Synthesis Paper

Research and Scholarship in Education

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*Introduction*

As the spring semester comes to a close, I reflect on how much I have learned and how much I have matured during this semester. After listening to the various professors talk about their journeys, their work in education, and their research interests, I have began to re-evaluate my own goals in the Ph.D. program both as a student and a professional. Even though not all of the professors had research interests that were similar to mine, I was able to take something away from each presentation. As a previous classroom instructor even at the university level, I was unaware of all of the research that has been done that addresses some of the problems that we are having in our classrooms. As a future leader in my field, I think that it is important to make such research accessible and present it in a way such that teachers can appreciate its usefulness and, equally important, are able to apply the research findings without spending too much extra time to incorporate them in their classrooms.

In this paper, I will discuss in detail why and how selected presenters made an impact on my ideas about graduate school in general, my research interests, methodologies, training for teachers, how to work with peers and faculty, and how to start thinking about a dissertation topic. I will also address how my personal meaning of Communities of Practice has developed over the course, and relate this meaning to my goals as a future scholar as a doctoral student in Mathematics Education with a minor in Instructional Technology at George Mason University.

*Descriptive Discussion*

This semester I have had the opportunity to hear from a variety of different professors within the Graduate School of Education. This has really changed my thinking about education, research, international relationships, and policy. I have also started to think about how I personally can fit into the research and make an impact on the field of mathematics education.

Listening to the professors talk about their experiences and their work in education has prompted me to look at the research related to my interests critically and begin to think about how I can extend and/or replicate the current research. In Erin Peters’s presentation, she asked us to identify our own interests. It was hard for me to narrow down my interests, but I came up with a list: Motivational Theory (specifically, avoidance behaviors), Equity (maybe something to do with second-language learners because I also studied Spanish), Teaching Mathematics (specifically, problem solving), Teacher Training (focus on math for elementary education majors and Action Research), and Instructional Technology (could this be a possible intervention to reach students having trouble?).

I am encouraged by all of the work that the presenters have done in their respective fields of education. I feel like I can make an impact in education and it won’t be done by just talking about it but by actually doing something about it.

The most influential speakers for me have been: Erin Peters, Dr. Priscilla Norton, and the Panel on International Education. Erin Peters spoke about the inequities in science education which seemed to parallel to those in mathematics education, Dr. Norton about instructional technology which is my minor, and the Panel about advocating for equity on several levels.

Erin’s presentation focused on how she came about her dissertation topic, something I have been praying to come to me ☺. As she was talking about her interests, I started trying to make a list of my own interests. My ideas in math education paralleled with her ideas about science education in several ways. For example, she said that the system sorts students by their scientific ability; this is also true for math. I am interested in making math accessible to all students, sort of an issue of social justice. I taught college for three years at Purdue before coming here. I always sought to identify the students early on that used avoidance behaviors – those that avoided extra help necessary to their understanding in order to hide their weaknesses. I invited these students to my office hours, and let them know that I *wanted* them to get a handle on the material. My efforts were sometimes successful and sometimes they weren’t. The bigger picture was that the students that weren’t able to pass some of the courses were automatically forced to a different college track whether it was: from Marketing to Organizational Leadership, from Pharmacy to Pre-Professional Studies, etc. We need to come up with a better system of support for these students, a way to reach them so that they can self-regulate their own learning and proactively seek help.

Erin’s talk about her methods and how NOT to limit yourself by ascribing to either qualitative or quantitative and how you may have to create your own instrument to measure constructs transitioned into Kelley’s talk on how to navigate the community of Higher Education. She stressed that being part of an Institute of Higher Education is not all about research, but a balance between research, teaching, conducting studies, and writing grants. She also stressed that to be a part of a PhD program you must be self-driven and be able to show that you are being productive. When I left her talk, I was struggling with the idea: Am I a big-picture person or a detail person? After more thought, although I’d like to be more of a big-picture person, I think that I am more of detail person.

Dr. Priscilla Norton took us through her own personal philosophical journey in life. But before she discussed her ongoing struggle with herself, she repeated a theme from Elavie’s talk. Dr. Norton referenced what is announced when you complete your PhD and walk across stage, “We confer this degree with the rights and responsibilities associated with it.” I found this very interesting that both she and Elavie commented on how having this advanced degree is really a contract to oneself to live a certain way. It got me to thinking that although it is earned, it is a privilege – a new outlook on working towards another degree. The next piece of advice that I found very helpful from Dr. Norton was her discussion about actions and ideas. She said that they should inform each other and are not as meaningful singly. If you are more a practitioner, make an appoint to think about what you are practicing. If you are in deep thought and prefer research, share your ideas and use them.

I am interested in Action Research and have chosen this topic for my final paper in my Mathematics Education cohort class. There seems to be a serious disconnect in scientific formal research and usability. Even if the results of research related to teaching are practical, it seems that the chance that teachers are both informed about the findings and also consider using them in their classrooms are slim to none, and this is a disgrace to the purpose of research. It seems that there are several pros of scientific research such as its formality and generalizability, but it also seems that action research has the advantages of immediate applicability that scientific research does not provide. Either a serious effort has to be made to implement research into practice, or teachers must go through a program to train them in action research.

Dr. Norton didn’t talk much about communities of practice and collaborating, but she did talk about online relationships and building communities. Although being a part of an online community didn’t affect performance, it did affect enjoyment. Those that joined communities of learners enjoyed learning more. Also, some have the preference of working with peers over working with an expert. Others prefer an expert over peers. She told us that although peers are good, experts are better. We should work with an expert to help us with our ideas, and then combine our thoughts with actions through design research. I really liked how she ended: we can revolutionize education if we can teach teachers that they are also designers. Instead of having a sage on the stage, or a guide on the side, the optimal learning will take place with a sage on the side ☺

I was intrigued by Dr. Norton’s research interest of online learning communities. I was the only instructor of hybrid courses at Ivy Tech Community College. Hybrid meant that we covered an entire chapter in a 3 hour weekly night class, and the students were expected to do homework and take quizzes online (in MyMathLab). Exams were also generated by MML, but were proctored so that it could be verified that they were not using the book or notes. One of the major goals of blackboard was to almost force the students to interact and be a part of a learning community by responding to related open-ended application problems. They were ‘forced’ because it was part of their grade to make an original post on a discussion board and also respond to two others’ initial posts. At the end of the semester, I asked the students to freewrite to me about their experiences in the class. I was leaving Ivy Tech for the job that brought me to this area (NCTM), and wanted to pass on constructive feedback to the department since I was the first to teach such a class. Surprisingly, most complained about the discussion board. They generally claimed that if the goal was to interact, they shouldn’t have been forced to do so while being forced to respond to a math question; they should have rather had the freedom to post about topics of their choice. Others didn’t see value at all I the discussion board, and were rather concerned with dedicating all of their time to practicing the homework problems (they were allowed unlimited attempts) and doing well on the weekly quizzes. Those students felt their grades were what were most important in the class and not being a part of a community of learners. Although this experience differed from that which Dr. Norton’s claim that working with peers makes learning more enjoyable, her claim that students appreciate a ‘sage on the side’ showed to be correct in my situation. At first I spent the three hours in class going through examples that highlighted major ideas from each of the sections in the chapters. I asked for continual feedback, and after a few weeks, I noticed less engagement from students in my examples. I told them that I was more than open to modifying class to better fit their needs. I dealt with this by giving them time to talk as a group as I left the room, and having one ‘reporter’ write the ideas on the board. When I returned, they had proposed that I make class into a work time where they were able to call me over and ask for assistance. This worked well since the class was small. This is an example of students also realizing that a sage on the side is the optimal learning situation.

The panel on International Education focused on a push for access for all. Unfortunately, according to the panel, there is a huge number of kids in the world not being educated formally at all. The IFA (International Framework for Education for ALL) was developed by several countries that got together to tackle this problem at a global level, but they are still not satisfied with the state of education for all at this point.

The technical ideas that the panel spoke about seemed to all fit under the more global theme of equity. It appears to me that all fields of education are currently focusing on the hot topic of differentiation, and how to better reach the interests and ability-levels of a diverse classroom of students. For me, it seems that joining the cause of equity for all can be overwhelming when considering how enormous and complex the issue is, so it may be more feasible to begin by focusing on equity on a more local level – the classroom.

I am currently working that the National Council of Teachers of Mathematics and the council’s Focus of the Year is Equity. Our annual meeting highlighted keynote speakers on the topic, and we have dedicated e-workshops to practical ideas for teachers to get started on the global campaign for equity in their own classrooms.

The buzzword for dealing with equity at the local level seems to be differentiating instruction. This, to me, seems like a catchy term for good teachers naturally do to maximize engagement among their students. I spent some time thinking about what tips would be most helpful for teachers to review to make sure they are making an effort to cater to the diversity in their classrooms, and I posted them on NCTM’s website ☺. My list included:

* Get real. It’s impossible to look at any classroom and pretend that all students are alike. Instead, focus on the differences that exist, value the diversity, and allow each student the opportunity to shine. Teachers should be open to different approaches and strategies as long as students are able to explain their reasoning. Students want the chance to be original, resourceful, or ingenuous.
* Blend whole-class, group, and individual instruction. It is more effective and efficient to use different strategies in different situations. When using groups, rotate students based on demonstrated knowledge, interest, and/or learning style preferences with the aim of moving all students to a higher level of achievement. Use the groups to set up learning activities that: teach new concepts, apply concepts previously learned, and also revisit skills not mastered.
* Be proactive. Embrace accountability. You as a teacher are responsible and obligated to plan a variety of ways to facilitate learning. Instruction may be differentiated in content, process, or product according to the students’ readiness, interests, or learning style. Students must be able to express themselves in what they learn, how they learn it, and how they demonstrate their understanding. As you progress as a great teacher, you will become more comfortable using multiple instructional strategies and a variety of representations at the same time to increase the chances of reaching all students.
* Acknowledge that students have different learning styles, learn at different speeds, are at different comfort levels of thinking abstractly, and differ in abilities to make connections. Offer choices and flexibility in the classroom. When appropriate, set up learning centers to provide choices. Make sure the centers include varied activities such as skill practice, problem solving, manipulatives, games, working with technology such as computers or calculators, graphs and other visuals, and writing opportunities. This will provide for a more comfortable, engaging, and inviting learning environment for students with different levels of understanding and different interests.
* Never separate assessment from instruction; rather integrate assessment into instruction by making informal assessments a way of life in your classroom. In the classroom, focus on qualitative assessment more than quantitative assessment. It is imperative to get to know each student’s achievement levels and strengths and weaknesses. Pre-assessment is a critical first step that should be used before designing any lesson. Don’t assume what your students know or don’t know; find out!
* Get to know your students! Outside of the classroom, keep up on your students’ interests. Try to find time to make a basketball game or a theatre production to show that you are interested in them outside of mathematics class. In the classroom, use personal interest inventories regularly. Once you know your students interests, you will be able to better create assignments that fit your students’ interests. Students will be more engaged in the learning if they feel it was developed around their interests.
* Use a variety of forms of assessment: formal tests, homework assignments, journals, discussions, and presentations. Equally important is that you follow through; use the results of assessments to continuously plan lessons on skills that are not yet mastered by your students.
* Reflect on lessons, projects, evaluations, and everything else that goes on in your classroom. Focus on how you could modify lessons to better fit the students’ needs and interests.
* Focus on the students! It may be easier for you to lecture and assign drill and practice, but remember that your ultimate goal is to be in the best interest of your students’ learning. Use more inquiry-based teaching practices and investigations.
* Realize that teaching is evolutionary. Great teaching doesn’t happen overnight. It takes patience and consistent dedication. Focus on becoming comfortable differentiating one new lesson at a time. Your plan must include more than the content. You also will need a plan for managing time and keeping students focused. You may worry about disruptions, but in a collaborative learning environment, students will be more engaged and disruptions may decrease. Students are unique, so the same approaches aren’t going to work year to year or even day to day. As teachers, we must monitor each learner, their learning, and make continuous adjustments.
* Take the time to briefly pre-teach or even re-teach to meet the needs of students before introducing new content goals. Use heterogeneous groups to facilitate a tutoring and mentoring relationship between students, but be careful not to overuse this strategy. Hold students accountable for their own learning. The more skilled students deepen their understanding by articulating concepts, and the less skilled have a chance to learn ideas from a different source. Sometimes a peer’s words are easier to internalize and may be less intimidating than working one-on-one with the teacher.
* When differentiating your classroom, don’t leave out the gifted students. Be cautious that you are assigning open-ended rich inquiry activities instead of more work or always using peer-tutoring and mentoring relationships. Differentiating should allow ALL students to be enriched. Differentiating is NOT adjusting the workload assigned based on ability levels or grading differently based on perceptions of students’ capabilities.
* Arrange your classroom in clusters to promote mathematical literacy. Get your students comfortable with the norms associated with collaborative learning; it’s a necessary prerequisite to differentiated instruction, and it also creates more opportunities for interaction. Imagine a teacher in a classroom of 32 students. In a 50 minute class period, she can’t dedicate even two minutes to a student individually, but in groups of 4, she could dedicate more than 6 minutes to a group. Additionally, when working with one group, the other groups would be on task communicating and making progress.

Although I spent extensive time thinking and writing about what measures a teacher must take in the classroom, I wonder now what the next step is for a teacher who is interested in becoming an advocate for equity on a larger scale. It may be helpful to inform teachers and educators what steps they can take beyond the local level but before the global level in advocating for equity. I wonder if this level means that they would have to choose a specific group facing inequities such as: gender, ethnic, rural/urban, public/private and follow its campaign individually. Following then, is the question, who makes up the Communities of Practice in an effort for equity? Are there several more local communities of practice that make up the more global community of practice? Are the local campaigns separate from the global campaign? What does it take to be a part of both communities?

*Analytic Discussion*

Over the course of this course, I have modified my definition of a Community of Practice (CoP). My group and I have come to define it as ‘a group of people who participate in a specific discourse community where the shared interests, goals, and practice of participants are closely related, and where their interactions on a group scale and among individuals within the group results in a deeper understanding of the topic in which they engage.’ For example, one could argue that all students in George Mason's doctoral program in education would comprise a CoP.  As a member of a CoP, an individual interacts with a core of practitioners who are considered effective at the work of the CoP, and the work of the individual evolves to resemble that of the core group. There could also be smaller groups of CoP’s more specific to concentrations: all doctoral students that are majoring in education, and then even more specific – doctoral students majoring in mathematics education, etc.

Lave and Wenger coined the idea in the early 1990s; explaining that at the core there would be a group of people who could do something well, and others who either desire to become a part of the group, or who, by virtue of having selected to specialize in the relevant discipline, are automatically on the fringes of the group, learn from the core participants until the newcomers were proficient.

St. Clair highlights three elements of CoPs as defined by Wenger: mutual engagement, joint enterprise, and shared repertoire. *Mutual engagement* refers to social relationships, where members in the CoP are “mutually engaged in order to negotiate a meaning” (p. 26).  They are committed to each other and take responsibility in mastering knowledge through discussion and other related activities. *Joint Enterprise* refers to the shared goal of the CoP (p. 26), which, as opposed to being short-term in nature, is broad enough to support the continuous growth and evolution of a sizeable group of practitioners. Through regular interaction, members of CoPs offer constructive criticism, ideally looking out for the sake of the group as a whole over their individual interests. *Shared Repertoire* refers to a common understanding, such as of research methods and communication/dissemination (p. 27).

*Reflective Self-Evaluation*

Reflecting on the definition of a CoP as described by Wenger, and considering the several presentations of professors and doctoral students, I can better see how I fit into this program as a whole, and also into my cohort as a mathematics educator. I can clearly see that there is research and evidence supporting CoPs, and can see how collaborating and reflecting are critical components of learning and growing professionally.

 Although some presenter’s interests aligned with my own more than others, I was able to take bits and pieces of advice from all of them. I enjoyed the diversity among the selected presenters. It was nice to hear about other concentrations, such as policy with which I was surprisingly interested – although I would have thought that I would have been completely turned off by. It was also nice to hear from PhDs that are accomplished and others that are still battling through the program.

 In the sections above, I integrated how this course has impacted my ideas about research and scholarship, communities of practice, and as an emerging scholar myself. I related the presentations and the readings to my own personal experiences, and have begun to form more concrete ideas of goals for my own future research plans. I am in control of my own learning, and this excites me!

When I critically look at the research that is available I can see that there is a real need for good research in the field. I have taken something from all of the professors that I have encountered this semester, and they have inspired me to accomplish my goals and become a leader in my field.