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REVIEW ARTICLE

THE IMPACT OF THE SCHOOL FIELD EXPERIENCES (PRACTICUM III) ON THE PERCEPTIONS OF ECAE PRE-SERVICE ELEMENTARY TEACHERS ABOUT MATHEMATICS

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ABSTRACT

Pre-Service Elementary Teachers who study at Emirates College for Advanced Education (ECAE), Abu Dhabi, UAE, have opportunities to actively participate in all aspects of school life through the Practicum program. This program begins during the first year with observations in schools (Practicum I), while the next three years (Practicum II, III, and IV), student teachers start to teach aspects of lessons, small group lessons and then teach full lessons, until finally taking responsibility for teaching several classes over a 10 week period during their final year of internship in the schools (Students' Handbook of ECAE, 2013). The ECAE students study four years to be elementary teachers who will teach mathematics, science, and English in English Language. The main objective of the Practicum III experiences for the students is to establish a strong foundation in the teaching, learning and assessment cycle. Students will plan, implement, assess, evaluate and reflect on lessons implemented in mathematics, science, and English. They will implement a variety of instructional strategies, prepare appropriate assessment tasks and develop reflective thinking skills in the planning and delivery of lessons. All lessons should use technological tools and formats including the communications between the students themselves, schools mentors, and college mentors. The main goal of this study was to investigate the perceptions of the ECAE students who finished their field experiences (Practicum III) about Mathematics. The researcher used an interview which consisted of nine questions with all students in the sample. The students' perceptions were varied from low to large impact of the Practicum practices on their views about mathematics and how can they teach the mathematical concepts to the elementary students. The results of the study highlighted the importance and the power of the field experiences (Practicum III) in schools to develop the students' mathematical knowledge and skills which are needed for the effective teacher. The researcher summarized the themes and sub-themes concluded in the results.

INTRODUCTION

The main aim of teacher education programs is to develop the knowledge, skills and attributes of pre-service teachers in order to prepare them to teach effectively in the schools and meet the challenges of classrooms and workplace in the technological era. Teachers, in general, play a significant role in the educational reform (Darling-Hammond and Berry, 1998). They also help learners in the learning process and accessing knowledge (UNESCO-IBE, 2004). One of the critical features in any teacher education program is school experiences which can be expressed as student teaching, practicum, or teaching practices. According to Hill and Brodin (2004), the practicum is one of the main components of the teacher education programs at ECAE in UAE. Saifullah *et al.* (2013) conducted a study to explore the effect of a reformed teaching practicum on the professional development of prospective teachers in terms of their pedagogical beliefs and skills.

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The sample consisted of 28 students in the B.Ed. program at the University of Gujrat. The researchers used three instruments in their study: Teachers belief inventory, classroom observation, and an interview. The results concluded visiting the schools by pre-service teachers changed positively their beliefs about overall environment, discipline and behavior of the teachers in the school. In addition, regular daily and weekly meetings with cooperative teachers and supervisors had a strong effect on the pedagogical beliefs and skills of the pre-service teachers.

Ambrose *et al.* (2004) completed a study on beliefs of elementary school teachers about mathematics and mathematics learning. The study included more than 150 participants which utilized qualitative data which was later quantified to enable them to make comparisons. Beliefs, since they are subjective, are difficult to measure so the researchers developed a computer based survey to assess the beliefs. It was determined after a pre/post assessment of the survey with the teachers that the survey would be effective in determining any

belief changes the teachers might have made between the dates of the assessments. Pajares (1992) felt the teachers might be unaware of the beliefs which shape their activities. Typically mathematics education researchers utilize a case study methodology to determine the teachers' beliefs which furnishes a wealth of information for researchers. Ambrose *et al.* (2004) However, a case study with the magnitude of 150 participants would be far too time consuming to complete in a timely manner. The researchers wanted to assess the prospective teachers years prior to entering the classroom. The ultimate goal of the survey was to determine what might affect prospective teachers' subsequent learning of mathematics which included their beliefs about mathematics and mathematics understanding and learning. The ultimate goal of the belief survey was to determine if it was subtle enough to obtain a gamut of scores on each of the beliefs and if the survey would be able to accurately measure their belief changes. The pre-test survey was administered in the first of four mathematics courses for prospective elementary school teachers at the beginning of the course and the posttest at the end of the course. A final score for each belief was a combination of individual scores from the rubric. The scores were ordinal since the sum of the scores was not used. Then a rubric-of rubrics system was developed which could be applied to each belief. Developing the rubric for this study was the most time consuming component. There were seven beliefs measured by the survey. Four beliefs, as an example included: "understanding mathematical concepts is more powerful and more generative than remembering mathematical procedures; if students learn mathematical concepts before they learn procedures, they are more likely to understand the procedures when they learn them. If they learn the procedures first, they are less likely ever to learn the concepts; children can solve problems in novel ways before being taught how to solve such problems. Children in primary grades generally understand more mathematics and have more flexible solution strategies than their teachers, or even their parents expect; during interactions related to the learning of mathematics, the teacher should allow the children to do as much of the thinking as possible." The researchers utilizing the survey discovered there were few high scores on the pre-test, but variations was measured and on the post-test low and high scoring prospective teachers were obtained. A major strength of the survey was a result of utilizing video clips and learning situations to create contexts to enable the teachers to respond in their own words rather than a multiple choice option. An example of a video clip depicted a child trying to complete a problem, but the teacher was overly directive and focused the child's attention on counting cubes instead of honing in on the understanding of the relationships among the quantities in the situation. She could have provided prompts which were not specific to the particular problem to ascertain whether the child could solve the problem with less assistance.

Sixty-five preservice elementary teachers' math anxiety levels and confidence levels to teach elementary mathematics and science were measured. The results suggest low math anxious preservice teachers are more confident to teach elementary mathematics and science than are their peers who have higher levels of math anxiety (Bursal and Paznokas, 2006). Math anxiety appears to be an example of a major problem among preservice teachers' beliefs and attitudes on their classroom teaching (Blosser and Howe, 1969; Stevens and Wenner, 1996; Tosun, 2000; Victor, 1961; Wenner, 1993). Math anxiety appears to be a major issue with preservice teachers since a significantly larger percentage of them was reported to experience higher levels of math anxiety than other undergraduate university students (Harper and Daane, 1998; Hembree, 1990; Kelly and Tomhave, 1985). The subjects of the study were sixty-five juniors and seniors from a midsized U.S. university currently enrolled in three methods courses honing in on methods for teaching elementary mathematics, science, and social studies. There was no manipulation involved in the study or any type of treatment. The students involved were predominantly female so no differentiation was made due to gender. The subjects were working to obtain their K-8 endorsement from the state and attended weekly practicum experience in the schools throughout the semester.

Three instruments were used at the end of the semester together to obtain the data for the study: the Revised-Mathematics Anxiety Survey (R-MANX), the Science Teaching Efficacy Belief Instrument (STEBI-B; Riggs and Enochs, 1990), and the Math Teaching Efficacy Belief Instrument (MTEBI; Enochs *et al.,* 2000). The students were asked to complete the R-MANX to determine their mathematics anxiety levels. The R-MANX contains 30 statements which requires a response from 1(no anxiety) to 5 (high anxiety) Likert scale. The statements describe a typical daily life with academic situations which require mathematical thought and tasks which are rated giving the degree of anxiety participants believe they would actually experience in the scenario. The possible scores ranged from 30 to 150 with the higher score revealing the higher level of mathematics anxiety. The test items were developed by the authors from the 45 item Mathematics Anxiety Survey (MANX). The reliability coefficient of the parent instrument has been reported as .91 (Erktin and Oner, 1990). To determine the validity of the MANX survey, Erktin and Oner (1990) conducted a study with 119 subjects with a result of a Pearson product moment correlation coefficient of .45 ($p < .0001$) between the student scores from the MANX and Richardson and Suinn's (1972) 98 item Mathematics Anxiety Rating Scale (MARS). Cronbach's alpha for the R-MANX was calculated as .90 in this study.

Personal efficacy subsets of the STEBI-B and the MTBI were given after the students completed the math anxiety survey to assess their beliefs regarding science and mathematics instruction in elementary classrooms. The teachers were given nine statements from the parent instruments and asked to rate them with a 1 (strongly disagree) to 5 (strongly agree) Likert scale. Possible scores ranged from 9 to 45 with the higher the score, the higher the efficacy. The efficacy beliefs indicate the extent the teachers believe they have the capacity to affect the students' achievement positively. The internal reliability alpha coefficients of the parent instruments were calculated to be .90 for STEBI-B (Riggs and Enochs, 1990) and .88 for MTEBI (Enochs *et al.,* 2000). Wenner (1993) noted, "The STEBI is a valid and reliable tool for studying elementary teachers' beliefs toward science teaching and learning. The Emirate of Abu Dhabi in United Arab Emirates (UAE) has established Emirates College for Advanced Education (ECAE) to be a new

world class institution and regional leader in teacher preparation, educational research and school development. ECAE offers the B.Ed. Program as one of other educational programs in which students study four years to be prepared to teach math, science, and English subjects in the English language for students in K-5 schools in Abu Dhabi.

All students (pre-service teachers) at ECAE have to participate in all aspects and activities of the school life through the Practicum program (student teaching) during the four years of this study. This program begins with observations in the first year and over the next three years student teachers start to teach aspects of lessons, small group lessons and then teach full lessons in math, science, and English for K-5 students until they take responsibility for teaching several classes over a 10-12 week period during their internship in the schools which is their fourth year at ECAE.

In the first year of the B. Ed. Program, students at ECAE have to finish the Practicum I Program which focuses on observations and interviews with teachers, administrators in public and private schools. In addition to writing reflection papers on all experiences they face in the visited schools and classes. Each student has to visit one public school for 5 times (one day for five consecutive weeks), and do the same activities at one private school (ECAE Students' Handbook, 2013). There is a college mentor for 3-5 students and the role of this mentor is giving feedback and supervises those student teachers. There is also a school teacher mentor for each student and the role of this mentor is to guide and help the student teacher during her/his visit to the school. While participating in the Practicum I period, pre-service student teachers practice several experiences by observing elementary students' school life in order to gain an understanding of the functions and features of schools, the role of a teacher, the life of the school learner, and the learning environment.

In the second year, the Practicum II Program takes place for pre-service student teachers at ECAE. The main objectives of this program experiences are to participate actively in classroom and school activities and routines, establish a stronger relationship between theories of learning and the practice of teaching, to help students understand the varied roles and responsibilities of the teacher, to allow students opportunities to gain confidence as teachers in training, and to develop their emergent teaching and critical reflective thinking skills so they become reflective practitioners (ECAE Students' Handbook, 2013). Darling-Hammond, L. stated, "Schools of education alone cannot prepare teachers well. It is critically important to develop a community for preparing teachers." (2006).

The main objective of the Practicum III experience in the third year is for the students to establish a strong foundation in the teaching, learning and assessment cycle. Students will plan, implement, assess, evaluate and reflect on single lessons and in a series of three sequential lessons in mathematics, science, and English. Students will engage in planning and teaching lessons with reference to Abu Dhabi Educational Council (ADEC) curriculum documents. They also will implement a variety of instructional strategies, using technological tools, prepare appropriate assessment tasks, and develop reflective thinking skills in the planning and delivery of lessons. Rule *et al.* (2007) analyzed the pre-service teachers' reflections after teaching some lessons in the practicum program and the results showed they learned a great deal about the essentials of teaching from these experiences. Their focus was: what motivates the elementary students, how they learn, how to improve the teaching skills to teach students in a better way, along with observations of students' skills, behaviors, and feelings.

During these practical placements in schools, student teachers are guided, assisted and supervised by visiting College faculty mentors and supported by school mentor teachers in the schools (ECAE Students' Handbook, 2013). In the Practicum III program, all student teachers, college mentors, and school mentors have specific roles and they all work together for the development and establishment of a strong foundation in the teaching, learning and assessment components. As a result of the program, students will be able to plan, implement, assess, evaluate, and reflect on single lessons and on a series of three sequential lessons in English, mathematics and science.

This study investigated the impact of the field experiences in the third year (Practicum III) on the perceptions of pre-service Elementary teachers about Mathematics. It will contribute to the knowledge of teacher education programs in the area of practicing the teaching and learning theories and it is the first conducted study on Emirati students in the processes of evaluating teacher education programs in UAE institutions. This study was planned to answer the following research question: What is the impact of the school field experiences (Practicum III program) on the perceptions of pre-service Elementary teachers about Mathematics and its teaching ?

Procedure (Methodology)

The researcher used the qualitative approach in this study through conducting an interview as the instrument of the study. The interview consisted of 10 questions and took place in the ECAE campus with all the students in the sample. The population of the study was all pre-service teachers who are studying in the B.Ed. Program in the Teacher Education Colleges in UAE who have the Practicum Program in their study. The sample of the study was all students at ECAE who finished the Practicum III Program at schools as field experiences in the Academic Year 2014/2015. There are some limitations of the study:

- The study investigated only female students from Emirates College for Advanced Education (ECAE), Abu Dhabi, UAE. So, the results of the study are difficult to be generalized on students outside the population of this study.
- The researcher selected only the ECAE students in the Practicum III program from all other practicum activities of ECAE. So, the generalization of the results of this study might not be accurate.

The researcher used "**Wordle**" (Word L) which is software for generating "word clouds" from text which you provide. The clouds give greater prominence to words which appear more

frequently in the source text. You can tweak your clouds with different fonts, layouts, and color schemes. The images you create with Wordle are yours to use however you like. You can print them out, or save them to the Wordle gallery to share with your friends (http://www.wordle.net/).

Results of the Study

The researcher collected the data from the interviews with all students in the sample and analyzed them to get themes and sub- themes. The following are the results retrieved from the analysis of the collected data:

1. **After your practicum experience, what has changed in your perceptions toward mathematics and teaching it?**

There were six themes retrieved from this question and the researcher provided some samples of the students' responses to each question of the interview:

1A Planning was essential to having a successful learning experience for the students.

"To be more aware of the different abilities and needs of your students and work accordingly."

1B Math teachers should practice all the time with math problems to be prepared to teach appropriately and not make any mistakes.

"Teaching math needs a lot more than knowledge. It needs more effort from the teacher to deliver the information to the students."

1C I became more interested in teaching and doing more activities with students since math can be fun and easy to learn. "I love mathematics and I love teaching it because it's easy."

2. **Describe your memorable teaching moments while teaching mathematics in your practicum. Why does this stand out in your mind?**

The results for this question contained seven themes and here are some samples:

2A Students are working at a grade level lower than where they should be working.

"My moment was sad because I discovered a student in grade three who couldn't recognize the numbers, count and she doesn't know addition and subtraction symbols! Who is more responsible: the teacher, school, or parents?"

2B Students are working at a much higher level than expected.

"I was amazed about the ability of the students to learn. I was shocked when I saw students in the second grade learning lessons I had learned in the sixth or seventh grade."

2C Differentiation in my classroom

"In the beginning I was under pressure because I was worried about teaching the fourth grade. The stress decreased because it wasn't hard like what I thought it might be and I realized I just needed to practice and make a strong plan for the differentiation in my classroom."

3. **Did you face any challenges in teaching mathematics and how did you overcome them?**

The results for this question contained four major themes with some sub- themes for each one, and here are some samples:

3A Lack of knowledge by the adult student in the practicum

"Yes, I forgot the multiplication time's tables and the division answers because I depended upon the calculator and have for long time."

3A1 "To overcome them I use YouTube Learning videos and other web sites because no one has any time to teach me and I should depend on myself now."

"Yes, my challenge is I am confused with mathematics so much. During the practicum I tried the safe way because I didn't know how to work out the numbers in equations."

3A2 "Finally, I overcame all these fears. The teacher in the school helped as well as a college teacher."

3B Language barrier

3B1"Yes, when my students answered my questions in Arabic."
3B2 "By using a traffic light system I managed to control this after one week."
"Yes, because I am an Emirati teacher and the students want me to teach in Arabic and at the beginning they refused to participate with me in English and were difficult to control."

3B3 "I explained to them my job is to teach you math in English and you have to participate with me. I make the rules for the class in order to manage control."

3B4"The problem which I faced was my students cannot understand everything in English."

3C Lack of supplies and materials

"Yes the school did not have enough resources and I had difficulties using technology because a school was not updated with the latest version of the interactive smart board so I had to connect it with my laptop."

3C1 "The classroom teacher helped me in connecting the devices with each other."

3C2"Yes, I had challenges and teaching mathematics since the school does not offer a copy machine. This makes teaching harder because we need to have worksheets during the lesson."

3C3 "I did not overcome them, because it is something bigger than me. The teacher also suffers from this problem. I think the school's department should solve it, and rearrange their budget".

3D Low level of students (children) in the classroom

3D1"Yes, when I taught subtraction many of the students add the numbers but did not distinguish between plus and minus. While using fractions a lot of the students did not know the ¼ and ¾ they only knew the half fractions."

3D2 "My mentor teacher helped me by asking the students to draw when they were confused between multiplication and addition. Some problems I use simpler ways to explain although they spent more time away from the class instruction as a whole."

3D3 "The first few days I was a bit nervous because I was assigned to teach two higher grades of fourth and fifth and I am used to teaching kindergarten and grades two and three. The second issue was although students are in grades four and five their level was similar to students in grades one and two and I think which is because of either your teacher or the curriculum."

3D4 "I tried my best to encourage them by using attractive materials such as charts, flash cards, and colored papers so they did not feel bored. In addition, I tried my best to simplify the language I am using so they understand. I also suggested they tried differentiation in some lessons and centers.

4. Describe your mathematics' teaching experiences during the practicum

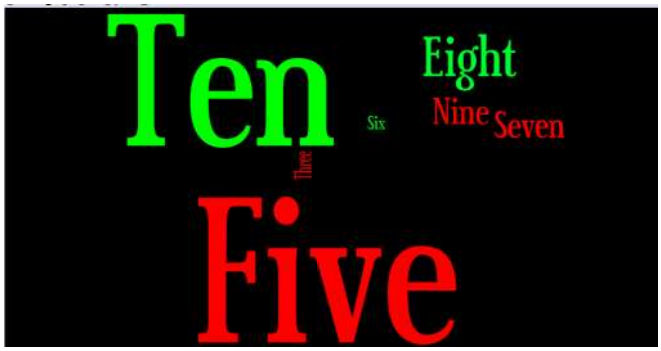
The results of this question can be summarized in the students' responses without classifying them in themes as follows:

- "I taught many math lessons in practicum and each one of them were successful and I enjoyed being a math teacher."
- "It was very interesting because I like math as a subject and it provides a challenging experience."
- "It was a good experience which mixed challenges and fun. Sometimes I feel the topic is tricky and the students can't get what I said so I concentrated really hard to come up with different strategies which suit all the levels of the students. Sometimes I found ways of teaching which add fun and are enjoyable to my lessons such as working in groups on problem solving and so I tended to use these ways daily."
- "I loved it and I can't wait to teach it next year in my final practicum."
- "I found teaching mathematics needs lots of power and being very patient, plus being creative all of the time to obtain the attention of the students."
- "It was exciting and I love it."
- "I do my best to give my class time to discover and enjoy the subject. I try to provide them with concrete objects which help me to accomplish my lesson in a discovery and full of joy at the same time."
- "It was amazing. I really enjoyed it a lot, even though I had a couple of students who took more time than others to follow the assignments, but it was enjoyable."
- "I learned how to teach mathematics to the special needs students by using different materials such as the smart board and toys and other items."
- "It was a great experience to teach mathematics lesson and integrated it with other subjects."
- "Writing the lesson plans and making the activities are the two main things which I did to teach math. Making the activities for the different levels in the same class is a big challenge for me. When I started to explain the lesson it became easier for me to continue the lesson and push my students to learn."

5. On a scale from 0-10 what score can you give yourself to show your qualifications in teaching mathematics? Please explain your score in a few words. Scale

0 ~ not confident,
5 ~ I am somewhat confident, but I need help,
10 I am completely confident and am able to explain any concept without help.

The researcher used the software, **Wordle**, to represent the responses of the students. The numbers which are large (10) mean those students were completely confident in this particular area. If the number is small (0-3) the student was not confident or somewhat confident.



6. What are the aspects of teaching skills which you think you need help in using them?

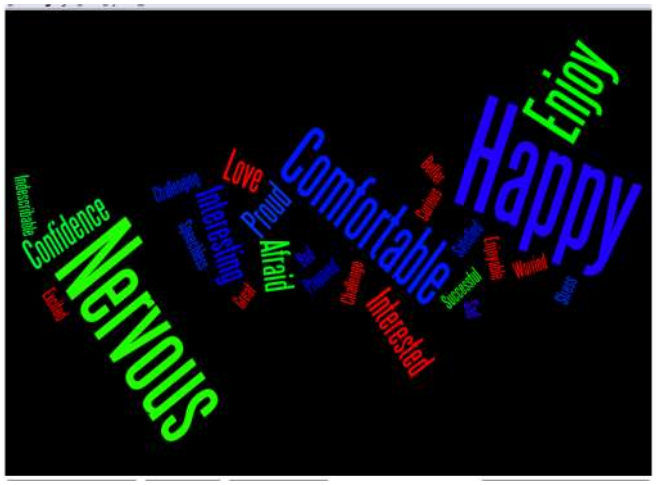
The students in the sample provided the researcher different aspects which can be summarized as follows:

- Preparing classroom activities which are related to the lesson. How to deal with low level and special needs students
- I have a problem with the language
- I think I need help with teaching with discovery learning and investigation
- Classroom management
- I want to be the best teacher in math and I want to use IT more in the classroom

7. Describe your feelings when teaching mathematics. Most of the students were: nervous, comfortable, happy, and enjoyed

the class. This is reflected by the size of the word listed below on the diagram.

The same method to analyze the data followed in question 5, the researcher summarized the responses of the students to this question using the Wordle Software and the results appear as follows:



8. What did you learn from Practicum related to your views about mathematics?

The researcher summarized the students' responses as follows:

- I learned teaching math is not as easy as I though before the challenges I encountered not only knowing the teaching skills, but how to apply those skills in the classroom.
- I learned which students learn from hand-out activities better than just listening to the teacher.
- I learned mathematics is very important in our lives and people need mathematics to think about the things which are around them and know more math concepts.
- I learned how to make activities which fit the abilities of the students.
- I learned in order to teach math one needs more patience to be a creative teacher.
- I learned which if you love what you do; you will work hard at it to make it easy for your class.
- I learned students learn best if they are interested in your lesson which has creative preparation.
- I learned which mathematics should be fun and exciting for the students or they won't be involved at all.
- I learned many things, example: You can teach the students math while they are playing.
- Teaching mathematics became easier when demonstrating for the students by using different types of activities. Mathematics becomes clear when related to our lives.
- I learned mathematics is not as difficult or complex subject as I thought. I can teach it with many different strategies and easily incorporate fun to various activities as other subjects or even better. I learned mathematics is a rich subject of skills which lets the brain work and be engaged in strong challenges.
- If you practice math more your interest will increase. Math is mind exercise.
- I learned mathematics can be learned by practice and as teachers we should use a variety of types of practice for our students.

9. Do you have any other suggestions or comments?

The students in the sample of the study provided the researcher with different suggestions or general comments related to preparation of the Elementary Teachers' program and here are some of those suggestions:

- I will advise the teacher to work on students' individual weaknesses in math since math is a subject in which each lesson depends upon the previous and next lessons. These lessons are not separated and which is why teachers cannot move to another lesson until they make sure each student is completely ready for the next lesson.
- Yes, math is a very important subject in our daily lives and every stakeholder must show his or her interest in the subject level.
- I suggest there is a program which connects all the students' teachers with their math teachers at the college and school to discuss any issues related to teaching math or even sharing the knowledge and the experiences or any new ideas.
- Provide extra courses about how to deal with special needs students prior to graduation. Students should observe or have a teaching experience with special needs students as part of their training.
- I believe all schools must integrate technology with math and not depend on textbooks.
- We need new ideas to teach math and we need a website to share our ideas with other colleges and universities.
- I would rather they let the teacher select what activity they would like to complete in the class and let them teach the students on their level of understanding since ADEC curriculum is way above their cognitive level.
- I wish the school would allow us during the practicum to utilize the YouTube to let students watch short movies related their lesson.
- We need to practice in the schools more than two months.
- I hope to study in our college mathematics course not only how to teach math, but we need to focus also in the lessons so we should be familiar with all ADEC outcomes and the lessons.

Correlations to the Previous Studies

Darling-Hammond and Barry (1998) found it beneficial to have a well-constructed practical experience for the preservice teachers which are intermingled with coursework as well as learning the curriculum, and having teaching experience. Although the U.S. school systems provides teachers to work in the classroom far too many are not adequately prepared to teach and develop a wide array of teaching strategies which can reach all of their students. This ties into the researcher's question number three; did you face any challenges in teaching mathematics and how did you overcome them?

Bursal *et al.* (2006) discovered preservice teachers are more confident to teach elementary mathematics and science since

they have low math anxiety than their peers who have a higher level of math anxiety. This correlates to number seven; describe your feelings when teaching mathematics.

Saifullah *et al.* (2013) revealed the pre-service teachers changed positively in their beliefs concerning their environment in the school, discipline, and the behavior of the teachers. This ties into the researcher's question number one; after your practicum experience, what has changed in your perceptions toward mathematics and teaching it?

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