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Preservice Teacher Development through Math Camp Involvement

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Abstract

This research study investigated the role that involvement in Math Camp had on the development of preservice math teachers at Bowling Green State University. The research question was, *In what ways do preservice teachers perceive their development through math camp involvement and how do they plan to use this development in their future classrooms?* Since 2013, there have been 134 BGSU preservice teachers that have participated in Math Camp. All of these individuals were solicited to participate in the research study. Fifteen responded to the solicitation and participated in the study. Each participant completed a brief survey as well as a semi-structured interview which was transcribed. The coding and analysis was structured in accordance with a framework that was adapted from Knowles and Cole's (1996) to fit the specific context of Math Camp: inquiry into self in relation to prior experience, inquiry into contexts and personnel roles, and inquiry into relationships. This research study yielded N=308 codes that were grouped into N=13 categories which all showed connections preservice teachers made between their Math Camp involvement and their development as teachers.

Keywords: preservice teacher, Math Camp, mathematics, education, field experience, teacher development

Introduction

In order to be globally competitive in education, the United States of America must prepare its future educators effectively. With ongoing changes and discoveries in best practices, curricula, standardized testing, etc., teacher education programs must be up to date on the best ways to prepare our nation's preservice teachers. Preservice teachers might have a variety of different experiences such as tutoring, peer teaching, observations in the field, or small group teaching. Research studies seeking to find the benefits of each experience are important for teacher educators to develop programs that prepare preservice teachers (PSTs) for the teaching profession. This research study focused on Math Camp which is one specific preservice teacher program held at Bowling Green State University (BGSU). In this program, the preservice teachers work together to design and enact a Math Camp that engages K-12 students in mathematical problem solving in an enjoyable and exciting camp-like atmosphere. Preservice teachers plan mathematics and problem solving based tasks as well as orchestrate the movement and flow of student groups throughout the camp day. These elements simulate a school environment where the preservice teachers are directly responsible for the students.

This research study began with a look into the potential connections that Bowling Green State University preservice teachers could make between their Math Camp involvement and the current literature available about teaching. A brief survey and a six to fifteen minute interview was conducted with each research participant to show the perceptions of the preservice teachers involved with Math Camp. The research question was, *In what ways do preservice teachers perceive their development through math camp involvement and how do they plan to use this development in their future classrooms?* The literature review, theoretical framework, explanation of the methods, Math Camp context, and the analysis of the results follows.

Literature Review

At Math Camp, preservice teachers experience certain aspects that are characteristic to what a teacher experiences on a regular school day. Starting at the very beginning of the day, Math Camp provides a unique opportunity for preservice teachers to greet students at the door and begin to establish rapport and connections as if it is the first day of school. It has become tradition that the preservice teachers form a high-energy tunnel for the students to enter through in order to model the excitement of Math Camp and set the mood for the day. The preservice teachers also have the chance to interact on a more individual, conversational level as they wait for the camp to officially begin. During this time, they can do as Dr. Rosemary Wong suggests and make each student feel noticed and important by smiling and engaging them in conversation ("Developmental", 2013). Dr. Rosemary Wong is an advocate for showing students they are cared for and greeting them at the door. These interactions are a gateway for classroom management.

Classroom management is defined as "consisting of the practices and procedures a teacher uses to maintain the environment in which instruction and learning can take place" (Wong & Wong, 2014, p. 5). Classroom management does not just happen. It is planned and based on research and context. There are certain procedures followed during math camp such as dismissal from each station. Each team leader and station leader has the opportunity to practice quieting down a group of students and getting their attention as well.

According to Wong and Wong (2009), the first few days of a school year are predictors of the success of the rest of the year. In fact, they claim, "What you do on the first days of school will determine your success or failure for the rest of the school year" (p. 1). Consistency

is so essential to the classroom that it is the most important thing to establish in the first few days.

While the results of the consistency practiced during Math Camp cannot be tracked, this is an excellent time for preservice teachers to practice their first day of school attitudes and actions. The Math Camp volunteers will practice greeting the students, showing warmth as well as control, and maintaining consistency in their procedures, expectations, and consequences. For example, if the station leaders set the procedure that every student will take a turn placing a number on the Brain Train board, then they must be consistent in that procedure to ensure that every student takes their turn and participates, not allowing other students to interrupt them.

Preservice teachers can learn how to effectively manage and teach their students through peer consultation. Peer consultation, according to Blase and Blase (2006), is effective when teachers avoid judgement of colleagues' work, develop supportive communication, show mutual respect, and believe that teachers have the ability to understand, test, and transform their teaching practices (p. 30-31).

According to the studies conducted by Blase and Blase (2006), caring interactions with peer consultants positively impacted the students (p. 33). This is because "peer consultants' caring and support positively affected their satisfaction, sense of security, and comfort as well as their teaching and student learning" (Blase & Blase, 2006, p. 33). Math Camp has the potential to create peer consulting opportunities. Whether it is unplanned (i.e. reflecting to another volunteer about how they think teaching the station went) or planned where the Stations Coordinator consults with the Executive Stations Coordinator for example, caring and support is happening. Preservice teachers have the potential to form a positive community and observe and help one another to be the best they can be for the students.

Preservice teachers also have the opportunity to be the best they can be for their students through reflection. According to Posner (2005), "reflective thinking [in field experience] will allow you to act in deliberate and intentional ways, devise new ways of teaching rather than always falling back on tradition, and interpret new experiences from a fresh perspective" (p. 21). The lively, innovative environment of Math Camp should encourage this type of reflective thinking for the preservice teachers. There is always room for improvement and one area that prompts the preservice teachers to reflect is in the post-camp survey. They have the opportunity to reflect on what went well and what should be fixed for next time whether it was in a station, during Brain Challenge, Math Art, etc. The preservice teachers also have the opportunity to adapt as they go and make changes to the station from one round to the next when they see fit, just like a teacher does from one class period to the next.

Theoretical Framework

The theoretical grounding for this research about BGSU's Math Camp, is Situated Learning (Lave & Wenger, 1991). The Situated Learning Theory also known as the Situated Cognition Theory, stems from the rethinking of learning done by researchers, Jean Lave and Etienne Wenger, in the late 1980s and early 1990s (Anderson, 1996). Situated Learning explores the idea of learning through doing. It is hands-on, in the field, critical thinking. Kirshner and Whitson (1997) define the theory as "apprenticeship, with its focus on authentic practice" and state that it is a more ideal mode of learning than abstract means of learning such as lectures. Lave and Wenger described this type of experiential learning as taking place in communities of practice. According to Lave and Wenger as documented by Smith (2009), "communities of practice are formed by people who engage in a process of collective learning in a shared domain of human endeavor". According to Anderson (1996), this type of learning is rarely implemented

correctly. The learners must stray away from a tutoring type of relationship and must all be actively involved in their own learning through doing (p. 9). Anderson (1996) explains that training must be done in complex social environments because little learning can be done through abstract instruction (p. 8). During situated learning, each participant in the community may play a different role but the authentic environment of collaboration, trial and error, and discussion benefits the learner. As Lave and Wenger explain, Situated Learning takes place in many different domains whether that is school, work, home, or leisure activities (Smith, 2009).

Researchers have studied preservice teachers in these Situated Learning experiences using various frameworks. The framework in which I studied my research was that of Knowles and Cole (1996). J. Gary Knowles, Professor Emeritus at the University of Toronto, and Ardra Cole, Associate Vice-President of Academic and Research at Mount Saint Vincent University, are specialists in teacher development and qualitative research. Knowles and Cole (1996) broke down the inquiry process of preservice teachers into four main components. These components are inquiry into self in relation to prior experience, inquiry into contexts and personnel roles, inquiry into relationships, and inquiry into self and ongoing professional development (p. 652). Knowles and Cole (1996) explained their framework as working in a "cyclical yet spiral fashion" (p. 651). By this they meant that the preservice teacher began by addressing the question, "Who am I as a teacher?" Next, the preservice teacher moved into reflection on the structure and system in which he/she was situated, followed by a look at relationships with participants in the learning environment. These participants included both students and colleagues. Lastly, the preservice teacher reflected once more on the self with a focus on one's own understanding of teaching and continuous development (p. 651).

In 2013, Sandi Cooper, professor and Coordinator of Mathematics Education at Baylor University, and Suzanne Nesmith, Associate Professor of Curriculum and Instruction at Baylor University, adapted the framework of Knowles and Cole to qualitatively analyze their preservice teachers in two types of field experiences. Cooper and Nesmith (2013) described a comparative study done to analyze the effects of traditional field experience versus a non-traditional math camp field experience by mathematics education majors at Baylor University. Their four adapted themes included "Focus on Self", "Focus on Contextual Features", "Focus on Relationships", and "Focus on the Teaching Process" (Cooper & Nesmith, 2013, p. 171). Overall, it was found that the math camp participants were more specific in regards to their growth and learning in their reflections than the traditional field experience participants were.

As I assessed how Cooper and Nesmith (2013) adapted and used the framework created by Knowles and Cole (1996), I read about Baylor University's version of math camp. It is important to note the differences between Baylor University's version of math camp and Bowling Green State University's version of Math Camp. First, Baylor University's camp was held during the summer for four days in a row, three hours a day. Each of BGSU's Math Camps, however, are one full day beginning at 9am and ending at 4pm. Baylor University's math camp involved the preservice teachers self-selecting a partner and together creating their own mathematical activity which they taught and adapted throughout the four days. BGSU's Math Camp, on the other hand, has a continuously growing bank of activities, created by the preservice teachers, which are ready to be selected for use at the different camps. While Baylor University's math camp served as a one-time field experience, Bowling Green State University's Math Camp is systematically structured to provide ongoing development for preservice teachers and high energy learning experiences for school age students. BGSU's Math Camps have a

stated goal of promoting K-12 students' enjoyment of mathematical problem solving and development of a growth mindset.

Methods

Participants

Since 2013, there have been 134 BGSU preservice teachers that have participated in Math Camp. I reached out to all of these individuals with the opportunity to participate in my research. The participants in this study (N = 15) represented preservice teachers who have volunteered at any number of Math Camps between 1 and 6 since the very first camp in the spring of 2013. Their participation in the study was voluntary. I sent an email out to every individual in the pool of 134 preservice teachers that had participated in Math Camp and then set up interview times with the fifteen who responded.

Context

As previously stated, these fifteen respondents from BGSU had participated in Math Camp's stated goal of promoting K-12 students' enjoyment of mathematical problem solving and development of a growth mindset. Math Camp begins each school year in the early fall with Collegiate Camp. This camp serves as both a professional development experience to train the new volunteers, as well as a retreat to build community among math education majors. Collegiate Camp is an overnight experience, beginning in the evening on Friday and lasting until late Saturday afternoon. The participants who are new to Math Camp get to experience the camp as campers, while the returning participants serve as Team Leaders, Station Leaders, General Volunteers, and Executive Leadership Team members. All of these positions are the same as the positions needed to run a kids' Math Camp.

The Executive Leadership Team is comprised of two Co-Leaders, one Energizer, and one Stations Coordinator. The Co-Leaders are the logistical heads of the camp. Some of their tasks include communicating with the school contacts, recruiting volunteers, creating the camp itinerary, and overseeing General Volunteers. The Energizer is responsible for keeping the energy up at camp, creating and facilitating energizers and ice breakers at camp, teaching the dances to the volunteers and campers, and overseeing the Team Leaders. Some tasks that fall under the Stations Coordinator position include creating mathematical stations activities, putting the student booklets together, acting as the scorekeeper during camp, creating Jigsaw pieces for camp, and overseeing the Station Leaders. The General Volunteers serve as floaters, stepping in as needed. The Team Leaders are paired up and together they lead a team of about six to thirteen students through the camp activities. While the Team Leaders travel with their teams, the Station Leaders remain at one out of the six stations facilitating that station for all six rounds.

The stations range from some lower order thinking activities to higher order thinking activities. An example of an activity that hits the content standards for a specific grade level is Go Fish, where students are moving from one five foot diameter "pond" to the other, matching mathematical content questions they pick up in the first pond to the answers they "fish" for in the second pond. Human Number Line is a life size game board that is made out of tape on the floor. Students must answer mathematical questions correctly in order to move forward spaces on the number line. Towers of Hanoi is another station that has been used at multiple Math Camps. The students must use higher order thinking to manipulate the tower of disks from one peg to another, following the rules that they cannot move more than one disk at a time and they cannot place a larger disk on top of a smaller disk. Brain Challenge, a series of problem solving questions that the teams solve together, and Jigsaw, a relay race system of equations, are also

features of every Math Camp. Each team forms a bond by playing "get to know you" games in the morning and also by learning and showing off their team dance throughout the day in between mathematical activities. Overall, the context of Math Camp is focused on teamwork, energy, and problem solving.

Analysis

Each participant answered five survey questions by filling out a paper copy of the survey with a pen. The survey asked the participants to record the number of Math Camps they have been involved with and the roles they played at each camp. The survey also asked the participants to rank their confidence as a teacher before and after Math Camp as well as rank their overall satisfaction with Math Camp. The survey questions can be found in Appendix A. I collected this survey from them and explained to them that the interview would be audio recorded and then transcribed. For the purpose of ensuring that the participants were comfortable, I told them that they could stop and think after any question and to take their time.

The interviews were semi-structured with seven questions and the possibility of follow up questions as necessary. The interview questions can be found in Appendix B. Each interview was audio recorded and then transcribed. For the purpose of clarity, I followed up with certain participants when I referenced a quote from them. Each preservice teacher was given a pseudonym with the abbreviation PST, meaning preservice teacher, and a number corresponding with the order in which they were interviewed. I will refer to the participants only by their pseudonyms to maintain confidentiality.

My coding and analysis was structured in accordance with the framework created by Knowles and Cole's (1996) first three themes; inquiry into self in relation to prior experience, inquiry into contexts and personnel roles, and inquiry into relationships. I adapted the Knowles

and Cole (1996) framework, however, by viewing it through the specific context of Math Camp. To construct my adapted framework, I posed a series of questions from the preservice teacher perspective under the three themes. My adapted framework can be found in Appendix C. Once I had constructed my framework, I began to code and analyze the interviews. First, I read through each interview multiple times, taking notes by hand. Then, based on those notes, I found 13 categories overall. From there, I placed these categories in the proper themes of my framework as I confirmed that they all fit into the domains of self-reflection, context, or relationships.

Results

The analysis of the transcribed interviews yielded a total of N=308 codes which were broken into N=13 categories. The number of categories related to each framework theme totaled N=3 for Inquiry into self in relation to prior experience, N=6 for Inquiry into contexts and personnel roles, and N=4 for Inquiry into relationships. What follows is a summary of the results separated into each category's respective framework theme.

Inquiry into Self in Relation to Prior Experience

To begin, the surveys yielded consistent results that showed an increase in preservice teacher confidence from before Math Camp involvement to after Math Camp involvement. All fifteen preservice teachers recorded that they felt more confident after having been involved with Math Camp. Question three asked the participants to rank their confidence as a teacher before they began their Math Camp involvement, and question four asked the participants to rank their confidence as a teacher after beginning their Math Camp involvement. The mean for PST confidence before Math Camp involvement was N=1.93 on a scale from 1 (not at all confident) to 4 (very confident). On this same scale, the mean for PST confidence after Math Camp involvement was N=3.2. In addition to the surveys, several of the preservice teachers spoke to

the confidence they gained through Math Camp during their interviews. The concept of teacher efficacy arose multiple times (N = 28) throughout the interviews and PST 7 shared, "I feel like I was very, very nervous whenever I was in front of people before Math Camp. And I wasn't really sure of how to teach a lesson or explain something. But Math Camp really helped me gain confidence." Other common codes that occurred in the interviews were in the roles the preservice teachers felt they played in the context of Math Camp. The role of guide or coach appeared N = 11 times while the role of leader or role model appeared N = 16 times throughout the interviews. PST 8 and PST 15 stressed the importance of acting as a coach or guide when the students were problem solving. They said that they used guiding questions and assisted the students in learning, but they did not just tell the students what the answers were, nor did they tell them what steps to take in solving the problems. PST 5 discussed the importance of being a role model through behavior as well as attitude. He explained that it is essential to model respectful behavior for the students as well as show them that they can have fun doing math. PST 1 reflected on her role as a leader saying, "The other leaders I have been working with have helped me become a better leader." In summary, the PSTs gained confidence in their teaching abilities and perceived their roles as guide, coach, role model, and leader.

Inquiry into Contexts and Personnel Roles

A wide variety of connections were made between the context of Math Camp and the context of a mathematics classroom. A strong connection PSTs made was between the planning and instructional processes of Math Camp volunteers and those of classroom teachers (N = 34). For example, PST 4 compared the role of Station Leader to the role of a teacher because as a Station Leader one must, "grab the attention of the students, explain the instructions and goals, hand out the materials, and then engage them in problem solving." PST 5, PST 11, and PST 14

emphasized how much planning goes into Math Camp so that the day runs smoothly, including having extra activities just in case which they compared to lesson planning. Taking the connections between the teaching process of Math Camp and the teaching process of a class a step further, the preservice teachers also suggested ways in which they will use and adapt Math Camp stations and activities in their future classrooms (N = 37). For example, PST 10 said, "I definitely would take the Leap Frog game from Math Camp to my classroom because I'm an Early Childhood Major. The Go Fish game would be a good way to get the students out of their seats while practicing math facts or even spelling words. A lot of different content can be used to modify it." The preservice teachers also commented on the higher order thinking that Math Camp induces based on the problem solving activities used (N = 17). Another key component of education that the preservice teachers learned through Math Camp is classroom management (N = 15). PST 4 explained, "Just the simple call back of "Math Hey" is a really good classroom management technique that I wouldn't have known if I didn't do Math Camp." The last two categories that fall under the framework theme of context and personnel roles are energy and attitude (N = 27) and the notion that math can be enjoyable (N = 16). Majority of the preservice teachers commented on the positive, exciting energy at Math Camp. While they recognized the difference in the Math Camp context and a classroom context, many of them did take the belief that they have the capability to make math enjoyable for their students like they do at Math Camp. PST 7 spoke to this by stating that the Math Camp volunteers can carry their positive, energetic attitudes from Math Camp into their future classrooms.

Inquiry into relationships

The PSTs discussed two different types of relationships; those that they formed with the students and those that they formed with their peers. They also connected these relationships to

how they perceive their future relationships as teachers. First, some of the preservice teachers noted the realizations that patience and careful observation of students are essential when teaching (N = 14). For example, PST 10 shared, "I really learned about the patience that it takes when students are trying to solve a math problem, not trying to give them the answer right away." Others shared this sentiment as well when they discussed their role as a guide or coach. In addition to patience, some preservice teachers also reflected on the ethic of care that they want to have for the students at Math Camp as well as in their future classrooms (N = 9). PST 6 said, "I want to get to know my students and I want them to know that I care. I want to be that teacher they can go to for anything." This concept of getting to know students falls under the category of building rapport (N = 39). PST 13 confided that he used to be very worried about building rapport with students until he gained practice through Math Camp. He reflected, "I'm able to make certain connections with some students and if I can do that in that short amount of time, it's helped me realize that it may be not quite as hard as I once thought." In addition to building relationships with students, the preservice teachers also found value in building relationships with their Math Camp colleagues with whom a common goal of educating children is shared (N = 45). Several preservice teachers referred to their Math Camp peers as people they can share ideas with and learn from just like they hope to with their future colleagues. PST 13 summed this up by saying, "Ultimately your goal is all the same and you can help each other improve."

Connecting Results with Literature

As I read the literature which I referenced in my Literature Review, I looked for potential connections between Math Camp and the classroom. While I found many potential connections, I was unsure of whether or not my peers would make these same connections. My research produced several significant results that relate to the literature out there about what great teachers

do. In addition to that, my research revealed a few powerful anecdotes and personal testimonies to how Math Camp changed the lives of the PSTs.

PST 11 shared her personal story of how Math Camp "gave teaching math a new light" for her. Before Math Camp, she was questioning becoming a teacher and contemplating switching career paths. However, after having experienced multiple Math Camps, she decided that teaching is exactly what she wants to do. PST 11 reflected:

> I think honestly my life would be different without Math Camp because before, I was really questioning becoming a teacher. What I've learned at BG was superficial situations that *could* happen in school, but Math Camp showed me what a real classroom would be and what I would have to do to help prepare these kids. If you put these students in the right setting, then they can learn anything, and take full advantage of what they are working toward. Math Camp gave me new light on what it means to be a teacher; it's not about handing them a textbook or lecturing them about math, but about giving the students a chance to see that math can be fun and they can learn just about anything if they put their minds to it. I found a new love for teaching, and Math Camp helped pave this new trail for me.

PST 11 is not the only Math Camp volunteer who gained a level of certainty and confidence in teaching. In fact, as previously stated, 100% of the surveys showed that the PSTs gained teacher efficacy through their Math Camp experiences. Through deeper analysis, I noted that each PST had had experience with at least two different Math Camp roles and that twelve out of the fifteen research participants had been a part of three or more camps. The three research participants who had only been a part of two camps were first year students who so far had only had the opportunity to attend two camps. The fact that all fifteen preservice teachers

have continued to be a part of Math Camp is not a surprise considering the fact that 100% of the surveys yielded a 4/4 for overall satisfaction with Math Camp. The continuous practice that Math Camp gives the PSTs may be directly linked to the confidence that they have gained. For example, PST 7 reflected, "Math Camp really helped me gain confidence…And I think that's only increased with the more I've been involved with it since then." This type of confidence is defined as teacher efficacy or the "beliefs in one's capability to organize and execute the courses of action required managing prospective situations" (Bandura, 1997, p. 2).

A study was conducted in 2015 on the relationship between mathematics teacher efficacy and student efficacy and academic achievement in math. According to Chang (2015) the results yielded that "teacher efficacy has a strong impact on student learning and achievement" (p. 1309). In addition to student success, the study found that higher teacher efficacy resulted in higher student efficacy (Chang, 2015, p. 1315). This means that the more confident a teacher is in his/her ability to effectively teach and manage his/her class, the more confident a student will be in his/her math ability.

PST 13 gained confidence in his ability to build rapport with students. As Dr. Rosemary Wong explained, the positive greeting and interaction between a teacher and student at the beginning of the school day could be the only positive interaction that child receives all day ("Developmental"). PST 13 spoke to these types of positive interactions by saying, "I'm able to make certain connections with some students and if I can do that in that short amount of time, it's helped me realize that it may be not quite as hard as I once thought."

Just like PST 13 realized he could reach individual students and PST 11 realized she could impact students' lives through Math Camp, PST 3 experienced the power that the ethic of care has on students. She formed a strong connection with a student who was extremely

disengaged at first. Taking the time to talk to the student one-on-one and give him some extra attention and care, she got him to open up. The dialogue went from discussing things they had in common such as watching YouTube videos to the student confiding that he lacks a good relationship with his father. After this conversation that came from a place of genuine care from PST 3, the student began to join in with the team dance and math games. PST 3 reflected, "That kind of connection and the way I approached him, that's what I would bring into my classroom."

Educational philosopher, Nel Noddings, would describe the attitude and actions of PST 3 as the ethic of caring in the classroom. While Noddings (1988) pointed out that caring is still a rather new concept in the context of the history of education and that it is connotatively feminine, she also countered those ideas. According to Noddings (1988), "Moral education, from the perspective of an ethic of caring, involves modeling, dialogue, practice, and confirmation" (p. 222). Great teachers care about their students' academic achievement but more importantly they care about each individual student's personal development.

Teachers can and should show that they care through positive comments and encouragement, inquiry in their students' lives, and purposeful dialogue to acknowledge bad behavior and prevent it in the future. In the context of Math Camp as well as 21st century schooling, I believe that Noddings (1988) would agree that teachers can teach caring by creating a positive, safe, inclusive learning environment where cooperative groups work together to accomplish a goal as a team.

The concept of cooperative learning groups working together in a safe, inclusive environment under the supervision of the teacher is where the idea of classroom management comes into play. Several PSTs reflected on the classroom management practice with which Math Camp provided them. Wong and Wong (2014) claim that classroom management is one of

three key aspects that influence teacher effectiveness, along with lesson mastery and positive expectations (p. 2). Classroom management is defined as "consisting of the practices and procedures a teacher uses to maintain the environment in which instruction and learning can take place" (Wong & Wong, 2014, p. 5). PST 1 explained classroom management in the context of Math Camp as "expectations that the students need to be following throughout the day", which she said also are present in a classroom. With classroom management being such an essential skill for a teacher to have, it is valuable that the PSTs are recognizing their practice with it through Math Camp. PST 9 referred to learning classroom management through Math Camp as being prepared by real life situations. Being prepared by real life situations *for* real life situations is the essence of the Situated Learning Theory. While Anderson (1996) claimed that Situated Learning is rarely implemented correctly, Math Camp appears to be a context in which Situated Learning succeeds.

As previously stated, collaboration and learning from colleagues was a topic that arose N=45 times throughout the interviews. This shows that the PSTs identify and appreciate the benefit of peer consultation. As Blase and Blase (2006) explained, peer consultation takes place effectively when teachers develop productive, respectful communication among themselves in order to learn and transform their teaching practices (p. 30-31). Peer consultation improves Math Camp as a whole according to the PSTs, therefore, benefitting the students.

As PST 11 stated, "If you put these students in the right setting, then they can learn anything." PST 11 demonstrated an understanding of context and environment which several PSTs commented on during their interviews. A common perception was that Math Camp is high energy and exciting, giving students a passion for mathematics and problem solving even if just for that day. As mentioned earlier, PST 7 believes that she and her Math Camp colleagues can

bring that positive, energetic attitude of Math Camp into their future classrooms. Then, as PST 11 suggests, the students will be capable of the problem solving skills, enthusiasm, and confidence that they exemplify at Math Camp.

Implications

As I reflected on all of the data, a few implications surfaced as well as a few questions. First, it is evident that Math Camp has had a positive impact on the PSTs from Bowling Green State University. Due to the positive results of Math Camp, there has been talk of spreading Math Camp to other universities as well as creating other content based camps at BGSU, such as Language Arts Camp or Science Camp. This makes me ask, what could this mean for the future of preservice teacher education? If further research shows that the Math Camp experience is more beneficial for the PSTs than traditional field placement, what could this lead to?

One interesting discovery I made while analyzing my research is the potential correlation between the perceived role of the PST and their comfort level or confidence. A couple of PSTs stated that they have gained more confidence through Math Camp than they did through their field placements. Also, 100% of the surveys and interviews revealed an increase in teacher efficacy among the participants. I believe there are two reasons for this phenomenon. First, I think that because the PSTs feel like a hybrid between a college student and a teacher, they are more comfortable in their roles. Since they perceived themselves as leaders, role models, coaches, and guides, they could have been more comfortable with trying new teaching techniques and learning than they typically are when they step into their field placement schools and have to enter into teacher mode. In addition to that, the PSTs are also a part of a "professional family" support system, which I believe leads to comfort and confidence.

Another main discovery I made through my research is that teachers have power. Like Whitaker (2013), I believe in people, not programs (p. 7). Great teachers can make a difference no matter where they are, what they have, or what they do not have. PST 11 reflected, "I really do think we can change kids' lives." In the ever changing education system of standardized tests, common core, curricular demands, and funding issues, it can seem as though teachers have the least amount of power. However, Math Camp shows that it is the teachers that make the difference and if a few dozen Math Camp volunteers can change lives in just one Saturday of teaching, they can most definitely change lives in their future classrooms.

The lens through which I viewed the research results was specifically categorized. I was focused on the themes of Inquiry into self in relation to prior experiences, Inquiry into context and personnel roles, and Inquiry into relationships. This framework influenced what I was asking during my interviews as well as what I was coding from the transcriptions. While the framework helped me maintain structure, I did not know what specific codes would be present. I did, however, find some connections between the themes Knowles and Cole (1996) discovered in their research as well as in the themes Cooper and Nesmith (2013) uncovered when using their adapted version of the Knowles and Cole (1996) framework.

Knowles and Cole (1996) focused their research on uncovering why certain field experiences do not provide quality educational opportunities for PSTs and asking questions regarding how teacher education programs can be improved. Knowles and Cole (1996) stated, "Most field experiences are too short, too structured, too focused on the immediacy of classroom action, and too detached from the personal; consequently, they often provide little more than superficial, "rites of passage" experiences" (p. 654-655). Therefore, the PSTs are not gaining a strong sense of self as teacher because the experiences are not personally impacting them (p.

654). The results in this research study, however, point to the fact that there is something different about Math Camp, because the PSTs who were interviewed spoke to the strong identities and personal growth they gained from Math Camp. Revisiting Knowles and Cole's (1996) statement, perhaps it is the less structured and more personal approach of Math Camp that makes this impact.

Knowles and Cole (1996) also spoke to the important role that context plays in a field experience, because according to their research, placing PSTs in single classrooms, where they are focusing their attention solely on the techniques of teaching, perpetuates a feeling of isolation and narrow perceptions of what teachers actually do each day (p. 657). The Math Camp context, differing from a traditional classroom setting, provides PSTs with the opportunities to collaborate, observe other teachers, interact with different students, and juggle various tasks such as instructional, management, and engagement responsibilities.

Lastly, a striking piece of information revealed by Knowles and Cole (1996) was that according to university mentors in various studies, "most preservice teachers who fail are unable to determine and respond to students' needs and relate to students well enough to engage their interest and participation" (p. 661). With rapport being an integral part of effective teaching, the reflections that the PSTs had about building rapport at Math Camp (N=39), hold great significance. Just as I adapted the way I used the Knowles and Cole (1996) framework to fit the context of Math Camp, Cooper and Nesmith (2013) adapted the same framework for their comparative field experience study. The use of similar framework may have led to the similarities in our results.

Cooper and Nesmith (2013) described a comparative study done to analyze the effects of traditional field experience by math education majors and math camp field experience by math

education majors at the same private university. First, when focusing on contextual features, Baylor University math camp participants reflected on the possibility of setting up a classroom like math camp stations while the field experience participants listed the pros and cons of how their assigned school and classroom operated structurally (Cooper & Nesmith, 2013, p. 173-174). The concept of adapting the Math Camp activities to be used in a traditional classroom appeared in both Cooper and Nesmith's (2013) research as well as in my research, N=37 times.

According to Cooper and Nesmith (2013), in the theme of relationships, both groups of pre-service teachers recognized the variance in student responses to their teaching but when discussing the students' content knowledge, the math camp participants were able to provide more specific observations. Patience and Observation is a category that appeared N=14 times in my research, pointing to the fact that the Math Camp environments at both universities influenced more careful observation from the PSTs than traditional field experience. The Baylor University math camp participants also gained insight into instructional techniques (Cooper and Nesmith, 2013, p. 174-175). BGSU's Math Camp volunteers commented on the instructional techniques they learned and practiced as well as the planning that is involved (N=34). Lastly, according to Cooper and Nesmith (2013), the math camp participants left the experience feeling confident in their ability to teach and take what they learned to apply it to future teaching experiences. The sense of teacher efficacy that the PSTs at both Baylor University and Bowling Green State University gained through the Math Camp experience, was a powerful outcome.

The connections between the research done by Knowles and Cole (1996), Cooper and Nesmith (2013), and myself show the guidance that the framework had on the results. The common categories and striking realizations all fell into the themes of self, context, and relationships as experienced by PSTs. Categories that were not addressed or uncovered, for

example, were PSTs' views on/experiences with standardized testing or Common Core, or building relationships with parents. Since these categories did not fit into the framework that Knowles and Cole (1996) created, the interview questions I asked did not touch the topic of testing and therefore, the results did not yield information on this topic. The framework did, however, allow for several avenues of PST reflection that shed light on the teacher development program under consideration.

Limitations

Although this research study uncovered and addressed several components of preservice teacher development through the context of Math Camp, there were limitations to the study. First, the sample size was small with only fifteen out of one hundred thirty-four Math Camp volunteers participating in the research. Secondly, these participants were all voluntary participants and not randomly selected. This may have an effect on the results when compared to the actual preservice teacher population sample who have participated in Math Camp. Due to the absence of risk as well as the absence of compensation, however, the fifteen research participants were in a space to speak honestly and freely. It is undetermined whether or not the research sample accurately represents the entire population sample, but the evidence yielded from the research sample should not be discounted.

Another limitation in this research study is the possibility of unintentional influence from the survey on the interview in regards to teacher efficacy. The fact that the PSTs were explicitly asked to rank their confidence before Math Camp and after Math Camp on the survey, may have provoked ongoing thought about teacher efficacy during their interviews. In other words, if the survey was not given prior to the interview, some PSTs may not have addressed their increased level of confidence as a teacher which appeared N=28 times.

Conclusion

Overall, this research revealed that preservice teachers positively perceive their professional development as a teacher through Math Camp involvement, as well as how they plan to use that development in the future. Several connections were made in the themes of self-identification, context, and relationships between Math Camp and a traditional classroom. These connections fell into N=13 categories. The results showed unity with the literature involving multiple aspects of education, including classroom management, rapport, planning, and collaboration to name a few. This study revealed significant ways in which preservice teachers have been impacted by Math Camp, and that information can be used to assess what other components of camp and teacher education in general can be adapted to better serve the needs of preservice teachers. Also, the participants in this study may have benefited personally from the study because the questions may have caused them to reflect in ways they never have before. This reflection can allow for the legacy of Math Camp to live on as the participants begin their first years of teaching.

Appendix A:

Math Camp Volunteer Survey

1) How many Math Camps have you been involved in?

2) What role(s) did you play in Math Camp? (Leadership, General Volunteer, Team Leader, other)?

3) How would you rate your confidence as a teacher before your Math Camp experience? Check the box that best describes your confidence level as a teacher *before* your Math Camp experience.

Not at all confident (0)	**Minimally Confident (1)**	**Somewhat Confident (2)**	**Mostly Confident (3)**	**Very Confident (4)**

4) How would you rate your confidence as a teacher after your math camp experience? Check the box that best describes your confidence level as a teacher *after* your math camp experience.

Not at all confident (0)	**Minimally Confident (1)**	**Somewhat Confident (2)**	**Mostly Confident (3)**	**Very Confident (4)**

5) How would you rate your overall Math Camp experience? Check the box that best describes how you feel about your overall Math Camp experience.

Not at all satisfied (0)	**Minimally Satisfied (1)**	**Somewhat Satisfied (2)**	**Mostly Satisfied (3)**	**Very Satisfied (4)**

Appendix B:

Semi-Structured Interview Protocol

1) Do you see any correlations between your involvement with Math Camp and your future as a teacher? (Can you elaborate on that?)

2) How is the teaching process of Math Camp similar or different to the teaching process of a class?

3) How did you conduct yourself as a teacher in your Math Camp volunteer role? How is this similar or different to how you will conduct yourself as a teacher in your future classroom? Why?

4) What (if anything) would you take from Math Camp to your future classroom? Why?

5) Did you/How did you establish rapport with the math camp students? Is this similar or different to how you would establish rapport with students in your classroom? Why?

6) Do you think relationships with the other Math Camp volunteers are beneficial? Do you see any connections between your relationships with them to your relationships with your future colleagues? If yes, can you speak to those connections?

7) Has math camp taught you anything about yourself as a teacher that you did not know before?

Appendix C:

Adapted Framework in Math Camp Context

Inquiry into self in relation to prior experience	Inquiry into contexts and personnel roles	Inquiry into relationships
▪ How do I act at Math Camp? ▪ What role do I take on at Math Camp? ▪ What impact do I have through Math Camp? ▪ What impact does Math Camp have on me? ▪ What have I learned about myself? Will I carry what I have learned into the future?	▪ How is Math Camp similar to a math class? ▪ How is Math Camp different from a math class? ▪ What will I take from Math Camp into my future classroom? Why?	▪ How do I establish rapport with the students at Math Camp? ▪ Do I see any connections between establishing rapport at Math Camp and establishing rapport in my future classroom? ▪ How do I view my relationships with my peers at Math Camp? ▪ Do I see connections between my relationships with my Math Camp peers to my relationships with my future colleagues?

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