Exploring the Gap between Framework and Practice: A Student-Teaching Experience of the Secondary Mathematics Pre-Service Teachers

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Abstract

Educators and researchers stress the importance of student teaching in teacher preparation since the pre-service teachers are given the opportunity and the challenge to put into practice the different concepts and theories they acquired from their academic courses under the guidance of a professional teacher. The study was conducted to assess the student teaching experiences of the secondary mathematics pre-service teachers (SMPTs). The study used an explanatory design model, which is a mixture of quantitative and qualitative approaches. The quantitative approach involved the analysis of the actual teaching ratings and comments/suggestions given by the mentoring teachers of the SMPTs, while the qualitative approach involved the conduct of a one-on-one interview to purposively chosen participants to support the quantitative results. The study involved 73 graduating SMPTs from seven selected public and private Teacher Education Institutions (TEIs) in the Cordillera Administrative Region (CAR). The results indicate the strengths of the SMPTs as well as their shortcomings and challenges during their student-teaching experience. For instance, classroom management, teaching without the supervision of a cooperating teacher and impromptu teaching were among the problems that emerged in the duration of their student-teaching. These results are important in the improvement of the secondary mathematics teachers' preparation program, particularly in their student teaching experience.

KEYWORDS

student teaching
mathematics pre-service teachers
math education

Introduction

Student-teaching is considered by educators and researchers as important, if not the most important, aspect of teacher preparation since the pre-service teachers are given the opportunity, at the same time challenged, to put into practice the different concepts and theories they acquired from their academic courses (Lee et al., 2012). It is a critical and important part of the teacher preparation program as it may serve as an assessment of the acquired knowledge in their teacher's preparation academic curriculum and at the same time diagnose the potentials of pre-service teachers in becoming a professional teacher. In particular, student teaching is significant in developing student teachers' pedagogical skills (Gursoy, 2013; Strawhecker, 2005), pedagogical

content knowledge, planning and preparation for instruction, classroom management; promoting family involvement and professionalism (Lee et al., 2012); and in learning more about themselves and their teaching for better outcomes (Chamoso et al., 2012; Gursoy, 2013). Studies also reveal that the student teaching experience of a pre-service teacher is influenced by their experiences as students (Harbin & Newton, 2013); teachers' background knowledge (Rosas & West, 2011); mentor support, their teaching efficacy and preparedness (Sirmaci, 2010; Rots & Aelterman, 2009); and, the learning community activities, which included sustained opportunities for pre-service teachers to observe, co-teach, discuss and reflect on their own and others' teaching (Cavanagh & Garvey, 2012; Gursoy, 2013).

However, Cheng (2011) cited in his review of related literatures that the core dilemma in initial teacher education is bridging the gap between theory and practice. This has been a common problem in teacher education and in the field of research. Tondeur et al. (2011) supported this in their review of qualitative researches highlighting the aligning of theory and practice as the primary theme among the seven discovered themes related to the preparation of pre-service teachers. Moreover, in his review of research trends in mathematics teacher education, Sanchez (2011) revealed that the relationship between theory and practice has been a research concern. Issues include pre-service teachers' perception on student teaching as a compliance and a disappointment, which resulted to resistance through absences among pre-service teachers (Rossi & Lisahunter, 2013) and the negative perceptions on their effectiveness as mathematics teachers and learners (Memnun & Hart, 2014). On the other hand, Rosas and West (2011) found that mathematics pre-service teachers perceived adequate readiness in teaching but argued that the confidence levels to teach mathematical concepts should be at least at the well or very well prepared. Additionally, Ozgen and Alkan (2014) reported that the student teachers' lack of skill in developing classroom activities and some situations were not even regarded as activities. These are just some of the many issues concerning teachers' preparation outside the country.

In the Philippines, the Commission on Higher Education (CHED), which is the supervising executive branch of the national government,

sets competency standards for the content and pedagogical knowledge of pre-service teachers. For instance, a BEEd/BSEd graduate must have a meaningful and comprehensive knowledge of the subject matter that he/she will teach. Moreover, the national government thru the Department of Education (DepEd), implemented a Teacher Education and Development Program (TEDP) conceptualizing a teacher's career path as a continuum that starts with entry to a teacher education program until he retires from formal service (CMO No. 30 series of 2007, Annex A). Competency standards expected from graduates of BEEd or BSEd programs in the country were also set (see Section 6, Article IV, CMO No. 30, series of 2004). In line with these provisions, the National Competency-Based Teacher Standards (NCBTS) known as Professional Development Guide for Filipino Teachers, was developed through the TEDP in 2006 (CMO No. 30 series of 2007, Annex A). Recently, the NCBTS was updated and it is now called the Philippine Professional Standards for Teachers (PPST). At present, the PPST sets the new standards that quality teachers should exhibit in the basic education (DepEd Order No. 42 series of 2017).

In the field of mathematics education in the country, the Framework for Philippine Mathematics Teacher Education (FPMTE) was authored by the Department of Science and Technology – Science Education Institute (DOST-SEI) together with the Philippine Council of Mathematics Teacher Education (MATHTED) Inc. in 2011. This provides the context and direction for the preparation of math teachers in the basic education. Particularly, mathematical content knowledge is considered as the core component of math teaching towards achieving excellence. This is supported by mathematical pedagogical knowledge, mathematical disposition & professional development, and general pedagogy and management skills.

Moreover, the curriculum of the mathematics teaching degree in the country exposes the secondary mathematics pre-service teachers (SMPTs) to both academic (theoretical) and nonacademic (experiential) subjects. Specifically, their curriculum consists of general education courses (63 units) which cover foundation general education knowledge and skills; professional education courses (51 units) which include

theoretical knowledge about teaching and learning, methodological skills, experiential knowledge and skills, and professional and ethical values; and, specialization courses (60 units) which include subject matter knowledge appropriate to the level of teaching high school students (Sec. 7-8, Art. 5, CMO 30 s. 2004). As part of their experiential knowledge and skills, the student-teaching of the secondary mathematics pre-service teachers (SMPTs) serves as their culminating requirement in their mathematics teaching degree.

In the Cordillera Administrative Region (CAR), Philippines, the SMPTs are commonly deployed to secondary high schools outside their school community for their student-teaching requirement. The deployment of the SMPTs ranges from the nearest to the remote high school institutions in the region. Thus, it is more likely that the SMPTs may have been experiencing a wide range of challenges and difficulties during their student-teaching apart from the intrinsic challenges of mathematics teaching. These may be attributed to different factors like their college preparations, cooperating teachers, cooperating school environment and community culture.

It is most likely that the student-teaching experiences of the pre-service teachers may determine their success in their future teaching profession, most especially during their first years of teaching. This is because those who are more successful in their student-teaching are expected to be more prepared for their future actual mathematics teaching compared to those

who did not perform well during their student-teaching. In addition, it is also plausible to argue that the student teaching performance of pre-service teachers may be dependent from their academic preparations in their college education. That is, the student-teaching experiences of the pre-service teachers may be boosted if they could successfully apply and appreciate the theories they acquired in their academic subjects. However, they may be upset in their student-teaching experience if they did not acquire the necessary knowledge and teaching skills prior to their student-teaching.

As shown in Figure 1, the present study assessed the teacher education program for the SMPTs through their student-teaching experience. Specifically, the study sought to answer the following questions: (1) What is the level of student-teaching ratings of the SMPTs?; (2) What are the strengths and rooms for improvements for the SMPTs during their student-teaching as suggested by their cooperating and supervising teachers?; and, (3) What are the challenges/problems encountered by the SMPTs during their student-teaching?

Exploring these student-teaching experiences may serve as an evaluation of the current mathematics teacher education curriculum in preparing the SMPTs in the actual world of teaching. For instance, exploring the weaknesses of the SMPTs during their student-teaching may provide insights on possible remediation/adjustments to the preparations of SMPTs prior
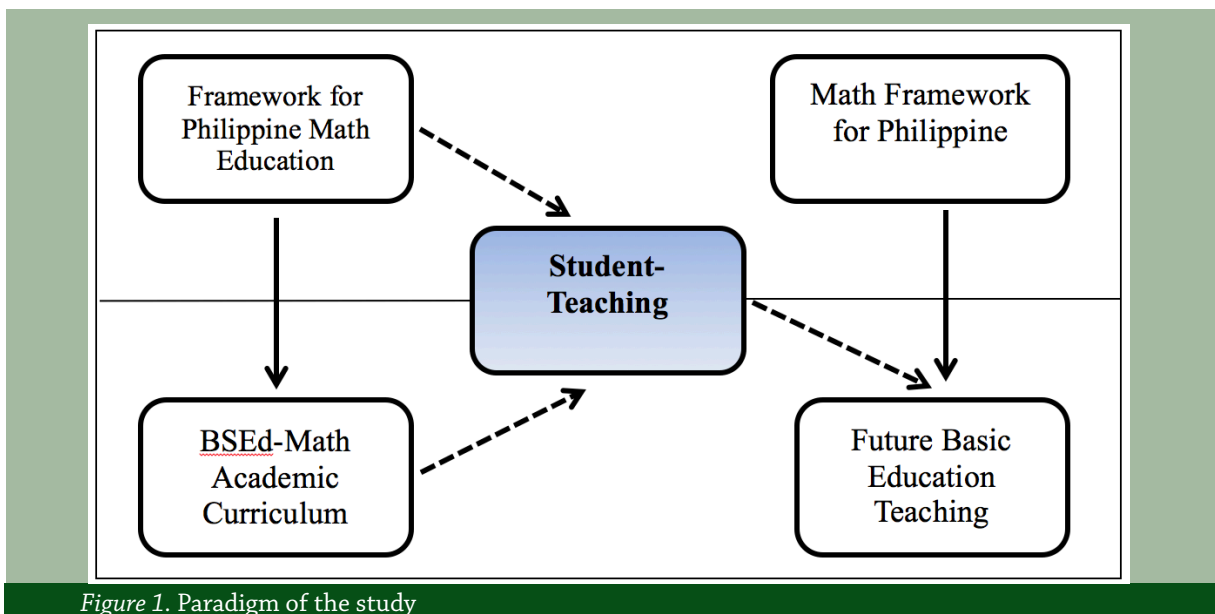

Figure 1. Paradigm of the study

their student-teaching requirement. The study also explored possible gaps in the teacher preparation of the SMPTs in relation to the Framework for Philippine Math Education which served as the foundation in crafting the BSEd-Math Academic Curriculum. In addition, the assessment of the student-teaching experiences of the SMPTs may also provide insights in their future basic education teaching potentials, which is anchored in the Math Framework for Philippine Basic Education.

Methodology

Research Design

The study employed the sequential explanatory design model, which is a mixture of quantitative and qualitative approaches. The quantitative method involved the analysis of the quantitative data that were generated from the SMPTs' student-teaching ratings and comments/suggestions given by their supervising and cooperating teachers. On the other hand, the qualitative approach involved the use of interview among selected participants to support the quantitative results of the study.

Participants

The participants of the study included 73 graduating Bachelor of Secondary Education (BSEd) major in mathematics students, who just completed their student-teaching, from selected Teacher Education Institutions (TEIs) in the Cordillera Administrative Region. The participating TEIs were those that are offering BSEd program with specialization in mathematics in the Region with at least five graduating students during the conduct of the study. Ten participants were purposively chosen as key-informants based from their student-teaching performance for a one-on-one interview wherein they were asked with questions related to their student-teaching experiences, including the challenges/problems they encountered during their student-teaching. There were 57 participants from the public TEIs while 16 were from the private TEIs. Also, there were 25 male and 48 female participants in the study.

Data Analysis

The quantitative data of the study were analyzed using both descriptive and inferential statistics.

Specifically, frequency counts, means and ranks were used to determine the prevailing strengths and weaknesses of the SMPTs in their student-teaching experience, while analysis of variance and LSD post-hoc analysis at 0.05 level of significance were used to compare their ratings relative to the different teaching components. On the other hand, the qualitative data which included interview results were used to support the quantitative results of the study.

The student-teaching ratings of the respondents were explored using their actual classroom teaching evaluations given by their cooperating and supervising teachers. A five-point numeric scale was commonly used by the different participating TEIs, with similar descriptive equivalents. Thus, the researcher adapted the more common descriptive equivalents among the participating TEIs. Also, to set a common ground for the ratings of the respondents, similar items of the rating sheets were grouped and classified based from the different areas of the teaching-learning process. This resulted to identification of 12 components, namely: teacher's personality (personal projection of the teacher), communication skills (ability to converse with the students), questioning skills (ability to ask proper and quality questions), lesson planning (preparation, implementation, and quality of lesson plans), content knowledge (mastery, presentation, and discussion of subject matter), lesson integration (relating the lesson to real life situations and to other fields), teaching method (manner of executing the different process of teaching), instructional materials (proper use of instructional materials and its quality and appropriateness), assessment/assignments (assesing student learning), classroom/time management (handling of students and pacing of discussions and pacing of discussion), motivation (encouraging students to engage in learning), and student-teacher relationship (rapport of the teacher with his/her students.

In addition, the comments indicated in the rating sheets of the SMPTs during their student-teaching's actual classroom teaching were scrutinized using an iterative process and thematic approach. Each sentence or phrase in the comments pertaining to a single idea was coded into themes using the specific areas of the teaching-learning process/activities. These codes were also classified using the 12 areas of teaching identified in their student teaching

ratings. To ensure a complete saturation of the samples, all comments were included in the analysis. Further, a frequency count for each code/theme was done for the purposes of ranking and comparing the different areas of improvements and strength of the SMPTs in teaching mathematics.

Lastly, the one-on-one interview results were audio recorded and transcribed personally by the researcher. Fictitious names were used in the presentations and discussions of the interview results to preserve the confidentiality of the identity of the participants and the participating schools.

Results and Discussion

Student-teaching performance of the SMPTs

Table 1 shows the very good performance of SMPTs in all of the identified teaching components during their student-teaching. However, numerically, the ANOVA test result indicates that they have significantly different ratings in the different components at 0.05 level of significance. The highest scores were obtained in the TP component; followed by the CS, STP, LP, CTM and IM components while the lowest ratings were obtained in the areas of QS, LI and TM. Sample items for the teacher's personality component are 'Teacher is neat and well-groomed', 'The teacher is free from mannerisms that distract learner's attention' and 'The teacher possesses a personality that commands respect and attention'; whereas for the questioning skills component, sample items are 'The teacher's questioning skill stimulates discussion in different ways such as probing for learner's understanding', 'The teacher's questioning skill was shown in his/her way of helping learners articulate their ideas' and 'The teacher's questioning skill was shown in his/her way of stimulating curiosity'.

The results prove that the SMPTs were observed to have the strength in their personality as teachers, communication skills, student-teacher relationship, lesson planning, classroom/

Table 1

Student Teaching Performance of the Respondents in Each of the Teaching Components

Teaching Component	N	Mean	Std. Dev.	Desc. Eq.
Teacher's personality (TP)	73	4.49^a	0.34	VG
Communication skills (CS)	73	4.20^b	0.48	VG
Questioning skills (QS)	68	3.74^e	0.50	VG
Lesson planning (LP)	66	4.16^b	0.53	VG
Content knowledge(CK)	73	4.06^{bc}	0.42	VG
Lesson integration (LI)	73	3.79^e	0.51	VG
Teaching method (TM)	73	3.87^{de}	0.43	VG
Instructional materials (IM)	73	4.13^b	0.47	VG
Assessment/assignments (AA)	60	3.96^{cd}	0.44	VG
Classroom/time management (CTM)	72	4.12^b	0.43	VG
Motivation (M)	50	3.91^{cde}	0.45	VG
Student-teacher relationship (STR)	50	4.17^b	0.38	VG
Overall	73	4.06	0.37	VG

Note: 4.50 – 5 		Excellent (E)
        3.50 – 4.49		Very Good (VG)
        2.50 – 3.49		Good (G)
        1.5 – 2.49		Fair (F)
        1 – 1.49		Poor (P)

Means with the same letters in a column are not significantly different at 0.5 LSD

time management and in using instructional materials during their student-teaching. While their weaknesses were detected in the areas of questioning skills, lesson integration and teaching method.

The very good description of the student-teaching performance of the respondents in each of the teaching areas is supported by the interview results. Particularly, it emerged in the interviews that the SMPTs generally had a good student-teaching performance, which improved towards the later part of their student teaching experience. They considered their classroom management, teaching method, mastery of subject matter, relating concepts to real life situations, lesson plan implementation, cooperating teachers, adjustment to the environment and efforts to execute lesson plans as among the factors that affected their student teaching performance. For instance, quoting from Fely (not her real name), when ask about the possible factors that affected her student-teaching performance, she said,

> *"Bukod sa cooperating teacher ay yong effort ko na mag-execute ng lesson kase noong sa public school, di ko sineryoso na parang come what may. Pero noong nasa private school na ako, doon na talaga ako nag-effort na maraming strategies, maraming worksheets at hindi na teacher-centered kase mas chinallenge ako ng critic teacher ko na magaling talaga in terms of content and strategies"* – ('Aside from my cooperating teacher is my effort to present my lessons because when I was in my public cooperating school, I exerted minimal effort in my student-teaching and I did not take it seriously, but when I was in my private cooperating school, I had to exert more effort utilizing more strategies, more worksheets and student-centered teaching methods because I was challenged by my cooperating teacher who is really smart in terms of content and strategies').

On the other hand, Joy (not her real name) said some factors that affected her student-teaching ratings were her ability in executing lesson plans and relating lessons to real life situations. She cited that her lessons seem to have good flow in the plan but the actual implementation is different and she added that she rarely related her lessons to real life applications.

It also emerged in the interviews that most of the SMPTs commonly used the lecture method during their student-teaching and only few of them utilized other methods like group activities and worksheets. Specifically, seven of the ten interviewed respondents disclosed that they largely used lecture method during their student-teaching, believing that it is the appropriate method based from the nature of math and their learners. They usually used lecture method to teach the concepts and integrate games or activities to motivate their learners or for mastery purposes. For instance, quoting from Rey (not his real name) *"I used lecture kase hindi naman nila maiintindihan ang math kung di nila alam yong concept. Gumamit ako ng activities for mastery purposes and enjoyment, most especially singing and outdoor games"* – ('I used lecture because they will not understand math if they do not know the concepts. I used activities for mastery purposes and enjoyment, most especially singing and outdoor games'). Joy also said *"lecture kase more on doon kase yong mga estudyante. Meron din yong cooperative learning tapos nagpapagames din ako to catch the attention of the students kase kapag hindi na sila motivated, hindi na talaga sila makikinig"* – ('lecture because it was the learning type of the students. I also used cooperative learning and games to catch the attention of the students because once they were not motivated, they will not listen'). Jenny said she used lecture, most especially for difficult topics and used inductive teaching strategies for easy topics that could be easily discovered by her learners. In the case of Jane, she commonly used group/peer activities because she noticed the different learning abilities of her students and said *"if they do not learn from me, may be they will learn from their classmates"* by strategizing the groupings/pairings of her students. Fely said she mostly used worksheets, wherein her students discovered the math concepts, because this is what she learned from their education subjects in college, that students remember more what they have learned by doing or discovery compared when the topic is just presented to them. These are indicators of the innovativeness of the SMPTs in teaching mathematics. Although they still largely embraced the lecture method in teaching math which provide challenges to students having the learning styles not suited for lectures.

In terms of instructional materials, it emerged in the interview that the SMPTs resorted more

on traditional instructional materials than the use of digital technologies during their student-teaching. All of the interviewed respondents said they largely used traditional instructional materials like black/whiteboard, printed visual aids on manila papers or cartolina, flash/metacards and cutouts as their instructional materials. Only four mentioned the use of digital technology, specifically powerpoint presentation using laptop and LCD projector rarely. Other than powerpoint presentations, calculators and computers are used in computing the grades of their students. This could be attributed to the absence or limited availability of digital technologies and the perceived suitability of the traditional materials in teaching their math lessons, like in showing a step by step process in problem solving. For instance, Fely said her instructional materials were more on old school materials like metacards, teacher-made visual aids like manila papers and manipulative like geoboard and a clock model. She further said:

"Pwede sana akong gumamit ng technology pero di available. Kung meron man, iisa lang or limited. Ganoon din sa private na kailangan mong ireserve for one week before pero yong mga lessons namin ay binibigay two days before execution kaya ang inisip ko is more on old school" – (She could have used digital technology but it was not available or if available, it was very limited. Although it was available in her private cooperating school but it was very limited and they needed to reserve one week before the time of use but her lessons to be taught were given just two days before the schedule. As a result, she resorted to the traditional instructional materials).

This limitation exposes the challenges of integrating technologies in teaching math. With the drastic developments and spread of information and communication technologies, more and more students become technology enthusiasts. This trend may constrain the effectiveness of the traditional instructional materials in teaching mathematics in the near future. Thus, the SMPTs may need to be provided with avenues to teach math with technologies during their student-teaching.

Lastly, the interviewed SMPTs unanimously mentioned that they were further motivated to enter math teaching after finishing their student-teaching experience. This is because of the positive comments they received from their students and mentoring teachers, taking the negative comments as constructive criticisms for their improvement; they wanted to initiate changes in the perceptions and teaching procedures of mathematics; and, they have learned a lot on how to teach mathematics from their student-teaching experience. While some of them admitted that they were partly discouraged by the different challenges of teaching, like misbehaviors of students, paper works and the preparations which are regularly done by a teacher. For instance, Jane said after her final demonstration teaching, her cooperating teacher mentioned that she understood better the topic compared to her high school math teacher, implying that Jane has the potential of a good math teacher. She added that based from her experience, she wanted to change the teaching procedures of mathematics, now that she learned better teaching methods compared to what her high school teachers used. While Grace believed that she was more encouraged because she learned more on how to teach mathematics from her student-teaching and despite the challenges she encountered, her positive experiences outweighed her negative encounters. On the other hand, Irene disclosed that she was more encouraged because it was her chosen field and she took all the negative student-teaching comments positively.

Comments on Actual Classroom Teaching during the Student-Teaching of the Respondents

Table 2(a) reveals that most of the respondents received the most negative comments in classroom management, specifically on instilling/maintaining order (41%) and handling misbehaviors of students/imposing discipline inside the classroom (38%). This was followed by the area of teaching method, particularly on the proper execution or sequencing of the teaching-learning process/activities (36%) and involving students in the different teaching-learning activities (35%); and time management (32%). In the summary of rooms for improvement of the respondents during their student-teaching, the frequency count of comments shows similar top five weaknesses, except in the rank orders where time management ranks third. Some examples of comments on instilling/maintaining order inside the classroom are "Before presentation/discussion of outputs,

let students return to their seats or at least let the students face in front", "Train your students not to be answering in chorus and they should minimize their noise" and "Establish order/attention before explaining/saying something to the class." On handling misbehaviors of students/imposing discipline, examples are "Be patient to call student attention during the discussion most especially those who are not listening", "You must need to be consistent in maintaining discipline inside the classroom" and "The teacher must maintain discipline inside the classroom while the activity is ongoing, some of the students are playing and not solving in their seat." On proper execution or sequencing of the teaching-learning process/ activities, samples are "There should be a clear transition from one topic to one another", "Motivation should come first before you

Table 2

The Rooms for Improvements for the SMPTs as Suggested by their Mentoring Teachers during their Actual Classroom Teaching

a. The Top Ten Weaknesses of the SMPTs during their Actual Classroom Teaching (n=69)

Area of the Teaching-Learning Process/Code	f	Percentage	Rank
Proper execution or sequencing of the teaching-learning process/activities	25	36	3
Involving students in the different teaching-learning activities	24	35	4
Employing student-centered instruction	17	25	9.5
Giving instructions	17	25	9.5
Relating lesson to real life situations/applications	18	26	7
Installing/maintaining order in the classroom	28	41	1
Handling misbehaviors of students/imposing discipline	26	38	2
Communication skills	18	26	7
Proper ways of using instructional materials	18	26	7
Time management	22	32	5

b. The Overall Weaknesses of the SMPTs during their Actual Classroom Teaching (n=69)

Area of the Teaching-Learning Process/Code	f	Percentage	Rank
A. Motivation	19	28	8
B. Teaching Method	52	75	1
C. Relating/Integrating Lessons	22	32	6.5
D. Classroom Management	47	68	2
E. Communication Skills	18	26	9.5
F. Content Knowledge	26	38	4
G. Use Of Instructional Materials	32	46	3
H. Teacher's Personality	18	26	9.5
I. Time And Pacing Management	22	32	6.5
J. Questioning Skills	24	35	5
K. Lesson Planning	17	25	11
L. Assessment/Evaluation	16	23	12
M. General Comments	9	13	13

introduce your lesson" and "Give guided activity first before evaluation." On involving students in the different teaching-learning activities, samples are "The teacher should make the students understood why their answer is wrong instead of giving the correct answer", "The teacher should not just give and accept answers, she has to let students explain where they got their answers" and "Let them be the one to visualize the problem by showing the illustration." Lastly, on time management, samples are "She should take note of her time and her lesson is good for 1 hour", "You should have timed your own solution so that you know the exact time your students will, I don't think one minute is enough to solve and discuss" and "Observe time limit for every part of the lesson".

As a whole, Table 2(b) reveals that the areas of teaching with the highest negative comments are teaching method (75%) and classroom management (68%). A similar result can be observed based from the frequency count indicated in the summary of suggested rooms for improvement. In the use of instructional materials, the weaknesses of the respondents were dominated by the proper ways of using instructional materials followed by the need to use instructional materials. In the content knowledge, majority of the comments are on mastery of subject matter followed by discussing/illustrating the subject matter. In the questioning skills area, the prevailing negative comments were more on proper ways of asking questions or questioning errors; and in the area of time and pacing management, the prevalent negative comments were more on time management.

The results imply that the SMPTs need to work more on improving on teaching method, classroom management, use of instructional materials, content knowledge, questioning skills and time and pacing management. This is supported by the interview results where the interviewed respondents considered classroom management and content knowledge as among the most challenging part of their student-teaching experience.

On the other hand, Table 3(a) shows that the strengths of most SMPTs were on the use of instructional materials (39%); followed by teaching method, precisely on proper execution/good flow of the different learning activities

(33%) and using good/suited teaching strategies (30%); content knowledge, which is more on good presentation/discussion (30%) and showing mastery of the subject matter (26%); and teacher's personality, specifically on their composure and projection in class (28%) during their student-teaching. Examples of the actual positive comments coded under preparing/utilizing good instructional materials are "The teacher had a well prepared and attractive teaching materials", "The teacher is creative and resourceful in preparing instructional devices" and "The teacher prepared complete and detailed instructional materials." On proper execution/good flow of the different learning activities, "Quiz was properly administered", "The teacher presented the concept of the lesson clearly and logically" and "Lesson presented in an organized manner and easy for students to understand." On using good/suited teaching strategies, "The teacher's strategy is suited to the capabilities of the students", "The teacher presented the lesson from simple to complex which is a very good strategy in teaching math" and "The teacher made the lesson more exciting by giving an activity which involved all the students and interesting because it is in the form of a game." On good presentation/discussion of the subject matters, "The teacher discusses lesson well", "The teacher gives clear explanation of the subject matter" and "The teacher was able to simplify the concepts for easier understanding on the part of the students." On showing mastery of the subject matter, "The teacher has shown mastery of the subject matter", "Teacher mastery was evident as she exuded confidence in her delivery" and "The teacher is well versed on the subject matter." On composure and projection in class, "The teacher has a well-modulated voice", "The teacher manifest confidence when teaching the lesson" and "Very good grooming and proper attire". These results assert the strengths of the SMPTs in preparing/utilizing good instructional materials; proper execution/good flow of the different learning activities; using good/suited teaching strategies; good presentation/discussion and showing mastery of the subject matter; and composure/projection in class during their student-teaching.

Overall, Table 3(b) shows that the SMPTs were most appreciated in the areas of teaching method, content knowledge, teacher's personality, use of instructional materials, classroom

Table 3

The Strengths of the SMPTs during their Student-Teaching's Actual Classroom Teaching Based on the Comments of their Mentoring Teachers

a. The Top Ten Specific Strengths of the SMPTs during their Student-Teaching's Actual Classroom Teaching (N=69)

Area of the Teaching-Learning Process/Code	NoR	Percentage	Rank
A1. Encouraging student participation in the different teaching/learning activities	15	22	7.5
A2. Employing strategies in motivating students	13	19	10
B1. Proper execution/ good flow of the different learning activities	23	33	2
B2. Using good/appropriate/suited teaching strategies	21	30	3.5
D1. Supervising/guiding/assisting students in the different learning activities	14	20	9
F1. Good presentation/discussion of the subject matter	21	30	3.5
F2. Showing mastery of the subject matter	18	26	6
G1. Preparing/utilizing good instructional materials	27	39	1
H1. Teacher's composure/projection	19	28	5
H2. Possession of personality/characteristics of a good teacher	15	22	7.5

b. The Overall Strengths of the SMPTs during their Student-Teaching's Actual Classroom Teaching (N=69)

Area of the Teaching-Learning Process/Code	NoR	Percentage	Rank
A. Motivation	28	41	6
B. Teaching Method	48	70	1
C. Relating/Integrating Lessons	20	29	7
D. Classroom Management	31	45	5
E. Communication Skills	8	12	10.5
F. Content Knowledge	36	52	2
G. Use of Instructional Materials	34	49	4
H. Teacher's Personality	35	51	3
I. Time And Pacing Management	8	12	10.5
J. Questioning Skills	6	9	13
K. Lesson Planning	14	20	8
L. Assessment	7	10	12
M. General Positive Comments	12	17	9

management and motivation. Conversely, they received the least positive comments in the areas of questioning skills, assessment, communication skills and time/pacing management as revealed in the summary of positive comments. A similar result can be observed based from the frequency count, except a slight rearrangement of the ranks.

Although the SMPTs seem to have strong point on presentation/discussion and mastery of the subject matter during their student-teaching, only 30% and 26% of them, respectively, received these commendations from their cooperating teachers. Also, the areas of time/pacing management and questioning skills, which are among the areas

with highest negative comments, are also among the areas with the least positive comments. This, somehow, indicates consistency of the negative and positive comments during the student-teaching of the SMPTs.

Generally, the results indicate that the negative comments outweighed the positive comments in all of the identified areas of teaching-learning process, in terms of frequency count and number of respondents in each category. This may imply greater rooms for improvement than the strengths of the SMPTs in teaching mathematics during their student-teaching experience.

In the interview, the common positive comments received by the SMPTs during their student-teaching include understandable lessons by their students, use of instructional materials, good classroom management and the enjoyment of students on their math lessons; while soft voice, lenient classroom management, lack of confidence, insufficient real life applications and explanations were among the common negative comments from their students and mentoring teachers. For example, Grace cited that according to her students, they easily understood the lessons but on the other hand, they pointed out her soft voice, while her mentoring teachers commented that she lacked in giving real-life applications of the concepts. Karen also mention the same sentiment: *"Naenjoy daw ng mga students ko yong pagtuturo ko kase jolly ngem kurang kanu ti pananghold ko ti students tapnu haan da agngalawngaw tapos nu agsao ak ijay sango ket awan jay confidence, karkaru idi first"* (My students said they enjoyed my teachings because it was jolly but my mentoring teachers said I had difficulty in controlling my students so that they will not make noise and I lacked the confidence in my discussions, most especially during my first day of teaching). Rey, on the other hand, cited the common feedbacks from his students were he knew what he was teaching and his students understood better from his explanations. He added that his mentoring teachers appreciated his classroom management abilities because he was able to control the students that even his cooperating teachers cannot control.

Challenges Encountered by the SMPTs during their Student-Teaching

It emerged in the interviews that the SMPTs were mainly challenged in managing their classroom, followed by their relationship with their cooperating teachers, the content aspect and culture/environment adjustments during their student-teaching experience. Figure 2 shows the distribution of the challenges/problems encountered by the respondents during their student-teaching. All the respondents considered classroom management as one of the most challenging part of their student-teaching, specifically in dealing with misbehaviors and disciplining students. For instance, Irene said *"classroom management ang madugo na part ng student-teaching ko kase may mga students na ganun talaga, hindi talaga makukuha ang attention, kailangang paulit-ulit"* – (Classroom management was the most difficult part of my student-teaching because some of my student's attention was difficult to capture). Rey also cited that he encountered difficulty in managing his class, even though he exhausted all what he learned about classroom management. This compelled him to disregard what he learned on classroom management in his professional subjects and resorted to being an authoritarian teacher. Mark revealed also that he encountered difficulties in managing his class because some of his students were playing and doing assignments in other subjects while he was teaching. Jane and Grace also have the extreme experiences of being insulted and disrespected by their students. According to Jane, some of her students in her private cooperating school said to her *"student teacher ka lang at wala kang karapatang magturo"* – (you are just a student-teacher and you don't have the authority to control us).

Moreover, four of them disclosed that they had problems with their relationships with their cooperating teacher. This includes lack of confidence by the cooperating teacher on the capabilities of the student-teacher. For example, the cooperating teacher of Grace re-teach the topics that she already taught. As a result, her students did not listen to her discussions since they expected that the topic will be discussed again by her cooperating teacher on the following day. According to her, this experience suppressed her teaching confidence and the essence of the student-teaching. This is similar in the case of Fely wherein there were times that her cooperating teacher did not give her a lesson to teach due to lack of confidence on her teaching abilities, even considering that Fely graduated with honors in a reputable private school. On the other hand, Joy
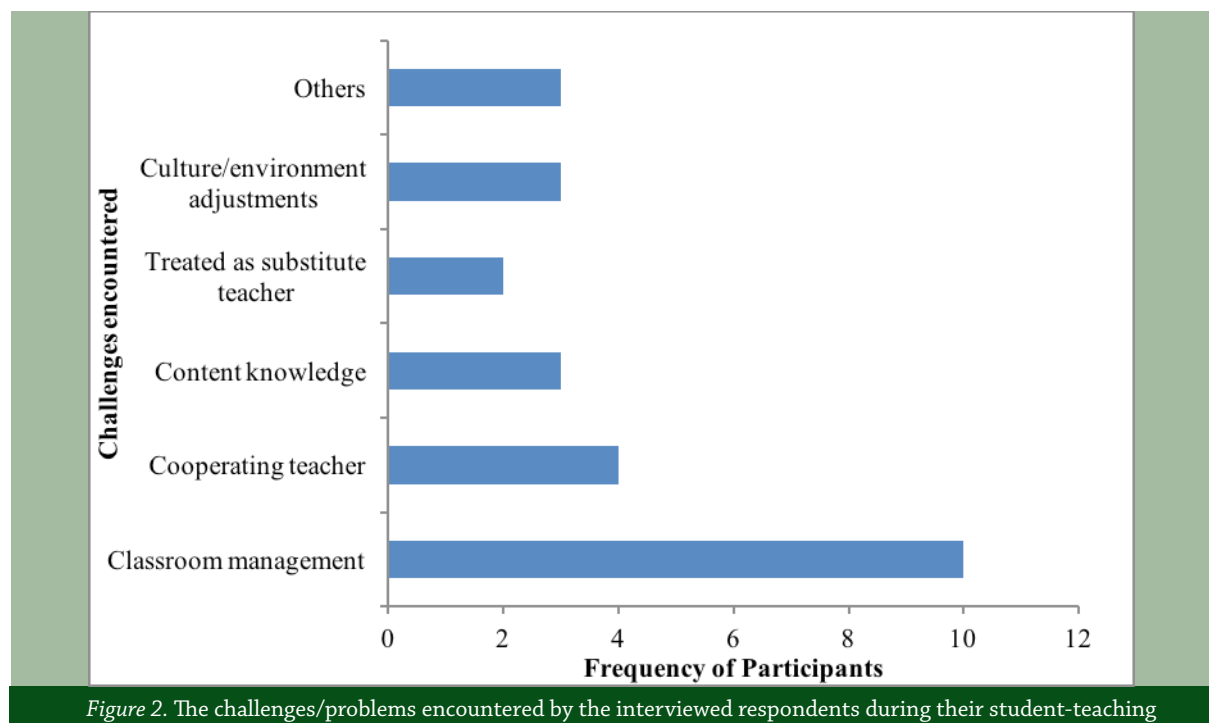
Figure 2. The challenges/problems encountered by the interviewed respondents during their student-teaching

encountered miscommunication problems with her cooperating teacher who questioned her teaching methods despite the fact that her lesson plan was checked and approved prior to the actual teaching. Shirley was also confused by the lesson planning method suggested by her cooperating teacher because it was totally different from what has been taught to them in college. Further, three of them considered the content aspect as one of the challenges during their student-teaching. For instance, Mark admitted that he encountered difficulties in teaching proving trigonometric identities and that he fully understood the topic only after teaching it. Three of them also mentioned that they were challenged by the new culture/environment during their student-teaching. For instance, Mark said "*yong place kase isa sa mga pinakamalamig yong place kaya first week ko pa lang, wind burn na ako kaya I had to wear face mask, kaya kailangang lakasan ang boses kase naka face mask ako habang nagtuturo*" – ('one of the challenges that I encountered during my student-teaching is the cold temperature in the place where I was deployed. This caused wind burns on my face and I needed to wear a face mask while teaching. As a result, I needed to make my voice louder because of the mask'). Other challenges mentioned during the interview included preparations of

instructional materials and motivating their students to at least love math.

Aside from these challenges, other emerging problems were encountered by respondents during their student-teaching. Two of them seem to be treated as substitute teachers in some parts of their student-teaching. Since they teach without the supervision of their cooperating teacher, even during the starting stage of their student-teaching experience. One of them had an impromptu teaching, during the first days of his deployment. For instance, Mark, who was a university athlete, narrated that his first assignment was to train athletes in his cooperating school and in the following week, he attended a collegiate sports tournament of his event. He said "*pagkatapos ng CARASUC, provincial meet na rin yon kaya wala yong CT ko kase coach siya kaya ako na mismo ang naghandle sa mga 4th year students, pati na rin sa grade 8.*" –(after the CARASUC (Athletic competition of the different SUCs in CAR), it was followed by provincial meet that is why my cooperating teacher was absent because he was a coach, so I had to handle his 4th year students and his grade 8 class). He added that he was not well oriented and introduced by his cooperating teacher to the students. Moreover, Karen mentioned that she immediately had her actual classroom teaching

during her first day, where she did not have any classroom observations and the worse is that she was not prepared. This was because her cooperating teacher was assigned as the officer-in-charge in the absence of their school principal. As a result, she mentioned she was really challenged at the instancy of her student-teaching. Quoting from her:

"jay first nga naiassignak nga teacher, ijayak nga talaga nga napasabakak ta idi first day nga napan kami ijay ket pinagsuro dak ijay sango nga haanak nga nakaprepare, isunga aghandle kan, agpa activity kan kunana ket haanak nga nag-obobserve kanyana isunga medyo narigatanak nga nag-adjust ijay ta nag-isuro ak nga dagus. Busy busy gamin isuna ta awan jay principal ket isuna ti sinmukat paylang kanyana." – (In my first assigned cooperating teacher, I was really challenged because I immediately had my actual classroom teaching during the first day, without any preparations and prior observations. It was because she was very busy as the OIC principal during that time.)

Teaching without the supervision of a cooperating teacher and impromptu teaching experiences during the early stages of student-teaching may defeat the purpose of having a smooth transition from theories to application in teaching math. In this case, the SMPTs may be overwhelmed by the abrupt applications of what they have learned and that their passion to teach may be suppressed by the challenges of teaching brought by such sudden shift.

Conclusions

The following conclusions were drawn from the study: (1) in terms of their actual teaching ratings, the SMPTs were rated very good in all of the identified teaching components. Their strength are their personality as teachers while their weaknesses were observed in the areas of questioning skills, lesson integration and teaching method. The SMPTs commonly used the lecture method and resorted on the traditional instructional materials over the use of digital technologies; (2) Most of the SMPTs were appreciated in their teaching method, specifically on preparing/utilizing good

instructional materials. On the other hand, most of the SMPTs received negative comments in their teaching method and classroom management, specifically on instilling/maintaining order and handling misbehaviors of students/imposing discipline inside the classroom. In general, the SMPTs were further motivated to enter math teaching after finishing their student-teaching because of the positive comments they received from their students and mentoring teachers; and (3) The SMPTs were mainly challenged by classroom management, followed by their relationship with their cooperating teachers, the content aspect and culture/environment adjustments during their student-teaching experience. Teaching without the supervision of a cooperating teacher and impromptu teaching were among the problems that emerged during the student-teaching of the SMPTs.

Recommendations

Based from the findings of the study, the following are recommended: (1) In order to realize the core goals of math education in the country as stipulated in the Framework for Philippine Mathematics Teacher Education, there may be a need to strengthen the content knowledge of the SMPTs as it did not appear to be their strength during their student-teaching. Also, it is possible that content knowledge has direct connection to the questioning skills, lesson integration and teaching method, which were the lowest rated areas during the actual teaching of the SMPTs. There may be a need also to equip the SMPTs with knowledge and skills on integrating technologies in teaching mathematics since most of the SMPTs resorted on the traditional instructional materials over the use of digital technologies and only few of them utilized other methods like group activities and worksheets. This is in consideration that we are now in the digital era; (2) The TEIs may need to revisit their math teaching preparation program and improve the preparations of their SMPTs in classroom management and teaching methodologies since these were the areas where most of the SMPTs receive negative comments during their actual teaching. The cooperating and supervising teachers are encouraged to capitalize on the strength of the SMPTs during their student-teaching and properly deal with their

shortcomings in order to further boost their commitment and motivation to enter the world of mathematics teaching; (3) There may be a need for the TEIs to review and strictly implement their memorandum of agreement, if any, with their cooperating schools to ensure that the SMPTs are provided with a student-teaching experience that is a smooth transition from theories to practice in teaching mathematics. Also, this is to avoid unnecessary student-teaching – related problems that may obstruct the expected learning of the SMPTs from their student-teaching experience; and (4) Similar studies may be conducted to validate and expound the results of the study. Specifically, to validate the study results of the present study and explore more possible gaps between the set standards and actual teacher preparations of SMPTs and other pre-service teachers.

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