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Describing prospective teachers' promote action in online mathematics learning

Jauhara Dian Nurul Iffah*, Lia Budi Tristanti

Department of Mathematics Education, STKIP PGRI Jombang, Indonesia

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ABSTRACT

Promoted action is an activity offered by the teacher to students so that they can develop new knowledge or experience. The promoted action chosen by the teacher will depend on the knowledge possessed by the teacher. It is commonly referred to as pedagogical content knowledge (PCK). In addition, to become a professional teacher with a well-measured PCK, the prospective teacher has been trained since the lecturing process. This study aims to describe promoting the actions of prospective teacher students in learning mathematics online. It is descriptive qualitative research on the subject of four students who take the peer teaching program. Subject selection was based on the PCK criteria of subjects with categories 0-0, 0-1, 1-0, and 1-1, which indicated the order of levels of pedagogical knowledge- content knowledge. Data collection methods are tests to determine the PCK of prospective subjects, observation of the learning process, and documentation of learning records. The triangulation used to see the credibility of the data is time triangulation. The results showed that all subjects elicited promoted actions in motivation, concentration, processing, and exploration phases. The four students have different ways of bringing up encouraging action based on their ability criteria.

INTRODUCTION

Education is a conscious and planned effort to create a learning atmosphere and learning process so that students actively develop their potential to have spiritual strength, self-control, intelligence, noble character, and skills needed by themselves, society, nation, and state (The Law of Educational System in Indonesia, 2003). Education is held by empowering all components of society to participate in the implementation and control of the quality of education services. The implementation of education cannot be carried out by only individuals, but there is a national education system applied. The national education system is all components of education that are interrelated in an integrated manner to achieve national education goals. This component consists of (1) educational objectives; (2) educators; (3) students; (4) curriculum; (5) facilities and infrastructure; (6) learning media; (7) learning resources; (8) education management; (9) educational evaluation; (10) educational supervision; (11) research in education; (12) dedication in education. This study will not only discuss all education components, but it will also discuss educators and learning media.

Educators are educational staff who are qualified as teachers, lecturers, counselors, tutors, widyaiswara (civil servant of education), instructors, facilitators, and other designations according to their specificity and participation in providing education (The Law of Educational System in Indonesia, 2003). Educators, as one component of the National Education System, play an essential

*Corresponding author: jauharadian.stkipjb@gmail.com

role in learning activities. Learning is an interactive process between students and educators and learning resources in a learning environment. From now on, educators at the school level are referred to as teachers. Teachers should have four competencies: pedagogy, personality, social, and professional (The Law of Educational System in Indonesia, 2005). Teachers' pedagogical competence refers to the competencies of students teaching management that at least included some points. Those are the comprehensions of education base or insights, students, curriculum/syllabus development, teaching design, educated and dialogic implementation of teaching, technology use, evaluation on learning result, and student development to actualize their various potencies. Teachers should master science, technology, art, and cultural knowledge toward professional competence. They are teaching the course materials based on the content standard of the education program, subject matter, and group of subjects. The materials cover the relevant concept and methods of art, technology, and scientific disciplines which were conceptually coherent to an education program, subject matter, and group of subjects to be taught (The Law of Educational System in Indonesia, 2008).

The competencies that teachers must possess as formulated in the Constitution are in line with Shulman (1986) about Pedagogical Content Knowledge (PCK). Shulman (1986) was the first to use the term Pedagogical Content Knowledge (PCK) when trying to help professional teachers. PCK is described as the result of understanding teaching material (content knowledge) and how to educate (pedagogical knowledge), which blend into teacher needs. Shulman (1986) formulated that PCK is an understanding of effective learning methods to explain certain materials and what makes certain materials easy or difficult to learn (Shulman, 1986). Two major parts of PCK are content knowledge and pedagogical knowledge. Shulman also stated that pedagogical knowledge is related to teaching methods and processes, including class management, assignments, lesson planning, and student learning. Content knowledge includes knowledge of concepts, theories, ideas, frameworks of thought, methods of proof, and evidence (Shulman, 1986). PCK is defined broadly so that the PCK idea not only can be applied to every teacher at every grade level but it is also explained that each teacher has or needs a different PCK.

Krauss *et al*. identified three dimensions of PCK, which were important for teaching mathematics. Those three dimensions were teachers' knowledge about math tasks, students' initial knowledge (i.e., any difficulty and misconception), and representation, analogy, illustration, or models of the math content that would be useful to be taught (Krauss et al., 2008). Teachers' PCK might determine the teaching process and affect students' learning outputs (Olfos et al., 2014). Developing and selecting tasks, representing and explaining, facilitating a productive discussion, interpreting students' responses, emphasizing students' understanding, and analyzing their misconceptions and difficulty appropriately are the elements of PCK (Ball et al., 2001). Another argument claimed that among content, curriculum, and teaching, "the knowledge of teaching" was the basic component of pedagogical content knowledge (An et al., 2004). Some researchers argued that a successful math teacher needed a strong foundation in pedagogical content knowledge, referring to professional knowledge for teaching specific branches of knowledge (Wilson et al., 1987, 2016).

This study focuses on researching student teacher candidates because to become a professional teacher, someone must start being trained after becoming a student. Furthermore, some studies showed that the comprehension of teaching mathematics to reach a qualified education is a specific professional knowledge that could be obtained through training in university and developed through reflection on teaching practices (Fennema & Romberg, 1999; Grossman, 2008; Morris et al., 2009). Therefore, prospective teachers got materials about teaching and learning theories to give them knowledge about teaching. More specifically, prospective math teachers also had chances to do teaching practices to implement any theories they had learned before. The importance of teaching practices was to familiarise them with the real teaching circumstance. Hence, they should prepare themselves since they are in college. Teaching mathematics needs a good knowledge of mathematics contents and pedagogical knowledge (Turnuklu & Yesildere, 2007). Therefore, in college, prospective teachers should learn about any competencies of being a good teacher theoretically and practically to be an excellent professional teacher. This indicated the importance of identifying prospective

teachers' PCKto prepare them to be professional teachers. This identification will be the basis for selecting students as research subjects and will describe the learning process they are doing.

Teachers might apply various models and teaching methods during their teaching process. They took their decision by considering some matters such as the difficulty of teaching materials, students' characteristics, and adequate facility (Lui, 2012). Students' different characteristics and competencies were the main concern for teachers. The main challenges in the teaching of mathematics include making mathematical logic and proof as a means of justification and depriving the teacher of authority to decide a truth, relating mathematics, its ideas, and applications, but not treating mathematics as an isolated collection of concepts and procedures (NCTM, 2000). This shows that teachers must involve students in the learning process and that involvement is related to linking mathematical ideas. Learning steps that can lead to active students are giving students an offer to carry out an activity. It is called teacher's *promote action.*

Promote action is an activity offered by an older person to a child so that the child acts in a certain way (Valsiner, 1983). What was promoted might vary. It could be in the form of things and activities that finally made the children do a particular action. It can also be interpreted as activities offered by teachers to students that lead to new knowledge (Goos, 2005, 2012). A set of promoted actions by a teacher to students in a particular area was called the zone of promoted action (ZPA). The process of teaching by a teacher has some procedures. However, not all of them were implemented, including ZPA. The teaching procedures that dealt with ZPA referred to any activities which made students do or behave to attain new skills. In this case, the author limited the new skills to new competence, skill, comprehension, and development that students attained, given that mathematics at school was about developments since elementary grade. In this study, researchers will describe various promote actions prospective teacher students raise when teaching practice.

Some factors to be considered involved the attainment of learning outputs, learning environment, and operational cost (Anggrawan, 2019). Good teaching models generated good learning outputs, a conducive learning environment, and affordable operational costs. This current pandemic era of covid-19 made teaching activities shift from offline to online. The results of previous studies indicate that students who previously studied face-to-face with good results must be able to adapt to online learning. In face-to-face learning activities, what cannot be replaced is direct, meaningful interaction between teachers and students (Tang et al., 2013). No interaction brought fewer learning experiences among students, and thus it would be difficult to understand the course (Mairing et al., 2021). Online learning tended to give more tasks to students and less explanation by teachers. Many tasks and limited explanations made online learning less effective for students (Giatman et al., 2020; Suryaman et al., 2020). Towards online learning, students need stable internet connections, the capability to operate technology, and supporting devices. Mainly, students in villages had serious internet connection problems (Mulyanti et al., 2020; Putra et al., 2020). However, this problem could be addressed by students' autonomous learning and their confidence in problem-solving (Mairing et al., 2021). This study will focus on learning practices carried out by students online. In the future, student teacher candidates will use technology to teach with online learning. So that in the future, the development of skills will increase and is referred to as Technological pedagogical and content knowledge (TPACK). TPACK presents a dynamic framework describing teacher knowledge needed to design, implement, and evaluate curriculum and teaching with technology (Niess, 2011). However, in this study, the skills related to TPACK have not been measured. The writers still focus on the PCK of prospective teacher students because students do not have experience in teaching in the field so students' PCK can still be assessed based on the teaching theory gained during lectures.

Some previous studies have discussed *zone of promoted action* (ZPA) in both medical and school areas (Bennison & Goos, 2013; Galligan, 2008; Goos & Bennison, 2008; Iffah, Sutawidjaja, Sa'dijah, et al., 2016; Iffah, Sutawidjaja, Sadijah, et al., 2016). Another study on mathematics students found that lecturing by implementing Valsiner's theory might convince them on probability courses (Tirto et al., 2019). In addition, the research on prospective teacher PCK that has been carried out previously is still limited to describing how the PCK of prospective teachers has not led to the learning of prospective teachers when teaching practice (Ayuningtyas & Apriandi, 2019; Gultom & Mampouw,

2019; Irfan et al., 2018; Makaraka et al., 2021). The novelty of this current study was that the author detected and described promoted action by prospective teachers when they had teaching practice in secondary school. Furthermore, the author also considered prospective teachers' PCK as the criteria for subject selection. The author would make some categories of PCK and describe the *promoted action* in a teaching process based on the PCK criteria.

Considering the issue described, this study's problem was promoting action (PA) by prospective teachers when they took teaching practices in secondary school. The teaching process was online via zoom meeting. The author identified the promoted action of prospective math teachers and whether it corresponded to the phases of teaching. The subjects of this study were selected by considering the students' PCK criteria. The result of this study could help develop prospective teachers' competencies and skills in teaching. In addition, lecturers might identify their students' PCK earlier to improve their students' PCK through lecturing in case they have students with low skills.

METHODS

Research design

The writers applied descriptive-qualitative research to describe the promoted action of prospective math teachers in their teaching practice. Data was collected through a skill test called a vignette to get the subject, observation, and documentation. The vignette test is used as a tool to identify the content knowledge and teaching knowledge of prospective teacher students who will later be selected as research subjects. Observation is used as a tool to describe the subject's promote action during teaching practice. The writers observed during the subject's teaching practice and recorded the subject's learning steps which were included in the category of promoting action. The researcher uses the observation sheet guidelines and lesson plans that have been made by students as research subjects to identify and classify students' activities that are included in promoting action. Researchers only focus on observing student activities as teachers when teaching because it will describe promoting actions that appear in teaching practice. Researchers do documentation by recording all learning activities. Learning activities in this study were carried out online with zoom media. The data collected was analyzed in stages according to Miles and Huberman, namely reduction, presentation, and concluding (Moleong, 2011; Sugiyono, 2015).

Participant

The participants in this study were the students of the Mathematics Education Department of STKIP (School of Teacher Training and Education) PGRI Jombang, East Java, Indonesia. They have currently been taking a peer teaching program. The selection of research subjects was based on students who are taking peer teaching programs because they have graduated and passed courses on education and are ready to practice teaching. For subject selection, the researcher gave them an initial test called vignette. The initial test was a scenario/illustration that contained students' solutions, questions, arguments, confusion, misconception, or comments that teachers should respond (Ebert, 1993). With the vignette test, the prospective teachers were asked to give their comments/responses on what students had written. Figure 1 showed the vignette test distributed to the subject candidates to identify their PCK.

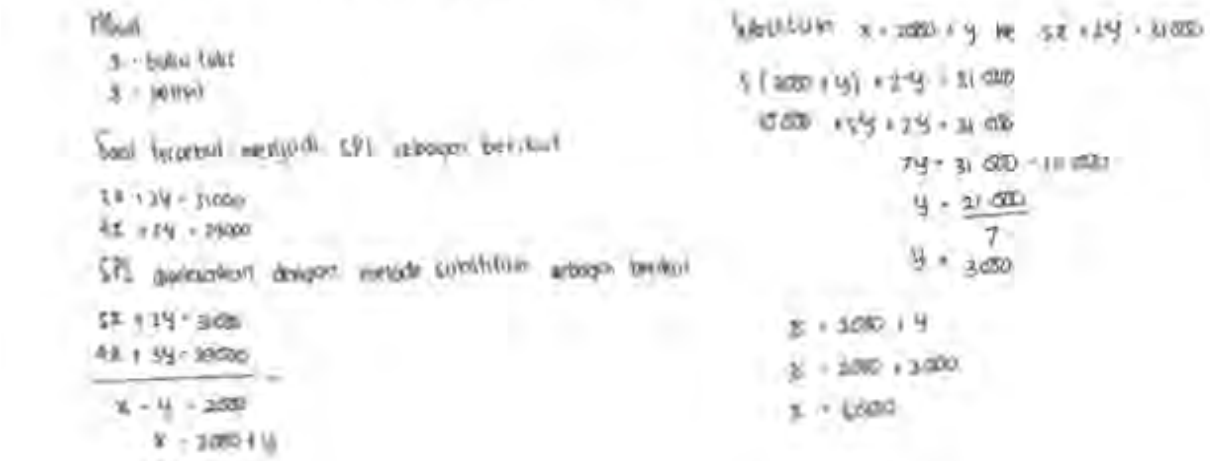
The researcher asked the subject candidates to write down their responses for points a-d on the vignette sheet. According to their responses, the researcher defined some criteria of PCK that the subject candidates had. The author used Karahasan (2010) framework to analyze the PCK of prospective teachers in this study. This framework was the completion and combination of another framework. In this framework, there were 2 components of PCK: pedagogical knowledge and content knowledge. Each of the components was classified into 3 categories: less (level 0), moderate (level 1), and good (level 2). Table 1 shows the characteristics of PCK that the researcher used for analyzing the prospective teachers' PCK, in addition to subject selection.

Case 1

In a teacher's learning gives an example of a story about SPLDV as follows:

Firza bought 5 notebooks and 2 pencils in a shop, it turned out he had to pay Rp. 31,000. The next day Nisa bought 4 notebooks and 3 pencils in the same store, it turned out that the total price was Rp. 29,000. Any price of a notebook and a pencil in the store?

Furthermore, the teacher asks students to resolve the matter by first making the mathematics model. Here's the answer to one of the students named Ghildan:



After observing the case, answer the question below:

a. Write your comments on Ghildan's answer
b. Is there something wrong or less? Please provide a sign
c. If the answer has an error or lack, what is the actual answer?
d. How do you give an explanation to students about the right answer from the matter?

Figure 1. Vignette

Furthermore, the author determined the subject of this study. They were prospective teachers who were in a peer teaching program. The subjects consisted of four prospective teachers with the following criteria:

Subject 1: pedagogical knowledge – content knowledge: level 0 – 0
Subject 2: pedagogical knowledge – content knowledge: level 0 – 1
Subject 3: pedagogical knowledge – content knowledge: level 1 – 0
Subject 4: pedagogical knowledge – content knowledge: level 1 – 1

Instruments and procedures

This study used a vignette sheet to identify the prospective teachers' PCK. This vignette was adopted from a previous study and the author only took some parts that dealt with content knowledge and pedagogical knowledge. It corresponded to the subject candidates who just got this knowledge theoretically. The test results through the student vignette were grouped according to the PCK level and the researcher took one from each level for further observation. The researcher chose one student who had good communication from each of the criteria based on the researcher's experience when teaching the student during lectures before the peer teaching program took place. Taking one student from each level is also based on the student being in the researcher's peer teaching guidance group so that the teaching practice activities of the research subject become natural to do. Table 1 shows the PCK level criteria used by researchers to take research subjects

Table 1
Criteria of PCK

Components of PCK	Level 0 (*Less*)	Level 1 (*Moderate*)	Level 2 (*Good*)
Content knowledge	Unable to express a definition correctly.	Able to express a definition correctly.	Able to express a definition correctly.
	Unable to use appropriate notation.	Able to use notation appropriately.	Able to use notation appropriately.
	Only use either declarative or procedural questions.	Still use either declarative or procedural questions.	Use any types of questions (including declarative, procedural, and conditional) appropriately.
	Unable to interpret and use representation.	Able to interpret and use both graphic and non-graphic representation.	Able to interpret and use both graphic and non-graphic representation.
	Unable to see the connection among different topics/sub-units.	Able to see the connection among different topics/sub-units.	Able to see the connection among different topics/sub-units, as well as take a step between the connections carefully.
	Providing and demonstrating knowledge for students.	Not only providing any instructions or adequate procedures but also assisting students to construct meanings and understanding.	Facilitating and assisting students, rather than providing answers along with their explanations.
	Introducing the procedures after the concept.	Seeing their roles as mentor, evaluator, and reminder.	Evaluating the students' understanding as well as enhancing their comprehension through questions that deal with further mathematical knowledge.
Pedagogical knowledge	Dominating any information.	Still dominating any information.	Appreciating and encouraging students to construct their mathematical knowledge through mathematical inquiry.
	Having problems in both topic and question orders during either the teaching process or teaching designing.	Only having problems on question order during either teaching process of reaching designing.	Ordering the topic material and questions/tasks appropriately.
	Feeling difficult to control and create a class with a democratic vibe/circumstance.	Sometimes capable to control and create a class with democratic circumstances.	Controlling and creating a class with democratic circumstances.

Data analysis

Data analysis in qualitative descriptive research is data reduction, data presentation, and concluding. Data reduction is done by removing data that is not under the research objectives. In this study, the reduction was carried out by removing data about the activities of research subjects that were not included in the promote action category. The presentation of the data is done by presenting the results of data reduction and grouping the data. In this study, the reduced activity data of research subjects were grouped based on the promoted action and learning phase In grouping, the researcher also played the learning recording to confirm the results of the observations and added if any data was missed when making observations. The results of the grouping are presented narratively. Based

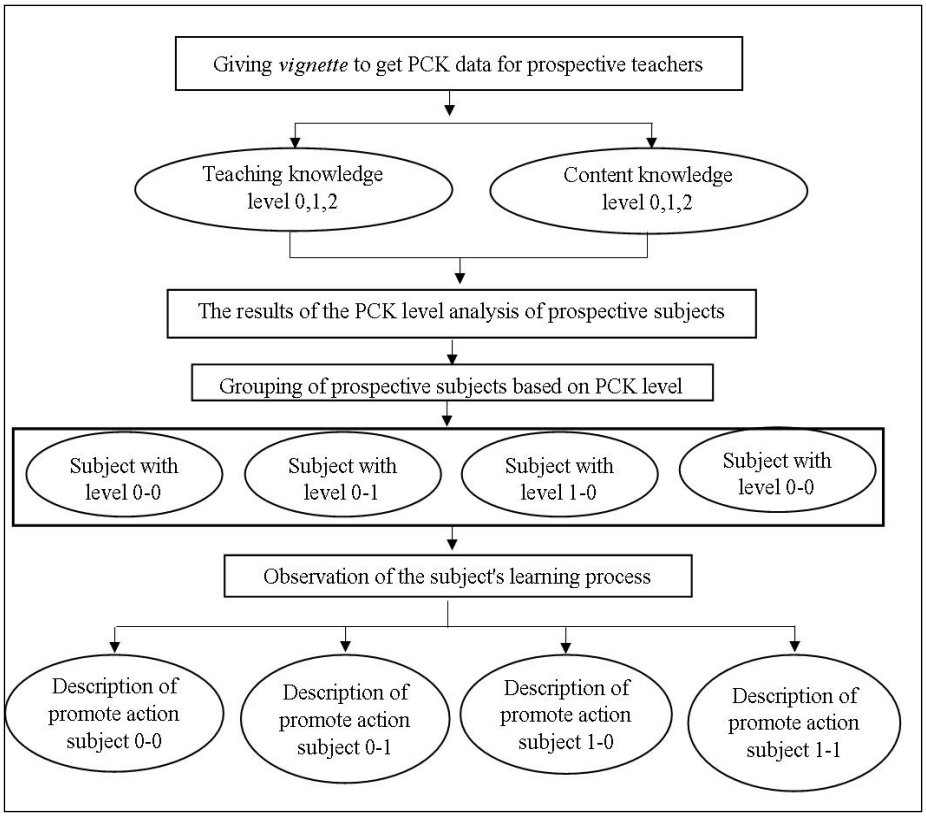


Figure 2. Research procedure

on the results of the presentation, the researchers concluded the form of promoting the action of prospective teacher students in learning mathematics which was carried out online (see Figure 2).

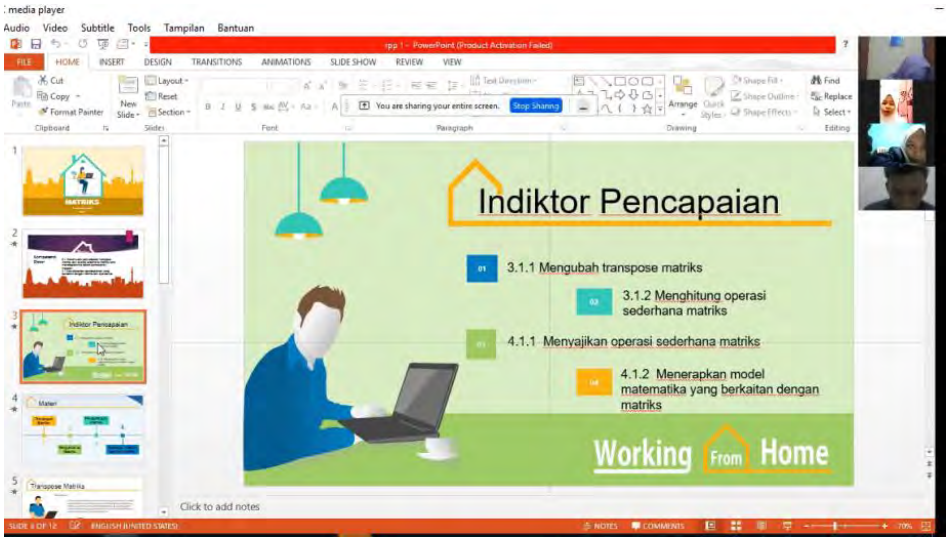
Triangulation is a technique of checking the validity of data that utilizes another thing (Creswell, 2012; Moleong, 2011; Sugiyono, 2017). The study used time triangulation to test the accuracy of the data. Researchers compared the results of the first and second observations and documentation taken at different times. The first and second data retrievals have the same characteristics so that they meet the valid criteria

FINDINGS

Promoted action by subject 1

Subject 1 implemented her teaching practice with her classmates as students. The author recorded the process of teaching and then analyzed the result. In the motivation phase, the promoted action that should appear was asking students to correlate a given example to the material to be discussed. However, it seemed that Subject 1 delivered the teaching objectives and asked the students about the previous material for their initial activity. She displayed her teaching objectives on the slides of power point. Figure 3 shows the learning objectives explained by the research subject She conveyed that the current teaching objective was matrix operation. She directly conveyed the objective without asking the students to correlate the example with the material to be discussed. Next, the subject asked the students to explore their knowledge through questions related to the previous material. Then she asked them some questions that dealt with the definition of matrix and the types of matrix. These questions were for all students in class. She asked these questions to identify whether the students had already understood the previous material. Nevertheless, none of the students responded to her question. They claimed that they had forgotten, had not understood yet, and some of them had decided not to give any response.

Since the students could not address her questions, she briefly re-explained the answers to the questions. In this case, she did not assist them in getting the answer but directly re-explaining them. It seemed that Subject 1 was lack of exploring the students' competence. This point is vital to detect



Translation:
3.1.1. Change transpose matrix
3.1.2. Calculate simple operation matrix
4.1.1. Complete a simple matrix operation
4.1.2. Apply mathematical models related to matrix

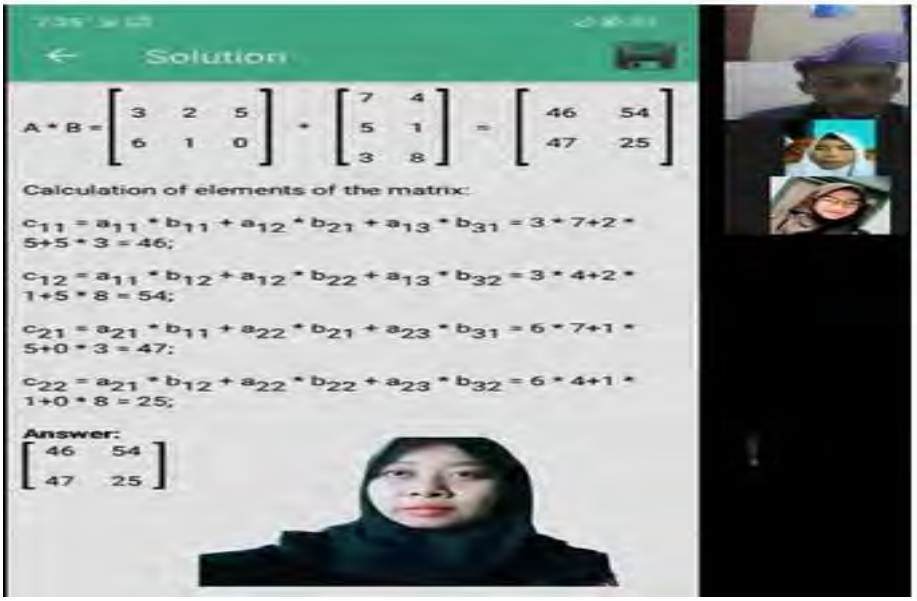
Figure 3. Subject 1 expressed the teaching objectives and proposed some questions

students' initial competence and whether or not they are ready to get additional material. However, the subject had gone through the initial phase of her teaching, called apperception (following the teaching plan she had designed), although it was less optimal.

The next phase of the teaching activity was about delivering material, called the concentration phase. The subject applied zoom meeting and an application of matrix operation. Students had already installed this application via their smartphones. The promote action that appeared was asking students to prepare the learning instrument. The subject asked them to install the application a day before having the zoom meeting. She identified the scope of the material by making a voice recording that explained the material. When it came to explaining the material, hence, she played the recording during the zoom meeting. The session was not only explaining the material being discussed but it was also explaining how to operate the application. She solely utilized the application to explain the material without having any other procedural explanation. The students only focused on the explanation and the application. With this activity, the subject successfully delivered the material. However, it was considered incomplete, as she did not give any procedural explanation. This made students difficult to understand the explanation of matrix operation thoroughly. The application might display the answer along with the method. However, the teaching process seemed less meaningful when the students had no idea about the roots of the solution displayed. The procedural process of attaining the solution remained necessary for students, given that they would not always be allowed to use the application for problem-solving.

She explained the material using the application, and the students needed to input the numbers of the matrix, and the result would be displayed in just one click (see Figure 4). Unfortunately, they might not understand the procedural counting method of the matrix operation. Besides, they would understand matrix elements, especially those useful for counting matrix. The subject neither asked them to identify the material nor constructed the concept. Otherwise, she directly explained it using the application. In this case, the students were her classmates who had already understood the procedural steps of solving matrix problems. When it comes to high school grades, they might not understand the material well. In the processing phase, the subject did not fully assist the students in understanding the material. She should have asked the students to construct the concept according

Subject 1 in the zoom meeting



The explanation by Subject 1.

The subject reads the numbers entered in the application and the end result out of the application.

Figure 4. Subject 1 explained the material being discussed via an application

to her instruction, but it was not apparent since the application automatically displayed the final answer. They just needed to read the answer without needing to construct the concept.

In the exploration phase, the subject showed her promote action by asking the students to apply the concept of solving all the given problems under her assistance. They could also use the application to solve the given problems. The task should be completed in a group. She divided them into two groups and gave them a group task. They were divided randomly. Given that it was online teaching, the subject observed the group work via group chat. She made a WhatsApp group chat consisting of the students and the subject. The task was displayed in the form of PowerPoint via zoom meeting, and the subject began to observe the discussion process through group chat.

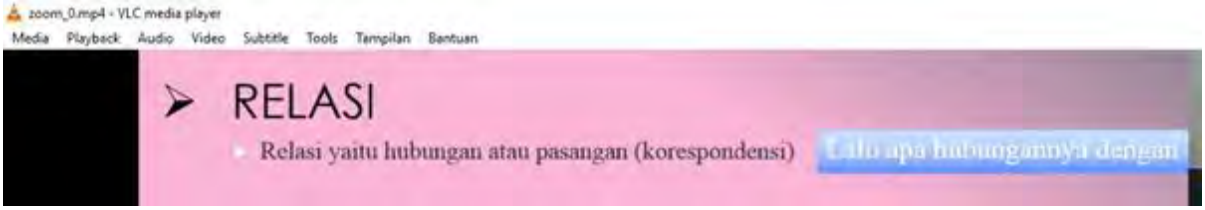
The discussion worked very well. It was found from the student's active participation in each group chat. Some students asked some questions to their group mates and the subject. The other group mates responded to their questions. As students were already familiar with WhatsApp, they had no problem using it. In this phase, they could follow the subject's instructions well.

After they held the group activity, the subject gave them another task as their next activity. She identifies the students' understanding by asking them to complete the task individually. The task was displayed in the form of PPT via zoom meeting. She asked them to complete the task through the application. She gave them some minutes to complete the task individually. The task was given one by one. She then asked them to present their work. They could choose the method, either manual or used application, to complete the task. However, if they decided to use the application, they could not explain in detail the process of solving the problem since the application automatically displayed the final result. In this case, Subject 1 did not show any promoted action in the feedback phase. She immediately closed her teaching when all the tasks had been completed and discussed together

Promoted action by subject 2

Subject 2 chose relations and function as the material of her teaching. Her PCK level was 0-1. He began his teaching activity with the motivation phase by conveying the teaching objectives and the importance of learning this material. The promote action was giving questions to explore and correlate with the previous material.

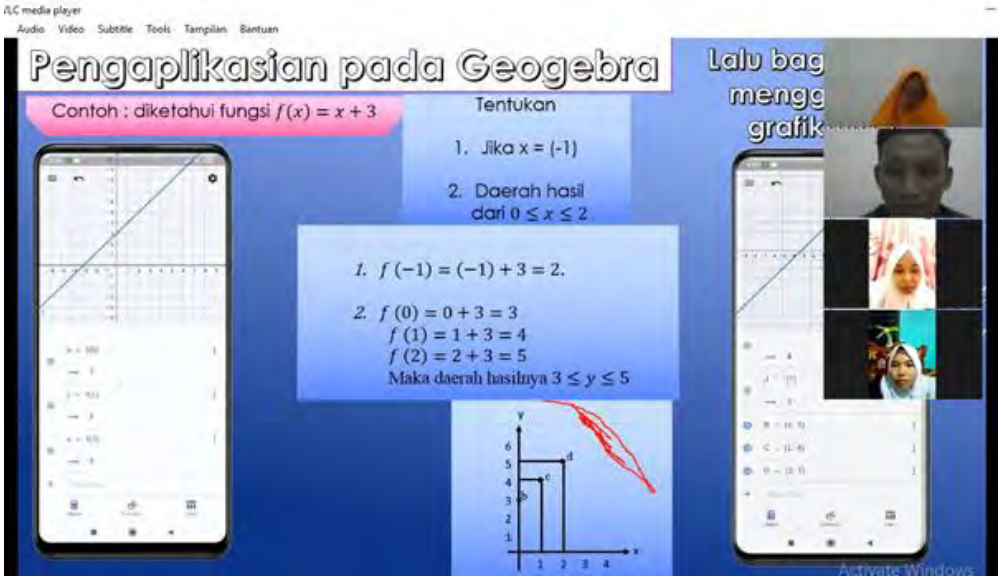
Relations and functions were not hard for students. Therefore, when Subject 2 proposed the question of its relations, many students could answer the question. Some of them could answer the question correctly, but some others were wrong. Concerning the students' wrong answers, Subject 2



Translation:
Relation
Relation is the relationship or correspondence

Figure 5. Subject 2 correlated with the previous material

Subject 2 in the zoom meeting



The explanation by Subject 2

Operation on geogebra subject simulates how to draw a graph using the geogebra app.

Figure 6. Subject 2 used Geogebra to draw the graphic of algebraic function

immediately corrected their answers without giving the questions to the other students, hoping they would give a correct answer. Based on the students' correct answers, the subject gave reinforcement and complimented them.

After responding to the student's answers, Subject 2 explained the answer to the question theoretically (see Figure 5). During the explanation, what made it enjoyable was the concentration phase. In this phase, the teacher directed the students' attention and focused on the primary substance of the material being discussed. The promote action emphasized the material's main substance, including each nature of relations. She marked the important parts of what she wrote. She also underlined some headlines. Since she gave much description on the slides of PPT, she needed to mark and underlie their important concepts.

Subject 2 went on to the exploration phase to encourage students to attain their expected learning output. The promote action was asking them to use the concept of relations to solve the problem. The students should complete the task individually. In addition, Subject 2 only gave two tasks displayed via zoom meeting. After asking the students to complete the given tasks, Subject 2 checked their works through their work presentations. Every student completed the given tasks. However, they took more time to complete the tasks. It was seen from how often the subject asked whether or not they had completed their tasks, and they said 'not yet. The longer time students spent completing the tasks indicated that they found it difficult to complete them, but they were not conveyed in class. Then, the student went on to function.

Subject 2 displayed the material in a complete, neat, and systematic way using PPT. However, he only read the PPT without giving any explanation at all. Although he could ask the students to construct a concept about function, he only asked them to listen to what he read. In the concentration phase, he could emphasize by underlining the important parts although he only read the material in the form of an example task about algebraic function. This emphasis was aimed to make the students focus on what they read. Indeed, what she did was interesting. Subject 2 then went on to the exploration phase by asking the students to use the application to draw a graphic of a simple algebraic function. The application she used was Geogebra.

Subject 2 explained how to draw a graphic using Geogebra, This can be seen in Figure 6. In the exploration phase, the students used media or mathematics instruments. The media she used was interesting as it could create a graphic which often brought difficulty to students. However, he was less interactive in delivering the instruction of operating Geogebra. Since the students only listened to what the teacher read, not all of them understood how to use Geogebra to draw a graphic of an algebraic function which was interesting to apply. Nevertheless, the students were not asked to demonstrate the application to draw a graphic since it was still teacher-centered. Hence, the subject could not measure whether or not the students understood how to use the application

Subject 2 asked the students to correct the graphic based on Geogebra. Unfortunately, they could not optimally respond to what she asked for since they had not tried the application yet. Hence, only a few of them gave responses to the use of Geogebra. In this case, the subject still had to assist the students actively. She did not implement a feedback phase in her teaching process as she did not ask the students to conclude the material they discussed in that meeting.

Promoted action by subject 3

Subject 3 was classified into level 1 for her pedagogical knowledge and level 0 for her content knowledge. The author recorded her teaching activity and analyzed it. Beginning her teaching activity, Subject 3 began with giving a question about the previous material. The material was about absolute value. Subject 3 asked the students about the previous material (absolute value), presentation slides are shown in Figure 7. In the motivation phase, she showed her promote action by asking the students to correlate a given example with the material to be discussed. Along with an example of a kid having a scout practice by moving back and forth, Subject 3 asked, “what is the concept of absolute value according to the example?” She gave some illustrations to remind them. in the concentration phase, she showed a promote action by asking the students to identify the scope of the material as the initial description. After they got their memory about the concept of absolute value, the subject went on by asking them to identify the types of absolute value. She gave some types and asked them to identify the features and the types of the absolute value. During the teaching process, the subject always gives many chances for the students to ask questions. When none of them asked any question, she sometimes gave a question while choosing one of them to answer the question. It was aimed to direct their attention to the material being discussed. If their answer was correct, she would give reinforcement and compliments. Otherwise, if their answer were wrong, the subject would assist them in finding the correct answer.

Subject 3 implemented the exploration phase in her teaching process to make students reach the expected output. She showed a promote action by asking the students to utilize learning media such as a worksheet, learning instrument, and other mathematic media. This phase was employing learning media. The subject showed that the application she used was cymath. The subject waited and ensured every student had installed the application, cymath (see Figure 8). Afterward, she simulated how to use the application by inputting the type of absolute value to be completed. The final answer and detailed explanation would automatically appear in just one click. Furthermore, the subject also assisted the students in solving the given problem. She had good interaction with them. In addition, she ensured that the students could operate the application. Next, the subject asked the students to solve the given problem to see how far they understood the material.

Subject 3 asked the students to use the application and the concept of absolute value to solve the given problem. It was classified into the exploration phase, in which the students applied the given concept to solve the problem. Every student was then able to solve problems and showed the correct answers. It also indicated that the teacher could deliver the material well, and thus the

Translation:
absolute value discussion
01 absolute value concept
02 absolute value equation
03 absolute value inequality
04 practice questions

Figure 7. Subject 3 gave a question about the previous material

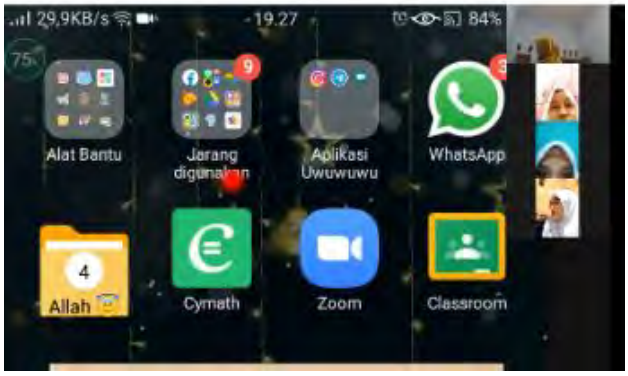


Figure 8. Cymath the application that students had downloaded

students could understand it. She did not show any feedback phase. The students seemed to have no instruction to conclude the material being discussed.

Promoted action by subject 4

Subject 4 was in levels 1-1 for pedagogical and content knowledge. She began her teaching activity with the motivation phase by exploring the students' knowledge through some questions. The material to be discussed was logarithm. She began the phase by asking, "what is a logarithm?" The subject chose some students to answer the question. She aimed for seeing their initial insight. The responses varied. Some kept silent, some gave the wrong answer, and others answered almost correctly, using their own words. After each student gave their answer, the subject explained the logarithm while giving reinforcement to their responses. Afterward, she went on to the features of the logarithm.

In the concentration phase, the subject showed her promote-action by asking the students to identify the features of the logarithm displayed. They were asked to see and show the differences among each feature. At first, the students worked together to identify the features until the subject gave questions to each of them individually. Luckily, they could identify the features under her instruction. Eventually, the students could successfully understand the features of the logarithm. Then, Subject 4 went on to the next phase by giving them problems with logarithm features.

In the processing phase, Subject 4 showed her promote action by asking the students to construct the concept of the material being learned. The students constructed the concept of logarithm based on the powers of numbers by addressing the subject's questions. In the processing phase, furthermore, Subject 4 conveyed that what they were learning should always be well memorized. In the exploration phase, she asked the students to apply the concept they constructed

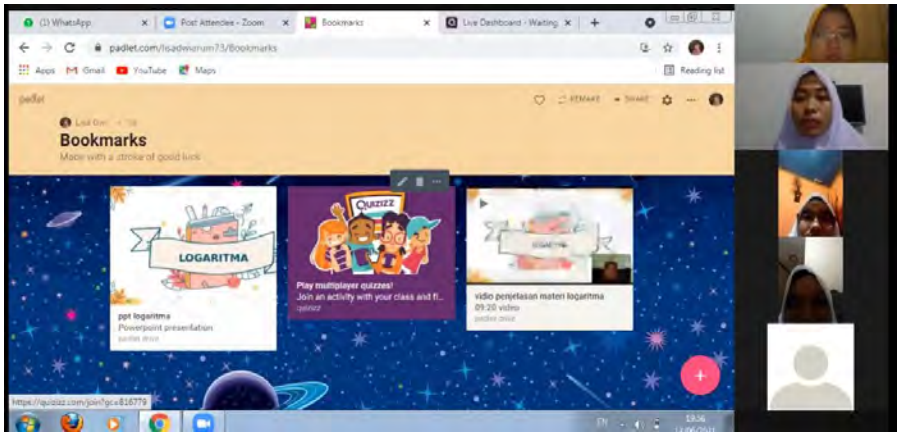
Subject 4 in the zoom meeting	The explanation by Subject 4.
	The subject explains the features that exist in the padlet application. students can access the material and conduct competitions to solve the problems on this padlet.

Figure 9. Subject 4 utilized media as means of teaching

to solve the given problems. She gave them six problems to be solved and immediately discussed. Those problems were all related to the features of the logarithm. When addressing the problems, she called the students individually to solve the problem and mentioned which feature they used immediately. However, she would assist the student who took difficulty finding the correct answer. As those problems were discussed immediately, the students could also see whether their work was correct or wrong. The subject asked them to correct their work once they found that their work was wrong. Subject 4 identified the students' performance and assisted those who were hard to understand the material.

In the exploration phase, the subject assisted the students in reaching their expected performance/output through learning media. She made an interesting media to encourage students' motivation to learn mathematics. Besides, she facilitated them to discuss the given problems and corrected their answers together

Subject 4 used a *padlet* as means to explain the logarithm. It contained material to be discussed in the form of PPT and some problems were displayed as quizzes. The students were interested in that media and thus, motivated them to study as the physical appearance of the media was interesting. At the end of the teaching, the subject directly ended the class meeting without asking the students to conclude the material being discussed (see Figure 9).

DISCUSSION

This study aimed to see any promote actions that prospective teachers might show during their mathematics teaching practices. The research selected the subject of the research based on the level of PCK. The result found that those four subjects with different levels of PCK had different teaching outputs. In general, subjects with lower pedagogical and content knowledge are taught using a simple method and applied to the procedures of teaching. The higher the PCK, the method of teaching became simpler and to-the-point. In addition, they would take more effort in exploring media. The results of this study are relevean to other studies which state that there are differences in the way of learning that is influenced by the teacher's PCK (Bowie et al., 2019; Capraro et al., 2005; Livy et al., 2019)

Those four subjects showed promote actions in their motivation phase of the teaching process by conveying their teaching objectives. Furthermore, they also gave questions related to the particular materials to explore their students' initial knowledge. This was important as they should consider their students' learning experience (Goos & Bennison, 2008). Students' initial insight and learning experience might help the students construct new insights. It was consistent with the constructivist perspective that teachers should give chances to students to construct their knowledge actively by considering their initial insights (Sa'dijah, 2001). Next, the subjects delivered their teaching material using media, which was inseparable from the online teaching and learning process.

It was consistent to further study that media could facilitate students to get concepts and experience on their own or through experiments. The four subjects also gave a lot of tasks to complete, either in groups or individually. It aimed to drill students with exercises to make them understand well the given material, besides problem-solving. Teaching mathematics was indeed familiar with lots of tasks (Goos, 2012). Therefore, the subjects let the students complete the tasks using various ways. However, the subjects would immediately assist their students once they got lost or stuck. It was consistent with a study that promoted action would bring positive vibes if teachers let their students free with their thinking (Hussain et al., 2011).

Various promoted actions and a variety of teaching depended on the prospective teachers' competence and creativity reflected on their PCK, depending on their academic competence (Aminah & Wahyuni, 2018; Gilang et al., 2019; Maryono, 2016). Subjects or prospective teachers with a PCK level of 0 could still develop their competence by either developing materials or extending the frequency of teaching practice to gain more experience and improve their PCK level (Aminah & Wahyuni, 2018; Jatisunda & Kania, 2020). This study found that the differences in PCK possessed by prospective mathematics teachers can create diversity in the practice of teaching mathematics. For prospective teachers who have PCK in the low category, it is hoped that they can improve their abilities through frequent practice and practice in more depth about mathematical content and pedagogical knowledge so that when these prospective teachers teach in class, they can become professional teachers (Bowie et al., 2019). This is relevant to the results of research by Kahan (2003) states that the ability of mathematical content contributes to the implementation of learning (Kahan et al., 2003).

The learning process carried out during the research process was done in online learning mode using zoom cloud meeting. This online learning provides new things for prospective teacher students. Because previously students only experienced direct learning, they must consider ways to package the material that can be conveyed properly. Learning activities carried out online make prospective teacher students more relaxed in preparing materials and teaching because students do it only from home, but it is also more flexible in time, and it is one of the advantages of online learning(Firman & Rahayu, 2020; Handayani, 2020). Constraints experienced by prospective teacher students include the same, namely, sometimes the unstable network that makes the material not smooth to be delivered. One of the online learning activities carried out by using the Zoom application, although it has obstacles, it still gives an interesting impression because it has features that can be utilized, besides that online learning will accelerate the digital transformation process in Indonesia (Nurmala et al., 2021; Astini, 2020).

Therefore, it can be said that although it has limitations in online learning, online learning can still be realized because it still gives an attractive impression to students. Important things must be considered and prepared by the teacher. A teacher can package learning so that it is conveyed properly, take activities to make students active, promote actions so that they can be accepted by students, and use suitable media in online learning. For this reason, it is necessary to do further research to identify promoted teacher action on various materials, as well as what media are suitable to be developed for online learning.

CONCLUSIONS

The results showed that the four prospective teachers who have PCK with different levels have different skills in bringing up promote action. The four prospective teachers carry out learning according to the phases in the learning process, but there are different ways of delivering the material. The first prospective teacher is the criteria of pedagogical knowledge (0)-content knowledge (0) only promotes action in the phases of motivation, concentration, processing, and exploration. The prospective teacher with these criteria presents material briefly and lacks interaction with students, so the class situation is still classified as passive. The second prospective teacher is a prospective teacher with the criteria of pedagogical knowledge (0) - content knowledge (1) only promotes action in the phases of motivation, concentration, exploration, and feedback. The second perspective teacher presents the material in a more structured and clear way, but prospective teachers are less able to bring out student activity. The third prospective teacher with the criteria of

pedagogical knowledge (1) - content knowledge (0) raises promoted action in the phases of motivation, concentration, and exploration. Prospective teacher with this criterion presents the material simply and easily for students to accept. The explanation is also concise and the variety of questions is easy to do. The fourth prospective teacher with the criteria of pedagogical knowledge (1) - content knowledge (1) raises promoted action during learning in the phases of motivation, concentration, processing, and exploring. The fourth criterion of prospective teachers presents the material in a more complete and structured manner, explores the material, makes students more active, and makes good use of the media. Student teacher candidates are also more communicative with students. Based on the conclusions from the research results, it can be said that it is necessary to have a balance between pedagogical knowledge and content knowledge to bring up promote action and carry out learning well and achieve learning objectives. For prospective teachers who still lack PCK criteria, they can continue to practice and make improvements in teaching methods. The prospective teacher needs to practice by teaching a variety of materials to better prepare students to become real teachers.

It can be concluded that the four prospective teachers both carry out learning according to the phases in the learning process, but there are differences in the way they deliver the material. Prospective teachers who have a higher level of content knowledge can make the presentation of the material more complete and structured, bringing up promote actions related to more material but less interactive delivery. Prospective teachers explore the material more than how to teach. This is different from Prospective teachers who have a higher level of teaching knowledge, they present the material simply. Only a few materials were presented, but students are creative in bringing up promote actions to be able to interact with students through the media and the way prospective teachers speak.

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