Pre-service mathematics teachers' experiences of teaching practice in function composition

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Abstract. Generally, teaching practice is carried out as a conceptual decision in achieving the vision and mission of tertiary institutions and each faculty in an effort to produce qualified teacher candidates who are ready to deal directly with the community or school. The research aims to description performance students’ math education at Majalengka University in teaching practice. The approach used was a qualitative case study in students’ math education at Universitas Majalengka. Data sources sourced from the students’ math education who establish teaching practice at school partner academic year 2018/2019, teacher and student school partner. The results show that observation provides a lot of information that is very useful for prospective teachers to develop their competencies. Next, participated in teaching practice does not get many a chance to practicing and they shall not find special guidance from tutor teachers. Participated in teaching practice would be able to execute study practice independent learning. Furthermore, experiences within were making plans for the implementation of a lesson (RPP) has got a good deal. Participated in teaching practice had a wealth of experience in their activities to get extra on the school. The achievement of competence would be good enough. Participated in teaching practice is still following a lecture once at the campus. Lastly, participated in teaching practice need to improve its ability in using the learning methods and the media learning to promote disorder too.

1. Introduction
Education is one of the platforms in developing the potential of every individual. Through education, each individual is expected to be able to recognize and find out all their potentials to be able to implement various competencies and experiences that have been obtained in social life. Competencies and experiences are prepared through education one of which is through the Teaching Practice as an inseparable part of a tertiary institution. The quality of the teacher in the future is determined by the quality of students as a prospective teacher today. University to provide and prepare the graduates to be ready for real working world according to social needs are the point. Quality of teacher is considered as the most important factor in affecting education quality [1].

Generally, teaching practice is carried out as a conceptual decision in achieving the vision and mission of tertiary institutions and each faculty in an effort to produce qualified teacher candidates who are ready to deal directly with the community or school. Contends that teaching practice forms an essential component of all the teacher education programs offered in the faculty [2]. The importance of teaching practice for prospective teacher-students is to prepare carefully how to become a professional teacher in their field, starting from preparing to make lesson plans, syllabus, teaching materials, assessment instruments and other preparations including mentally in carrying out learning in class.
This is the time student-teacher is given the opportunity to practice the techniques of teaching to prepare them for the real world of the teaching profession [3]. The problem is whether every student is well aware of the importance of the teaching experience in the teaching practice activities? The answer is no. Not all students understand and realize the meaning of implementing teaching practices for themselves.

Teaching practice plays the role of building knowledge and a real experience for prospective teachers. This activity can be a reference for evaluating the quality of teachers in teaching in real classrooms. The quality of teachers in the future is determined by the quality of students as current teacher candidates. Teacher quality is considered as the most important factor in influencing the quality of education [4]. Therefore, each tertiary institution has provided and prepared teaching practices as a program to produce graduates who are ready in the real world of work that is in accordance with social needs. Some past studies have proven that teaching practice helped pre-service to have better discussions with lecturers and mentors, and thus managed to help pre-service teacher candidates to determine the approaches to use and their implications in teaching [5, 6].

Revealed that the experiences of the participants and the people they met during their teaching practice were very important in shaping ways to be able to appreciate themselves, including commitment, motivation, and satisfaction as a teacher [7]. Of course the experience of students in teaching practice activities is the main key to make themselves qualified teacher candidates, including math teacher candidates. As a prospective math teacher, it is not only the mathematical concept that must be mastered, far more important than that is the readiness of being able to stand in front of the class as a professional teacher. Therefore, this article aims to describe the experiences of prospective mathematics teachers in teaching practice activities as study material that can be considered for improvement in mathematics learning.

2. Research Method

The approach used in this study is a qualitative approach. This is a small scale preliminary qualitative case study based on interviews of four participant pre-service teachers who were undergoing teaching practice in Senior High School at Majalengka. This model was chosen because through this model researchers can analyze in depth. In addition, this model can maintain the integrity of the object under study (as is) and maintain focus on the target. The case, in this case, is a problem [8].

This research was conducted at 4 mathematics education students at Universitas Majalengka who took part in teaching practice at Maja High School. This study looks at the preparation, implementation and results of teaching practice activities carried out by students. Research data obtained from information provided from students, tutors and partner school students. The instruments used were observation sheets and interviews. Observation sheet to see student activities during teaching. While interviews are used to dig up information from sources. This type of interview is semi-structured. The characteristics of semi-structured interviews are open-ended questions but refer to the interview guidelines. Interview guidelines are used as a benchmark in the order and use of structured words and focus on goals. The data analysis technique used in this study is to use analysis techniques, namely data reduction, data display, and conclusion verification. The data validity test in this study uses the credibility test by triangulating data [9].

3. Results and Discussion

Practice implementing planning with the guidance of the supervisor and tutor. In addition, during the learning process in the classroom, the Participant is evaluated by the tutor in each meeting, both in preparation and learning. The following are the indicators of assessment of teaching practice examinations which are the average results of the activities of the tutor teacher presented in the Table 1.
Table 1. Indicators and Grades of Practice Exams

| No | Name | Field Presence | Preparation of Learning Planning / RPP | Implementation of Learning Practices | Attitudes and personality include discipline, responsibility, relationships between friends, honesty and how to dress | Creativity and practice implementation activities | Implementation of educational tasks, including flag ceremonies, library service picks, guidance counselling, student council, extracurricular | Collaboration with fellow participants | Preparation of individual reports, portfolio of Practice activities | Total | Average | Score | Quality |
|----|------|----------------|----------------------------------------|--------------------------------------|-------------------------------------------------------------------------------------|----------------------------------------------------------------|----------------------------------------------------------------------------------|--------------------------------|--------------------------------|-------|--------|-------|---------|
| 1  | P₁   | 90             | 70                                     | 74                                  | 62                                                                                   | 58                                                                   | 69                                                                              | 7/8                           | 72                            | 64               | 637       | 70.7778 | B       |
| 2  | P₂   | 88             | 68                                     | 72                                  | 60                                                                                   | 54                                                                   | 67                                                                              | 7/3                           | 69                            | 62               | 613       | 68.1111 | B       |
| 3  | P₃   | 94             | 76                                     | 85                                  | 73                                                                                   | 69                                                                   | 74                                                                              | 7/8                           | 79                            | 75               | 703       | 78.1111 | B       |
| 4  | P₄   | 92             | 74                                     | 78                                  | 79                                                                                   | 64                                                                   | 76                                                                              | 8/0                           | 74                            | 72               | 689       | 76.5556 | B       |

3.1. Participant 1 (P₁)

Participant 1 (P₁) is a campus activist who is also the head of the senate in semester V. P₁ has good social interactions with friends and lecturers. P₁'s academic achievements are not too prominent but are good, so the mastery of P₁ material is good enough. During the P₁ activities were monitored following the activities well. This is supported by the results of interviews with tutors. The tutor teacher believes that the learning plan made by P₁ is good enough. However, P₁ in its implementation in the classroom is still fairly stiff, especially from the use of very formal language. However, the overall class mastery that has been done by P₁ is good. Humor has several assets that can help in improving learning in general [10].

After the test results are obtained, the data analysis of interviews and observations, then performed a comparison to determine whether the data obtained is valid or not. Following are the quality of the planning, implementation and evaluation results of P₁ as shown in Table 2.
Table 2. Results of $P_1$

| Exam Results | Interview Result | Observation Results |
|--------------|------------------|---------------------|
| 70.7778 (Good Category) | $P_1$ finds it difficult to throw a conversation that can break the ice. This is because the nature of $P_1$ is indeed very rigid and formal. | $P_1$ has good classroom management skills. This is marked by the skills to open and close the lesson, the skill to explain the lesson, the skills to hold variations, and the skills to provide reinforcement. |

Conclusion: $P_1$ does the planning well enough so that the implementation of learning in class can be managed well. $P_1$ requires a lot of practice to be able to implement planning properly.

3.2. Participant 2 ($P_2$)

Participant 2 ($P_2$) is a student who took a semester off and almost resigned. Previously recorded having resigned at the university before. $P_2$ has closed communication with friends and lecturers. Academically, $P_2$ is classified as a smart kid but not diligent. So that the value obtained is more hampered from the attitude that is not good. It has also been carried out in Teaching Practice activities, where the tutor complained that $P_2$ did not consult the Learning Plan before learning [11]. Besides this application function, they describe several other functions of word problems in the mathematics classroom, such as: to motivate pupils, to evaluate their intelligence and mathematical abilities, to train pupils’ creative and heuristic reasoning, and to develop new mathematical concepts and skills.

After the test results are obtained, the data analysis of interviews and observations, then performed a comparison to determine whether the data obtained is valid or not. Following are the quality of the planning, implementation, and evaluation results of $P_2$ as shown in Table 3.

Table 3. Results of $P_2$

| Exam Results | Interview Result | Observation Results |
|--------------|------------------|---------------------|
| 68.1111 (Good Category) | But it is unfortunate, communication with tutors is not done by instinct. | $P_2$ difficulties in managing classes, so learning in the classroom feels saturated and students are less motivated to participate in learning. |

Conclusion: $P_2$ getting up learning tools is less than optimal. Minimal experience makes $P_2$ lacking variation in growing student motivation.

3.3. Participant 3 ($P_3$)

Participant 3 ($P_3$) is a student who is academically less than the other 3 teaching practice participants. But the fighting spirit is very high, this can be seen from the enthusiasm of $P_3$ in participating in teaching practice activities well. Communication with tutors is done intensively so that the delivery of material gets a lot of input. In fact, it is not uncommon for $P_3$ to replace tutors to teach in other classes. Learners can display conceptual understanding which can be referred to as an integrated and functional grasp of mathematical ideas [12].

After the test results are obtained, the data analysis of interviews and observations, then performed a comparison to determine whether the data obtained is valid or not. Following are the quality of planning, implementation, and evaluation results of $P_3$ can be seen in Table 4.
Table 4. Results of $P_3$

| Exam Results | Interview Result | Observation Results |
|--------------|------------------|---------------------|
| 78.1111      | $P_3$ gets praise from the tutor teacher related to the delivery of material that has been done. $P_3$ receives a lot of input from the tutor teacher and is implemented in classroom learning. | $P_3$ really enjoy the interaction with students. Learning in the classroom happens conducive and students are motivated to participate in learning. |

Conclusion:

$P_3$ really enjoy the interaction with students. Learning in the classroom happens conducive and students are motivated to participate in learning.

3.4. Participant 4 (P4)

Participant 4 ($P_4$) is a student and administrative employee in a secondary school. His experience in the world of work provides an illustration to build good communication. $P_4$ has good class mastery in learning. Ndlovu and Brijllall [13] purported that many students performed badly in mathematics because their learning is associated with a lack of conceptual understanding of concepts. Learners can display conceptual understanding which can be referred to as an integrated and functional grasp of mathematical ideas.

After the test results are obtained, the data analysis of interviews and observations, then performed a comparison to determine whether the data obtained is valid or not. Following are the quality of the planning, implementation and evaluation results of $P_4$ as shown in Table 5.

Table 5. Results of $P_4$

| Exam Results | Interview Result | Observation Results |
|--------------|------------------|---------------------|
| 76.5556      | $P_4$ has good communication with students. Students get a lot of motivation. But the material given several times is not completely implemented. | $P_4$ not yet mastered the material taught, so the learning objectives are not fully implemented |

Conclusion:

$P_4$ has good experience in communication so it’s easy to break the ice. However, $P_4$ has limitations in presenting material clearly and clearly.

Professional vision refers to teachers’ ability to see and interpret features of classroom situations that are significant for students’ learning [14]. Educational literature generally distinguishes two integrated sub-processes in professional vision namely noticing and reasoning. Noticing involves teachers’ ability to focus on classroom events that are relevant for effective teaching [15]. Put differently, it describes teachers’ ability to select elements in instruction that foster or constrain learning from the myriad of other things happening in a classroom [16].

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4. Conclusion
Observation provides a lot of information that is very useful for prospective teachers to develop their competencies. Teaching practice participated does not get many a chance to practicing and they shall not find special guidance from tutor teachers. Teaching practice participated would be able to execute study practice independent learning. Experiences within were making plans the implementation of a lesson has got a good deal. Teaching practice participated had a wealth of experience in their activities to get extra on the school. The achievement of competence would be good enough. Teaching practice participated is still following a lecture once at the campus. Teaching practice participated need to improve its ability in using the learning methods and the media learning to promote disorder too.

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References
[1] Bahcivan E and Cobern W W 2016 Investigating coherence among Turkish elementary science teachers’ teaching belief systems Pedagogical Content Knowledge and Practice 41 63–86.
[2] The University of Botswana, Faculty of Education 2011 Teaching Practice/internship Handbook 2011/2012 (Gaborone: University of Botswana).
[3] Mannathoko M C 2013 Does teaching practice effectively prepare student-teachers to teach creative and performing arts? The case of Botswana International Journal of Higher Education 2 115-21.
[4] Bahcivan E and Cobern W W 2016 Investigating coherence among Turkish elementary science teachers’ teaching belief systems Pedagogical Content Knowledge and Practice 4110 63–86.
[5] Botha M and Reddy C 2011 In-service teachers’ perspectives of preservice teachers’ knowledge domains in science South African Journal of Education 31 257-74.
[6] Agbo S 2003 A Learning Community Model for Professional Development and Transformational Teacher Education: Linking Teacher Preparation with In-service Teacher Learning and School Improvement. In: Preston, D. S. (Ed.), The Idea of Education (Amsterdam, NY: Radopi).
[7] Khalid F 2014 The impact of teaching practice experience in shaping pre-service teacher ‘professional identities Mediterranean Journal of Social Science 5 1921-27.
[8] Sukmadinata N S 2005 Metode Penelitian Sosial (Bandung: PT. Remaja Rosdakarya).
[9] Miles M B and Huberman A M 1994 Qualitative data analysis: An expanded sourcebook (New York: SAGE Publications).
[10] Ivy L L 2013 Using humor in the classroom The Education Digest 79 54–57.
[11] Wim Van Dooren W V, Len S, Wortelaer H D, and Verschaffel L 2019 Improving realistic word problem solving by using humor Journal of Mathematics Behavior 53 96-104.
[12] Mutambara L H N, Tendere J, and Chagwiza C J 2020 Exploring the conceptual understanding of the quadratic function concept in teachers’ colleges in Zimbabwe EURASIA Journal of Mathematics, Science and Technology Education 16 1817.
[13] Ndlovu D and Brijlall D 2015 Pre-service teachers mental constructions of concepts in matrix algebra African Journal of Research in Mathematics Science and Technology Education 19 1-16
[14] Van Es E A and Sherin M G 2002 Learning to notice: Scaffolding new teachers’ interpretations of classroom interactions Journal of Technology and Teacher Education 10 571-595.
[15] Seidel T and Stürmer K 2014 Modeling and measuring the structure of professional vision in preservice teachers American Educational Research Journal 51 739-771.
[16] Blomberg G, Stürmer K, and Seidel T 2011 How pre-service teachers observe teaching on video: Effects of viewers’ teaching subjects and the subject of the video Teaching and Teacher Education 27 1131–1140.
[17] Borko H, Jacobs J, Eiteljorg, E, and Pittman M E 2008 Video as a tool for fostering productive discussions in mathematics professional development *Teaching and Teacher Education* 24 417-436.

[18] Widodo S A, Prahmana R C I, Purnami A S, and Turmudi 2018 Teaching materials of algebraic equation *Journal of Physics: Conference Series* 943 012017.