INTRODUCTION

Based on feedback and reflections of a cohort of pre-service secondary school mathematics (PSSM) teachers from prior action research studies, we, the instructors, a mathematician educator and a mathematician, agreed to take the following actions: (1) attend to meticulous planning for an effective, smooth, and well-integrated co-taught class maximizing each instructor’s expertise; (2) maintain a communication line with trust in the collaboration; and (3) co-teach the course for a longer period of time to have the most benefits from the experience for both PSSMs and co-instructors. In this presentation, we will discuss the results of continuous re-modeling in the co-teaching approach on the preparation of PSSM teachers who came to an initial teacher preparation program with qualifications of strong content knowledge and developing effective pedagogical skills. Using data from interviews, and written reflections, our study centered on one main research question: What is the nature of the experience of PSSM teachers and their instructors in a co-taught methods mathematics course?

THEORETICAL FRAMEWORK

Considering the students as a cohort forming a community, learning to analyze student learning for the benefits of their professional knowledge, we identified the theory of situated cognition as a useful frame for this study.

Situated cognition “recognizes the inseparability of thinking and the contexts, in which it occurs, and explains the inherent significance of real-life contexts in learning” (Choi & Hannafin, 1995, p. 53). Choi and Hannafin (1995) further stated that “knowledge is assumed to be the dynamic by-product of unique relationships between an individual and the environment [and] learning is a natural by-product of individuals engaged within contexts in which knowledge is embedded naturally” (p.53). This theoretical frame emphasizes four aspects of learning: the role of context; the role of content; the role of facilitation, and the role of assessment.

Due to the focus of this study (co-teaching in a mathematics methods course) we will only concentrate on the role of facilitation—a natural dimension of the teaching-learning process.

METHODS

• Action research (Mills, 2007) has been utilized to investigate the experiences of both PSSM teachers, and the mathematics educator and the mathematician in a co-taught methods course.

• Data collection: – Daily reflections by PSSM teachers and the course instructors during the implementation of the module – Individual interviews with all the participants. Students were interviewed twice (at the end of the implementation semester-Fall and at the end of the following Spring semester) and the instructors were interviewed once at the end of Fall semester.

This process for improvement was not just limited to our own personal feedback, but we were also using the comments from the students. (Mathematician)

“Um, one critical component definitely would be that the instructors would have to be able to be comfortable with each other. Also, they have to be able to be critique each other. This model requires a level of compatibility that allows for open communication and critique. There is also a level of comfort that is necessary between the instructor and the students.” (Mathematician)

“Both instructors have to have a collaborative spirit; it is no longer about “you, you, you”. You can no longer plan the agenda for the class during the five minutes before the class. That opportunity no longer exists because you have to get the insight of the other instructor. And, collaborative lesson planning is extremely time consuming.” (Mathematics Educator)

RELATED QUOTES

“I would say that “timing” and “time management” are also critical. During one of our teaching phases, we noticed that “we couldn’t finish the agenda because the pre-service teachers began a discussion that was important for their learning…we had to alter our agenda for the sake of their learning. Now, this is a typical thing that a teacher has to do in the regular classroom, so it is important to also model this type of agenda adjustment for the pre-service teachers.” (Mathematics Educator – Post Interview)

“...one aspect that I truly enjoyed about having both the math educator and the math professor in the class was that I could experience the blending of different approaches to solving the same problem. Variety is a good thing.” (PM-Final Interview)

“I hate to repeat myself, but having both the mathematician and mathematics educator in the same classroom at the same time allows for a more holistic experience. As I said earlier, I can see how not experiencing the more holistic approach increases the chance of the pre-service teacher developing poor habits.” (VM-Focus Group Interview)

“It was a very positive experience. It was evident that the mathematician knew the content. It was also evident that the mathematics educator knew how to present the material to us. I recall the mathematics educator taking deliberate action to introduce us to multiple approaches to gaining insight into a particular mathematical concept.” (ES-Final Interview)

“This theoretical frame emphasizes four aspects of learning: the role of context; the role of content; the role of facilitation, and the role of assessment.”

“It was great to have the opportunity to get more one-on-one access to them. It was amazing how much additional insight could be gained in those one-on-one opportunities.” (ES-Final Interview)

FOCUS GROUP INTERVIEWS

Participants: – 26 PSSM teachers – 4 instructors (three mathematicians and one mathematics educator) – A mathematician educator as a coach to the instructors

Data Analysis

• Data collected were used to generate a detailed case for PSSM teachers and the course instructors

• Interviews, and reflections were initially coded individually

• Co; (Mathematician)

RESULTS

• Students highlighted the following: – Having access to two different perspectives always enhance learning – Co-teaching capitalizes the expertise of the two instructors – Chances for one-on-one interaction with instructors are increased

• Integrated learning environment allows students (Pre-Service Teachers) to experience the modeling of the fusion of content-mastery and pedagogy-mastery

• It could be overwhelming if it is not managed well

Instructors highlighted the following: – Student reflection/feedback was instrumental in the process – It was a mutually beneficial and positive experience

• Co-teaching takes significant time and requires meticulous planning and debriefing sessions

• The coach provided critical feedback that lead to improvements

• Time management continued to be an area of improvement

• Consistency is critical for the success of this experience for both students and the instructors.

Lessons learned: – Flipping the classroom allowed the instructors significant instructional time to engage in the type of discourse that PSSM teachers experience both expertise, reflect on their experiences and share expectations. Continuum with scheduled, regular meetings to plan and debrief seemed to be critical for effectiveness. Mutual trust and respect for individual expertise are crucial to build a professional relation to effectively co-teach.

REFERENCES


Pier A. Junor Clarke, PhD & Nermin Tomsur Bayazit, PhD
Georgia State University

Pier Junor Clarke: pjunor@gsu.edu ; Nermin Bayazit: nbayazit@gsu.edu ; Graduate Research Assistant: Elijah Porter II: eporter9@student.gsu.edu