability to practical life. I want teachers and students to view science as a subject that can be taught and understood. Engaging in these activities is a creative research process in itself. Knowing this, I had to make time for scholarly work—specifically writing. A great deal of my writing occurred in the midnight hour—starting very late evening and going early into the next morning.

Research involves writing in various forms. Some of the writing responsibilities done in research are proposal or grant writing and writing for various academic journals. These activities were not discussed or emphasized during my postdoctoral experience. Given the many years of experience and wisdom at MSU and within the Center, I did not capitalize on this, nor did the senior researchers within the Center assist me and other postdoctoral fellows in this aspect of our professional development as junior researchers. Particularly, grant writing and writing for

academic journals are necessary activities for the livelihood of academic research, promotion and tenure. If postdoctoral fellows are not given time to think about their research interests and how these ideas could be foundational for larger ideas that can be supported through grants, then they will not be prepared in the post-postdoctoral or assistant professor position as junior faculty members. Postdoctoral fellows must begin thinking about grant writing and journal article writing.

I just wrote my first grant, just a month ago. It was a small grant, but having the opportunity to write a proposal, plan the budget, and articulate the specifics of what I wanted to do as a research project were beneficial learning activities for me. Particularly vital was my pulling together my ideas and writing them in a succinct manner that was well supported with a literature review, methodology, and analysis of data. The research findings will be presented to a diverse audience and written for publication in a couple of science education journals. The guidelines for publishing, selecting a journal, and writing for the audience of a particular journal are activities that postdoctoral fellows should engage in during their appointments. Again, senior faculty should be instrumental in assisting appointees in developing these skills.

I encourage my two postdoctoral colleagues to think about their personal research agenda beyond their postdoctoral tenure. Thinking about the post-postdoctoral experience is not unrealistic and should be an on-going focus along with current responsibilities of the postdoctoral appointment. The more time spent imagining what life is like after the postdoctoral experience is good preparation for a future faculty position. If postdoctoral appointees can articulate a research agenda, or direction for future employment, and discuss connections from the postdoctoral experience leading to a faculty position, then this will place them in an attractive position to begin their academic careers. Even making the decision to find a position in a teaching university, a liberal arts college, a private institution, or a large research university, or to pursue interests outside of academe, are things that postdoctoral fellows should give much thought. Being in the middle has it privileges. Being in the middle enables you to think about a future beyond the postdoctoral position. It also gives you a chance to continue building up your academic credentials for a position after the postdoctoral appointment. Again whatever skills or additional areas you would like to learn more about or to develop as a researcher, then the postdoctoral position is a good place where you can do this.

There are three activities that postdoctoral appointees can do to prepare for a future faculty position in research. During my postdoctoral appointment and now as a first year faculty member, I maintain a journal notebook that I revisit at mid-semester and again at the end of each semester; I write a personal research agenda at the end of each semester; and I keep current my curriculum vitae. First, the journal documents my thinking over the semester. I keep a separate journal for each semester. In the journal I keep a log of potential research questions, insights from the courses I teach, articles that I read, notes from student assignments I graded, seminars I attended, conversations I had, and notes from meetings I attended. I also record books and articles that I want to read that connect to something that I am thinking. In reviewing this journal, it is a map of how my thinking is progressing and to remind me of what I was thinking. I am able to make connections with past and current thinking. I can see my growth in conceptualizations of particular topics, and this is helpful for advancing my research goals which

could lead to a larger, funded research project because I have invested in the critical and reflective thinking about questions and issues.

Second, the research agenda keeps me focused on broad and specific research questions, and it serves as a quick reference of my research focus. I update it at it the end of the semester to guide me into the next semester. I make changes to the research agenda based upon the research I have done. I aim to make the research agenda more focused as I tighten the connections between what I am researching and where I want the research direction to go.

Third, I update my curriculum vita (CV) at the end of each semester. This document is also important for keeping current the areas of teaching, scholarship, and service. It also lets me see how I am developing as a young scholar. Thus, keeping a journal, writing a research agenda, and maintaining an updated CV are good professional development tasks that postdoctoral fellows, and graduate students, should do for building professional credentials.

Was the Postdoctoral Fellowship Worth It?

It's a Learning Thing

Reflecting on my experiences, I understand that the postdoctoral appointment was a transitional position, and I gained a great deal over the 14 months in the Center for Curriculum Materials in Science. The postdoctoral appointment is a "training-and-development position" (Schneider, 1998, p. A14), and postdoctoral appointees should view it as such. I came into the Center with an orientation to do research; hence I gained a great deal of experience in meeting this goal. I worked on teams to design, implement, and assess curriculum in a diverse high school. I taught both undergraduate and graduate level courses, and I was able to work independently on my own research projects with studies I conducted in my science methods courses. I produced scholarly with on my own and with graduate students, and presented some of this initial work at conferences. I am still working on research conducted in the Center and furthering my research agenda with ideas that were formed in my work as a postdoctoral fellow. I have maintained good personal and working relationships with members in the Center, from senior faculty to graduate students and other postdoctoral fellows. Overall, my participation in CCMS was extremely worthwhile and very much appreciated.

My postdoctoral experience enhanced my view of curriculum materials, curriculum development, teacher education, teacher professional development, and diversity. These areas are primary areas of my current research agenda and practice as a first year professor at Teachers College. The complexities of curriculum development and teacher education that attend to all learners, the various contexts of schooling, and teachers' and students' background knowledge and experiences have been re-enforced as part of my personal research agenda because of my work in the Center.

After completing my dissertation work on poststructuralism and power in science teaching and teacher professional development, I had only scratched the surface of my understandings and potential application to science education. I am still very much interested in my dissertation work and excited about making connections between this work, curriculum, and issues of

diversity. As a new faculty member, I am working through my dissertation and making connections from the dissertation with work from my postdoctoral experience to my current teaching. I see many connections and potential areas to focus scholarship and research. Keeping a journal and updating my semester research agenda are helping me to pull different ideas together into a coherent area of research.

I would encourage postdoctoral appointees to make a strong effort to work on developing their own interests, especially in working through ideas from dissertation research, or working to further develop research skills, such as data collection, data analysis, and different forms of writing. The heavy responsibilities of being in the middle—being in transition, moving from graduate student to junior faculty—and learning during my postdoctoral appointment were primarily my tasks to negotiate and to balance. I would encourage postdoctoral appointees to fulfill the responsibilities of their appointment while actively and creatively forging a strong effort to develop their own goals and interests. If at all possible, merge the two and test out ideas for devising a personal research agenda.

Reflections from Over the Mountain

In the process of mountain climbing and going through the middle passage, postdoctoral fellows should learn how to manage, develop, and work within the advantages that a postdoctoral appointment will afford you. Use time to nurture strong relationships with other postdoctoral fellows and graduate students, and then continue these relationships for personal and professional support beyond the postdoctoral tenure. Find willing senior researchers to assist you as mentors. Do not isolate yourself from the vast wisdom and resources these seniors can give you. You may have to be aggressive and demand certain things you need, so learning the art of negotiation will be good for you. Remember you are in the postdoctoral appointment to fulfill certain duties, but this may also be a space for negotiating what you want and need to prepare you for the next phase in your career.

During my postdoctoral appointment, I was able to teach science methods courses, to conduct research, to advance my scholarship, and to build strong collegial relationships. So was my postdoctoral experience worth it? Sure, it was! It was an exceptional experience, including the mountain climbing and feeling like the "middle-woman." I would encourage others to learn and to take advantage of a postdoctoral appointment. The view is better over the mountain!

Notes

1. The Center for Curriculum Materials in Science is one of several national Centers for Learning and Teaching (CLT) that focuses on critical research and development issues related to improving curriculum materials for K-12 science. The American Association for the Advancement of Science (AAAS) is the lead institution and coordinates programs and research of three doctoral granting institutions that have extensive research, development, and training experience in curriculum reform. These partners are the University of Michigan, Northwestern University, and Michigan State University, along with Chicago Public Schools, Detroit Public Schools, and the Lansing School District.

2. American Association for the Advancement of Science (AAAS) Project 2061Analysis Criteria were designed to evaluate the effectiveness of mathematics and science curriculum materials. There are seven major categories with indicators for each. The seven major categories were used as a guide for lesson and unit planning: Category I: Providing a Sense of Purpose for Students, Category II: Building on Student Ideas, Category III: Engaging Students

with Real World Examples/Phenomena, Category IV: Developing and Using Mathematical or Scientific Ideas, Category V: Promoting Student Thinking about Experiences and Knowledge, Category VI: Assessing Student Progress, and Category VII: Enhancing the Learning Environment for Students.

3. The CCMS five guiding principles for instructional materials development: (1) the centrality of clearly stated science learning goals, (2) the importance of building pedagogical supports into instructional materials, (3) the usefulness of student investigations, (4) the value of incorporating learning technologies into instructional materials, and (5) the need to serve diverse learners by designing instructional materials that are accessible to all students.

4. The Knowledge Sharing Institute (KSI) is annual major summer activity where partner members exchange information, resources, and expertise within the Center and within the larger community of science educators, researchers, and curriculum developers. The KSI plays a key role in coordinating and unifying the work of the partner institutions.

5. The Tea Time Chat, initiated by a postdoctoral fellow at University of Michigan, involves informal discussions about topics significant to understanding curriculum reform and policy. The Tea Time Chat involves CCMS members and others from within and outside partner institutions through participation in phone and video conferencing.

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