

## PAPER DETAILS

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## Examining Middle School Mathematics Student Teachers' Post-Observation Conferences

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### Abstract

Teaching practicum allows prospective teachers to use the theoretical and practical knowledge they have learned as a student. The conferences held with the participation of the cooperative teachers, prospective teachers, and their peers that take place after each course, carry great importance for prospective teachers to develop their professional skills. This study aims to examine the conferences held after the practice courses in terms of type and content. Two conferences of 11 prospective teachers, who undertake teaching practicum in Muğla Sıtkı Koçman University, Department of Elementary Mathematics Education were analyzed through content analysis. It was observed that prospective teachers generally took into account the criticisms in the conferences after the first practice and took action to improve their second teaching session. The criticisms made in the second set of meetings were found to be more positive than the previous ones. Therefore, it can be said that post-conference evaluations of the prospective teachers contribute to their professional skills.

### Key Words

Practicum • Prospective teachers' reflections • Evaluation post-observation conferences

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There are numerous research highlighting the teaching practicum as an important part of teacher education for prospective teachers' developing professional identities and their practice of teaching ([Darling-Hammond et al., 2005](#); [Valencia et al., 2009](#)). Practicum allows prospective teachers to experience theory and practice simultaneously to establish a balance between the two. Prospective teachers have a chance to practice their competences in real-life situations and under the supervision of more experienced teachers ([Clarke et al., 2014](#); [Vartuli et al., 2016](#)). Their experiences primarily include learning about their profession in a practical context, getting familiar with some basic skills required in their professional life, and putting the theoretical knowledge they have acquired during teacher education into practice. Some studies have also revealed that prospective teachers are unsuccessful or struggling with putting the theoretical knowledge they have acquired during their learning process into practice ([Emre-Akdoğan & Yazgan-Sağ, 2019](#); [Frykholm, 1996](#)). Researchers have used various terms to refer to teachers who supervise prospective teachers in practice settings; such terms include supervising teachers, mentors, and cooperative teachers. In this study, the term cooperative teacher refers to the teachers in the classrooms and are assigned to the task of supervising teacher students in the practice.

Many studies in the review by [Clarke et al. \(2014\)](#) reported that prospective teachers (PTs) evaluate their teaching practicum as one of the most important components of their initial teacher education. Therefore, prospective teachers need to have an effective and productive practicum to have their teaching experience as efficiently as possible. This efficient practicum process should pay attention to factors such as the prospective teachers' effective guidance, guidance and observation of model applications by the cooperative teachers in schools ([Eraslan, 2008](#); [Paker, 2008](#)); the university supervisors' ability to provide effective and on-site guidance and feedback to the prospective teachers ([Eraslan, 2008](#); [Paker, 2008](#)); and the ability to maintain teaching experiences in the classroom environment for a long time for the prospective teachers to improve their practices ([Baştürk, 2010](#); [Kuran, 1992](#)). Among all these opportunities, the most important basic structure that affects the professional development of the prospective teachers is self-assessment, and feedback from their lecturers and their mentor teachers regarding the process of teaching practicum. During the teaching process, the prospective teacher should be aware of the issues that need improvement regarding their teaching methods by taking into account the evaluations of the teacher and the lecturer at the post-monitoring conference (after the lectures). [Chaliès et al. \(2004\)](#) emphasize that the supervised prospective teachers needs to be involved as an active participant in the post-monitoring conference in which the supervisor and supervisee collaboratively analyze the data from observation and construct knowledge applicable to the classroom practice. The evaluations made in the post-monitoring conference are revealed by PTs' reflective practice and contribute to the development of the prospective teachers. For example, [Arrendondo and Rucinski \(1998\)](#) argue that a "support/challenge" interaction pattern rather than a directive style in conferences contributes to the mentors' and prospective teachers' reflective thinking.

Studies on practicum ([Acheson & Gall, 1997](#); [2003](#); [Pajak, 2000](#)) mention three learning cycles for PTs; first one is the pre-course conferences, which aimed to provide opportunities of conversations between the cooperative teacher (CT) and PT to help inexperienced PTs with lesson planning. The other learning opportunity is during the lessons where PTs observe the CTs' teaching process in their classrooms ([Grosser-Clarkson & Neel, 2019](#)). Lastly, post-course conferences where PTs make reflections on their performance and feedback is given by CTs and the

university supervisor (Hoffman et al., 2015; Staub, 2004). Reflection is an essential focus of teacher education (Marcos et al., 2009) because it can improve the quality of teaching and is vital for professional development (Darling-Hammond, 2014). Along with the reflection and feedback from CTs and the university supervisor, in the conferences there is another important participant, the peers. Peer evaluation or peer coaching puts another dimension to the evaluation. This supplementary form of assistance to coaching, mentoring, and supervision can be defined as peer coaching. Peer coaching has emerged to reduce the workload of CTs and supervisors during the practice (Kreis, 2019). During peer coaching, students of similar level of competence can exchange and discuss their ideas for planning a lesson in a pre-course conference or what they have observed during the lesson in a post-course conference.

In the post-course conferences, peers, CTs, and the university supervisor evaluate the prospective teacher in the context of some basic elements for the course they teach, while the prospective teachers reveal their reflective observations. These meetings aim to improve the prospective teachers' upcoming lectures and teaching actions. The contents of the evaluations made in the meetings can be instructive, guiding, or just evaluation-oriented. Therefore, each of the conferences that can be held in more than one variety provides different gains to the prospective teachers. An examination of the content and process of post-course conferences may be useful in understanding how this development potential of supervision can be realized.

In this study, the evaluation process is examined under two contexts, type and content of the post-course conferences. Based on these two context of the evaluation process the leading question is as follows: "What is the context of the post-course conferences regarding the mathematics prospective teachers?" In addition to this main problem, a sub-problem will also be examined since it will also be evaluated how there is a change in the context of the post-course conferences held after the lectures of the prospective teachers: What are the overall differences between the first and second post-conferences of the prospective teachers based on the types and content of the two conferences?

### **Conceptual Framework**

The conferences in which prospective teachers' educational practices evaluated are discussed in two different scopes in the literature: "type of conferences" and "content of conferences". These two scopes will constitute the conceptual framework of the study.

The type of conferences is divided into 6 categories in the literature (Blanton et al., 2001; Fernández & Erbilgin, 2009; Erbilgin, 2014; Tsui et al., 2001). The first type is called "Questioning". These conversations are based on asking questions that will help the prospective teachers self-evaluate the lecture. The second one is the "Assessment" category. The focus of this category is that the prospective teachers make positive and negative comments about the teaching actions. "Explaining" is the third category. It covers the explanations and interpretations made by the meeting participants regarding the teaching processes of the prospective teachers. The fourth category is called "Describing". These are the speeches that cover the direct observations made regarding the teaching processes of the prospective teachers. "Suggestion" is another category. It includes the instructional advice given by the meeting participants to the prospective teachers. Finally, there is the category of "Emotional Talk". The content of this

category includes the affective discourse of the prospective teachers during the course towards their students, themselves and their future profession.

The content of the meeting speeches was also examined in 6 categories. The first of these is called "General Pedagogy". In this category, situations such as providing motivation, effective use of assessment and evaluation methods, management of group work, calling students to the board and their functioning on the board, processes of using materials, and ensuring students' participation in effective lessons were discussed and evaluated. The second category is "Mathematics Pedagogy". In this category, speeches were made based on the use of mathematical misconceptions, teaching approaches to mathematics, materials, and approaches that facilitate mathematics learning. The third category is called "Mathematical Knowledge". In these conversations, various situations where mathematical knowledge is used are discussed. "Classroom management" is another category. Speeches in this category are also meeting speeches where concepts such as discipline, effective use of time, class management, control of useful noise during the activity, and dealing with students individually are discussed. The fifth category is called "Teacher-student relations". In these speeches, concepts such as dealing with the emotional development of students, establishing rapport with students and addressing them by their names, being able to talk in and out of class, and the teacher getting to know their students were included. The last category is "General Teacher Growth". In these speeches, such issues are discussed as determining the roles of the teacher, the professional development comments of the prospective teachers towards themselves, realizing when they should use which strategy, revealing their development, determining their feelings about being a teacher and the aspects they should develop.

## **Method**

### **Research Design**

This research was designed using the qualitative research paradigm. In this research, the case study design was used to examine the content of the conferences where the prospective teachers' performed teaching in the real classroom. The situation revealed in the case study was determined as "post-course conferences" held after the lectures of the prospective teachers. Therefore, since there are more than one conference and each one is compared with each other, the multiple holistic case study design was preferred (Yıldırım & Şimşek, 2003). The unit of analysis is the observations made by the participants of the conferences (prospective teacher's peer/ critical peer, cooperative teacher, prospective themselves and the university supervisor) regarding the prospective teachers' teaching actions.

### **Participants**

Prospective mathematics teachers enrolled in the "Teaching Practicum" course in the 2nd semester of their 4th year to complete a series of assignments (e.g., observing classes, learning school policies and procedures) in elementary schools. In the academic year of 2018, 11 prospective teachers (2 males and 9 females coded as PT) undertook the "Teaching Practicum" course and they cooperated with two mathematics teachers (a male-MT and a female WT) for 14 weeks.

The prospective teachers are expected to come together with their university supervisors to discuss their observations and turn in their field notes and assignments. The internship is a two-semester experience, and elementary prospective teachers are enrolled in two practical courses in their fourth year. Student teachers prepare and teach lessons at 5th through 8th-grade levels under the supervision of their cooperating teachers for 12 weeks. Each week, student teachers meet with their university supervisors to discuss their teaching experiences and reflect on their teaching. At the end of the semester, they should complete 4 individual teaching sessions in the school by themselves and their CT, colleagues and university supervisor observe their teaching.

### **Data Analysis**

Audio recordings of 26 interviews of 14 prospective teachers were collected for the study, however, as each prospective teacher was expected to have 2 interviews and yet the 3 interviews of prospective teachers were incomplete, so they could not be included in the data set. As a result, the voice recordings of 22 interviews of 11 prospective teachers constitutes the final data set. The transcriptions of the interviews were analyzed using the theoretical frameworks of the conference content and conference type (Fernández & Erbilgin, 2009; Erbilgin, 2014).

In coding the conversational segments that included the communication of feedback, the authors adopted the notion of "idea unit", which contained a distinguishable idea, expressed in a phrase, a sentence or a number of sentences (Tsui et al, 2001). Each idea unit was then coded according to (1) the content; and (2) the nature of feedback.

The transcribed audio recordings of the meetings with content analysis (Yıldırım & Şimşek, 2003) were first coded by 2 researchers. 14 meeting transcripts randomly selected and coded by all researchers. The consistency between coders was calculated as 73%, a complete consensus was reached with the evaluations made on each data coded differently (Miles & Huberman, 1994). In addition, the analysis of one of the transcripts was examined with the prospective teacher, who is the subject of the conversation, and the harmony between his thoughts on the situation and the consistency of the codes given to the situation was also examined (Miles & Huberman, 1994). Table 1 is summarized the type and content of the speeches.

For confirmability, opinions were obtained from prospective teachers participating in the evaluation meeting on the results and their feedback on the categorizations was requested. There was no different criticism of the categories made in these feedbacks and the evaluations made by the researchers were approved. Since the analyses were based on the conceptual framework used in the studies and were supported by direct quotations from the speeches, dependability and transferability of the study were provided.

Table 1  
Scopes of the Evaluation Conference

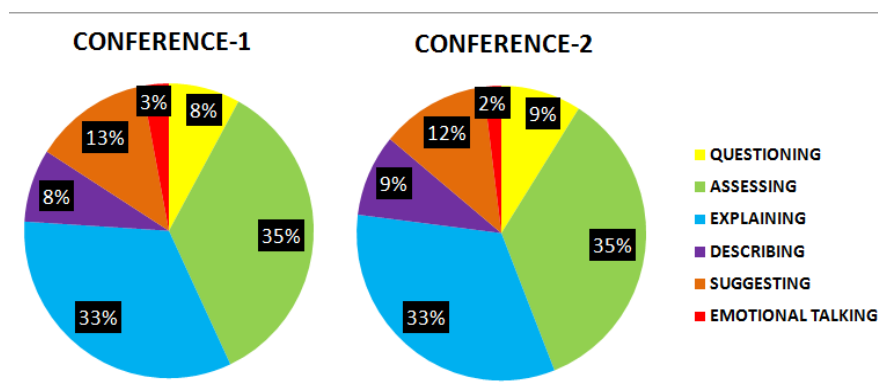
Scopes of evaluation conferences	Sub-dimensions of scopes	Examples from Speeches
Type of conference (nature of the feedback)	Questioning	Is it the questioning of the prospective teacher that leads to the dual conversations? Are the questions no questions? The student made a mistake here. What would you do to fix it? You didn't use your hand, you went wrong?
	Assessment	Positive-negative comments were made to the prospective teacher. You were very good compared to the introduction phase of the course was very successful. The transition between the materials was very successful.
	Explaining	Prospective teachers express themselves regarding their teaching processes in the course, and observers according to their situation in the course. There was a mix-up in the classroom because I couldn't find the material, I have not tried the material before because I wanted to do it with the students etc.
	Describing	The prospective teachers describe themselves or the observers describe the work of the prospective teachers. You could not use the smartboard effectively, you asked so and so questions, the student gave so and so answers.
	Suggesting	Advice on the prospective teachers' work and future lectures. All suggestions are neither direct nor indirect. You have used a little more visual when you were talking about it. During the activity, you could have used more visual and then shown it how it's done yourself.
	Emotional Talking	The feelings of the prospective teachers during the lesson. I was so nervous. I was so excited. The lesson was very happy, etc.
Content of the conference	General Pedagogy	You couldn't obtain the motivation of the kids. Group work or direct instruction, board use, to what extent should they participate in the lesson, should they be called to the board or not, group work, management, the participation of students' participation in the lesson. Participation of students in the course, assessment and evaluation.
	Mathematics Pedagogy	They'd understand better if you did that. <del>Misconception</del>
	Classroom management	Did their sense of discipline were too relaxed or too harsh for their classroom? Did the kids listen to you around a lot? Classroom noise, usage of time.
	Mathematical Knowledge	Content Knowledge -For example, when you had it done according to the y-axis (a, b), but you said (a, b) again in its x-axis. Two points cannot have the same name in the same coordinate system. -You asked about the surfaces. You called the bases, bases You called side surfaces, surfaces. They asked about how they relate to each other, you replied. The surface is bigger than the base. That was wrong.
	Teacher-Student Relations	There is emotional and more individual content. Name addressing, extracurricular conversations, conversation, one to one teacher-student relationship. They express sentimental things about students. I explained it, but they couldn't do it (can be confirmed by comments of the teacher about his students.) Including their pros and cons. I tried so hard, but the kids couldn't communicate with me. They didn't like me.
	General Teacher Growth	Which teaching strategy should I have used?, I should've only talked about math., What are the reasons for this and that., How does it feel to be a teacher?, How does the teacher develop and what should he do as a teacher if you do all this.

## Results

In this study, the conferences attended by primary school mathematics prospective teachers at the end of their lectures in internship schools were examined and these examinations were detailed under two main headings as "Type of Conference" and "Content of conference". These two main headings were divided into six subheadings and the changes observed between the two evaluation conferences held for each prospective teacher were revealed.

### *Types of Communications in Post-Course Conference*

In Graph 1 below, the scope of the speeches in both evaluation conferences is given in terms of their types. When the graphs are examined, it is seen that there is a high rate of parallelism between the percentages showing the types of 1st and 2nd conferences.



Graph1. Percentage Comparison of Types of Meeting Talks

In both meetings, it is seen that the speeches belonging to the assessment category are more dominant with 35% compared to other categories, and the least talked category is 3% emotional talking in the first and 2% emotional talking in the second respectively. It can be said that the types of speech of the questioning and description categories are 8% and 9%, respectively, with a very small difference in both meetings.

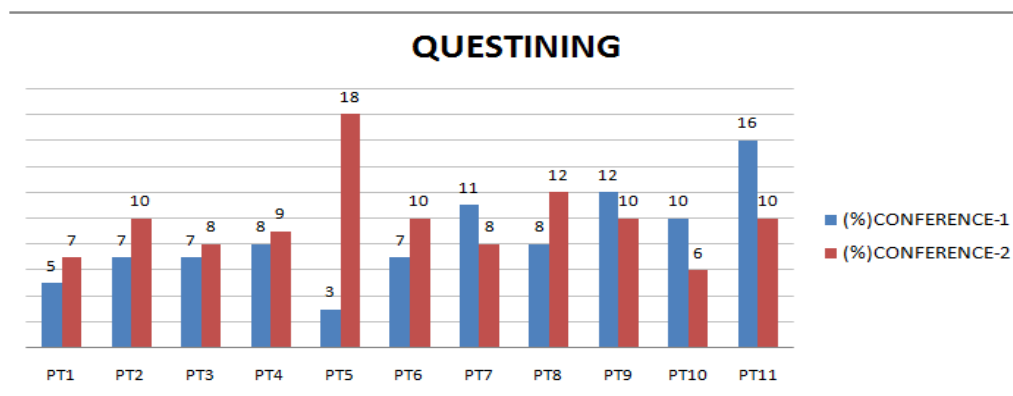
When we compare these two conferences, it is observed that the percentages of the categories of explaining (33%) and assessing (35%) in the second conference (see Graph 1: Conference 2-C2) do not vary compared to the first one (see Graph 1: Conference 1-C1). Suggestion category was 13% for Conference 1, 12% for Conference 2, 3% for emotional speech category Conference 1, and 2% for Conference 2. Speeches belonging to the definition and inquiry categories also experienced an increase from 8% to 9% in the percentages included in Conference 1 and Conference 2. The fact that prospective teachers inspect themselves in their second conference and clearly reveal the matters in the classroom can be shown as a reason for this increase.

In general, to understand how the types of speech in both conferences changed in the context of the participants, the differences of each participant in the categories of speech types were examined. These examinations are detailed below.

**Questioning:** In the speeches in the post-course conferences, questions that will enable the prospective teachers to examine the lecture and how they can improve the lecture were coded as "questioning". Considering the ratios of



the meeting speeches of this code (see Graph 1- Conference1), 8% of the first conference and 9% of the second conference were mentioned at a below-average intensity. Graph 2, in which these speeches are compared in the context of two meetings and prospective teachers, shows the intensity of the questioning-based content speeches of each prospective teachers in the first and last conferences.



Graph 2. Comparison of Conversations of the Questioning Category

When the graph is examined, it is seen that the number of questionings of 7 prospective teachers in the second meeting increased compared to the first meeting, and the conversations of 4 prospective teachers about the questions were more frequent in their first meetings. In the second set of conferences, it can be said that this was caused by the increase in the questions of the prospective teacher and the teachers' starting to share the reflective thoughts of the prospective teachers in addition to the university supervisor and their peers.

In the second post-course conference, in which PT4 asks students to create a right square prism with unit cubes, the conversation between him and his peer and the cooperative teacher can be an example of this situation:

Peer: Time was limited, but I expected you to do conversions. You could have asked a question from there.

PT2: Should I have a 180-degree rotation?

Cooperative Teacher: You could have done that, but what you really needed to do was to give the details in meters and ask for the volume in cubic decimeters.

However, while the questions about how to improve the teaching of prospective teachers were more frequent in the first conference, it was observed that the questions of the prospective teachers about their actions or failures in teaching and learning processes during the second conferences were more frequent. This shows that there are also changes in the types of questioning of prospective teachers themselves.

The 1st and 2nd conference's speech of PT5 is also an example of this change:

#### 1. Meeting:

PT5: Because they did not look at the full activity sheet, some children thought that the third question was not asked while solving the questions step by step.

University supervisor: Nice catch. What were you supposed to do then?

#### 2. Meeting:

University supervisor: What was the goal of this course? Was it solving questions or teaching problem-solving?

PT5: Actually, the goal was to teach problem-solving, but I thought I could also ask some questions.

PT5: When I first had the second question done and questioned why you did so, they directly answered the third question. Therefore, it would be more accurate to look at the questions until the third question.

The majority of the questionings in the conferences consisted of open-ended questions. It was revealed that most of these were proposed by the university supervisor among the conference participants. However, it was determined that the conference participants other than the university supervisor mostly asked short-answer and yes/no questions during the conversations.

A sample of open-ended questions of questioning category was directed by the university supervisor to PT11 in the first conference:

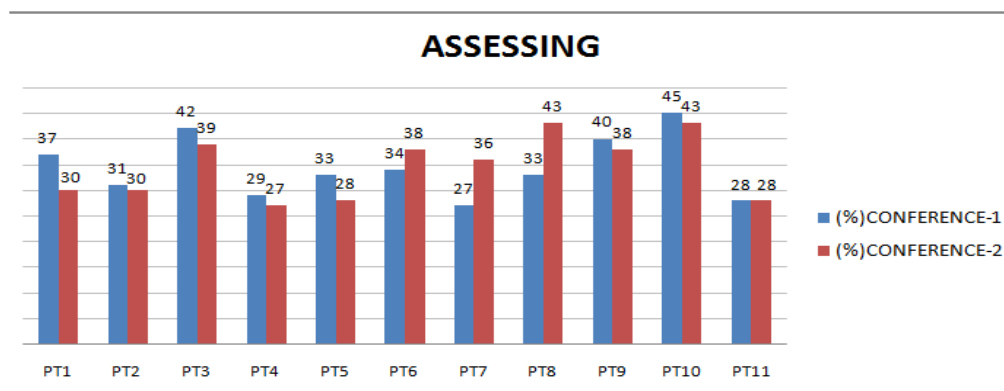
University supervisor: Could you do self assessment? Where do you think you made a mistake besides time management?

However, in the post-course conference of PT8 after 5th graders lesson, a question by the cooperative teacher that requires a yes/no answer is asked like this:

Cooperative teacher: There was a lot of noise in the classroom, could you speak loudly to make everyone sit down?

In the second set of conferences, it was seen that the self-analysis of the prospective teachers increased, personal questions about their improvements in the first conferences were examined about the teaching and learning processes in the second ones, and generally, open-ended questions were asked by the university supervisor, and the yes/no questions were also asked by the cooperative teacher, and they were explained with the examples above.

**Assessing:** Positive and negative comments from the conferences about the prospective teacher's teaching actions are coded as "Assessing". The Assessing category has the highest percentage in both two conferences with 35%. The conversations were examined and interpreted by comparing them in the context of prospective teachers in Graph 3. Looking at the chart, it can be said that 7 of the prospective teachers had more frequently mentioned the assessing in the first conference and 4 in the second conference. Nevertheless, there is not much difference in the number of evaluative speeches in the two meetings. In this category, it can be said that the comments about the first lectures of the prospective teachers were negative, and these comments generally changed more positively in the second post-course conference. In other words, while prospective teachers assessed themselves negatively in their first conference or even though the conversations made within the scope of the assessing were generally negative, positive assessments were made in the second conferences indicating that more positive and in-class teaching actions improved.



Graph 3 Comparison of Conversations of the Assessing Category

For example, while there were more negative assessments at the first conference of PT8, there were more positive assessments at the second meeting of PT8. This situation is also seen in the following sample.

#### Conference 1:

University supervisor: You could not integrate into the class. But you are a part of that class. You need to feel and hear everything that goes on in the classroom. For example, if two children hurt each other while fighting in the back row... You need to be able to feel it. You turned your back when you were using the board. You shouldn't do that. You should always write on the board while controlling the classroom.

#### Conference 2:

Peer: I think it was a much better lesson than your previous lesson. Classroom management was especially good. You were able to include all the students in the course. The students wanted to attend the class. The engage stage of the lesson was important, it went really well. And you did a great job managing the level of your voice.

At the same time, the positive comments in the second set of meetings were generally expressed by comparing them with the previous lesson. For example, the positive comments on the second lecture of PT3 were stated by the cooperative teacher by comparing it with the previous lecture:

#### Conference 1:

University supervisor: The biggest problem, you are aware of this; the instructions of the activities. Also, you give so much closed feedback to the children while walking between groups, that is, "Read" and "Look". However, the child is struggling there, asking questions to you... You need to give me more useful clues in your answers. You didn't give any useful clue.

#### Conference 2:

Cooperative teacher: You have a rising chart, that's a good thing. I thought your classroom management was a little better this time.

It was observed that the majority of the assessments were on the mathematical pedagogy knowledge and classroom management of prospective teachers. In this case, it can be said that prospective teachers especially have problems with these two issues and conversations are intensified in these two contexts. Although evaluations of the prospective teacher's subject matter knowledge have been made from time to time, it is possible to say that the number of teachers is low compared to the other two contexts.

The assessment of the university supervisor on mathematics pedagogy in the second post-course conference in which PT9 conducted drawing a linear pair angle activity using a geometry board is as follows:

University supervisor: You also switched from geometry board to dotted paper. That was a good transition. But you measured with the protractor only yourself. However, it would be more efficient if every child had a protractor and made measurements themselves.

The assessment made by the university supervisor and the cooperative teacher on classroom management in the first lecture of PT10 is as follows:

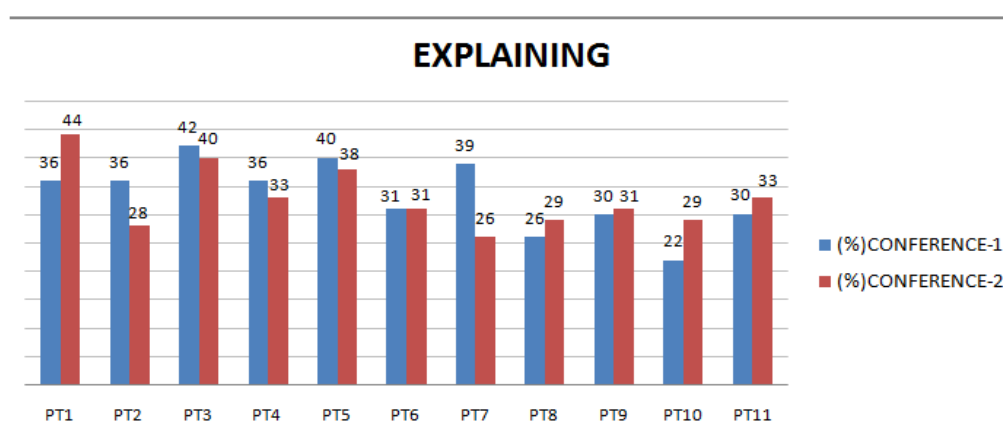
University supervisor: The purpose of our activity is to allow children to study at different paces, but when the children ask "Shall we move on to the other question?" you answered, "wait". That was very wrong.

Cooperative teacher: Students should continue to do the questions at their own pace.

University supervisor: Absolutely. Students who are fast learners do not have to wait for those that are not, and some students do not have to catch up with the fast learners. That's the beauty of using group activity in the classroom.

While the comments under the assessment category were generally negative in the first conferences, they were replaced by positive comments in the second ones. It is seen that this transition occurred because of the comparisons between the first and second teaching sessions. It can be said that the reason for the increase in positive assessments is that the prospective teachers are trying to react to the negative comments they received in their first teaching practice.

**Explaining:** In the content of the conference, the examinations made in this category, which covers the explanations and interpretations of the teaching processes of the prospective teachers, were coded as "Explanation". Considering the meeting as a whole, the explanation category is one of the most observed categories with 33% in both meetings. The comparison of each prospective teacher in the context of two conferences is given in Graph 4.



Graph 4. Comparison of Conversations of the Explanation Category

When the graph is examined, it is seen that there is not much difference between the two conferences. While the number of mentions of the explanation of one prospective teacher in both conferences showed equal distribution, 5

prospective teachers mentioned this category more frequently in the first conference and the other 5 prospective teachers in the second one. It was observed that most of the explanations were made by the prospective teacher among the conference participants. It can be said that this is also due to the prospective teacher's explanations about the questions of the other participants of the conferences. For example, in the first conference of PT3, his explanation of a situation during the lesson is as follows:

PT3: Since I could not give the instructions properly at the beginning, the whole class was confused, they could understand what I mean. So I went around the classroom to explain each group separately. I've already kept the beginning short to get straight to the event, to catch up on time.

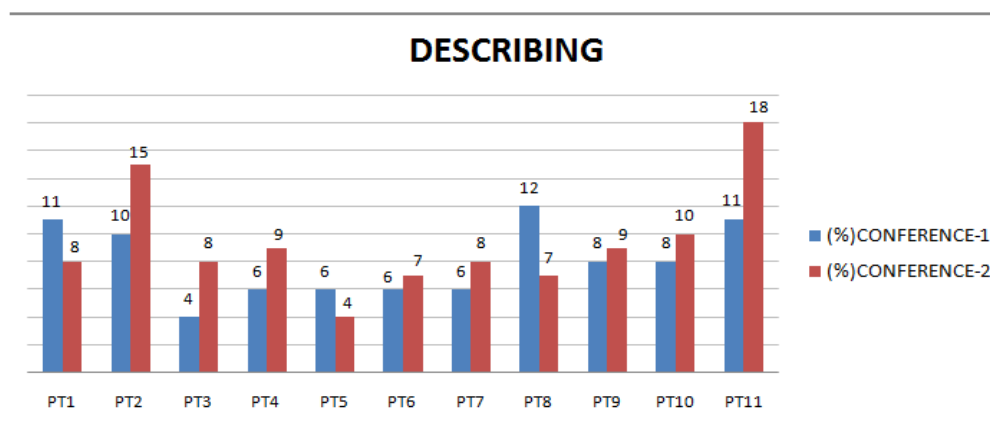
PT6's explanation for the questions by the university supervisor at the 2nd conference is given below.

University supervisor: You were unprepared for using materials. You could have prepared at home, why didn't you do it?

PT6: I wanted to do it with them. I wanted to give you the impression that I was doing it with you. But I think it would have been better if I had prepared beforehand.

There is no difference in the explanation category between the meetings. It can be said that this is an expected situation since prospective teachers constantly try to explain the inquiries directed at them.

**Describing:** Conversations covering direct observations about prospective teachers' teaching processes are coded as describing. Describing category were handled very little in both conferences with 8% and 9%, respectively. The conferences involve describing conversations are given in Graph 5.



Graph 5. Comparison of Conversations of the Describing Category

When both conferences are compared, it can be seen that only 3 prospective teachers have describing percentages are more than the second one. The other prospective teachers used more describing talking style in their second conferences than the first one. Most of the prospective teachers were keen to describe the teaching process of their practicum in the conferences. These descriptions are getting more through the conferences.

For example, a situation observed by a peer during the course of the PT10 in which he tried to teach "finding out the volume of a cylinder by the idea of using surface area of the circle with the same centers."

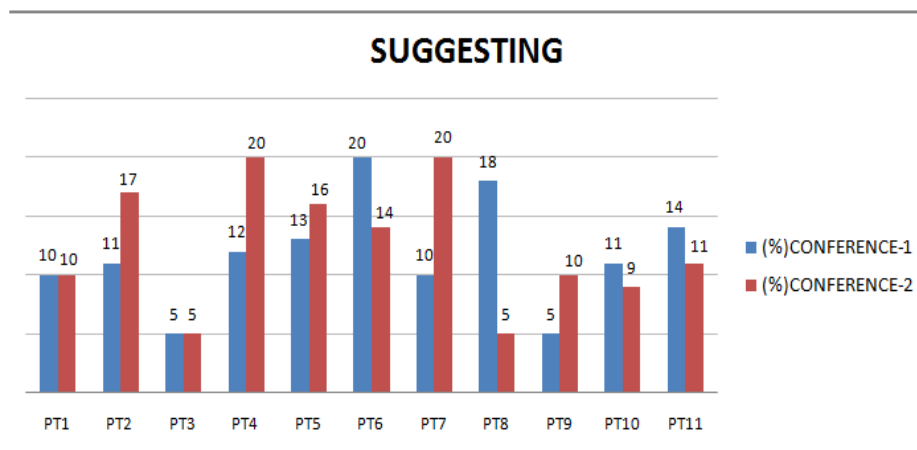
Peer: During lesson you asked a question to a student “you add base and lateral areas while finding the surface area of the cylinder, why did you do it?” and the student explained as “Teacher, because a cylinder is formed with the sum of all.”

Here, an observation made by the peer of the cooperative teacher PT1 about the teaching session and they discussed this observation and explanation at the post-course conference. In this observation, the Cooperative teacher asks the prospective teacher to emphasize the definition and content of the measurement units equally:

Cooperative teacher: In the courses you study the centimeter topic a lot, but you did not examine the meter particularly.

The definition category has the almost the same rates in both conferences (C1:8%; C2:9%) and it is the least mentioned category. The reason behind this can be that the participants collected their observations during the course not directly what is happening at that moment but rather they prefer to add their comments on the situation that they observed.

**Suggesting:** The instructional advices are given by the participants of the conferences to the prospective teacher was coded as “Suggestion”. Considering the ratios of the suggestion category, it is seen that 13% in the first conference and 12% in the second conference were discussed. The comparison of two conferences on prospective teachers' teaching practice is given in Graph6.



Graph 6. Comparison of Conversations of the Suggestion Category

Looking at the chart, it is seen that 4 of the prospective teachers had more suggestive conversations in the first and 5 in the second conference meeting. There is no change in percentage between the two conferences for the 2 prospective teachers. In the category of suggestions that emerged most of the time while university supervisor propose some technical advise and strategies for the teaching situation to the prospective teacher. Although these are the suggestions for alternative strategies instead of the methods and strategies they use in their teaching processes, they also include some general tips to help them become better teachers in the future.

The suggestions of the cooperative teacher about the changes that PT8 can make regarding the course are given below.

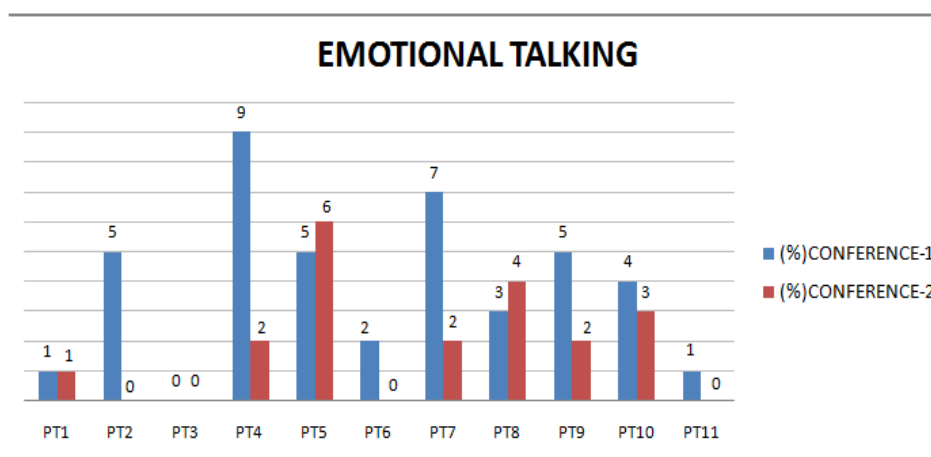
Cooperative teacher: I think the introduction was a little short. You could have spent more time on it. You could have attracted the students by asking “whose father has a real estate agency?”. Then he started to the activity immediately, and said that everyone should do it themselves first and then we were doing together. But there was a conceptual gap there. Maybe he could make one student read the first step out loud and check whether everybody understand the first step of the activity.

Similarly, a suggestion was made by the cooperative teacher to PT6 to increase the motivation of the classroom at the beginning of the lesson.

Cooperative teacher: I wish it was more visual. I'd like a 1–2-minutes video at the stage of engage in the lesson. You mentioned the trains in Japan. You could have put them there as visually. You could have used the smart board. There are some very good videos on this subject. They get the attention of the students really well.

In both conferences, the speeches belonging to the suggestion category emerged as the prospective teachers were advised by the meeting participants about the lesson they taught and their classroom actions and how to improve their relations with the students in the future. It is seen that these suggestions are frequently made by the university supervisor.

**Emotional Talking:** In the content of the conferences, the affective discourses of the prospective teacher towards their students, himself/herself and his/her future profession were coded as "Emotional Speaking". Emotional speech is the least mentioned category of two conferences with 3% and 2%, respectively. The comparison of the speeches belonging to this category in the context of prospective teachers for both conferences is given in Graph 7.



Graph 7. Comparison of Conversations of the Emotional Talking Category

When the Graph is examined, it is seen that there are more emotional talking appears in the first conference of 6 prospective teachers and for only 2 prospective teachers in the second conference emotional talking appears more. At the same time, for PT6 and PT11 there was no emotional talking at the second conference and no emotional talking of PT3 for both conferences. We can attribute this situation to the fact that prospective teachers mostly focused on

their feelings towards students in their first lectures, were very excited and frequently expressed their emotional attachment to their profession. PT4 expressed the emotion on poor classroom management as;

PT4: Some students correctly use letters for naming the point in the coordinate system, but some showed the coordinates incorrectly. I couldn't control all of them. I noticed the mistakes, but since I had been checking the time continuously it made me anxious and excited.

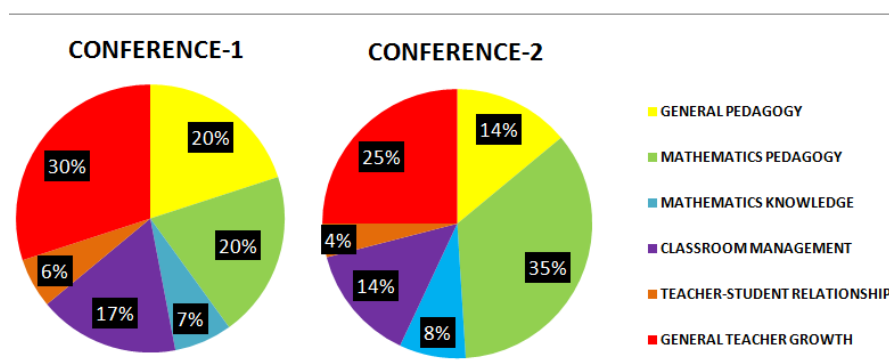
Here, too, a situation caused by the excitement experienced by PT5 was mentioned.

Cooperative Teacher: There is nothing very different from the last time you taught, you started very anxiously this time. So, this unsatisfied lesson happened because of these feelings of yours. You know, if you were a little more comfortable, if you had a little more control, everything could have gone well.

The emotional talking category has the least percentage among others. It can be said that the reason why prospective teachers talk less in the second conferences than in the first one is that they get used to the classroom environment and their students and focus on the course process rather than their feelings.

### Types of content in post-course conferences

When the post-course conferences were examined, 6 topics emerged based on the content. How these topics change in percentage in both conferences is shown in the graph below.



Graph 8. Percentage Comparison of the Contents of Conferences

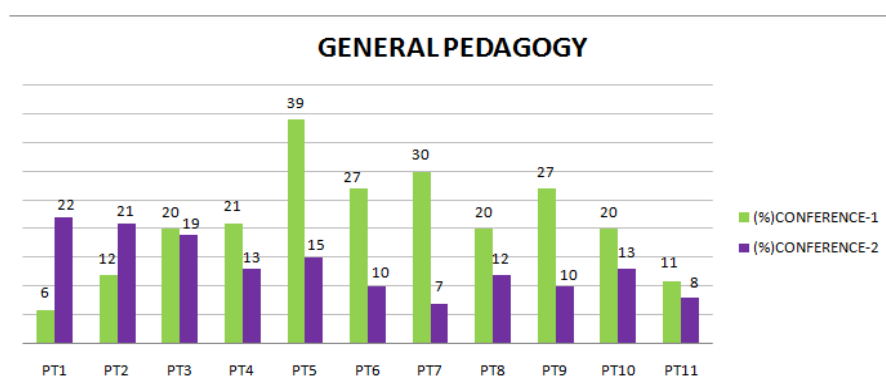
Considering the whole percentages of these two conferences; two categories appears very distinctive among others. The General Teacher Growth category were quite frequent in the first conference with 30%, and the Mathematical Pedagogy category has a very high percentage with 35% in the second conference. It is seen that the least mentioned content emerged as Teacher-Student Relationship with 6% and 4%, in the conferences respectively. When these two conferences are compared, it is seen that there is a decrease in the percentage of the general teacher growth, general pedagogy, classroom management and teacher-student relationship categories, and there is an increase in the categories of mathematics knowledge and mathematics pedagogy. At the same time, although the General Pedagogy and Mathematics Pedagogy categories had at the same rate (20%) in the first conference, the rate of the Mathematics Pedagogy category increased to 35% in the second conference, while the rate of general



pedagogy decreased to 14% compared to the first conference. This should be considered as a sign that prospective teachers do not need to talk about general pedagogy as often as they used to do. Instead their frequency of talking about mathematics education is increased and they concentrated on their pedagogical content knowledge.

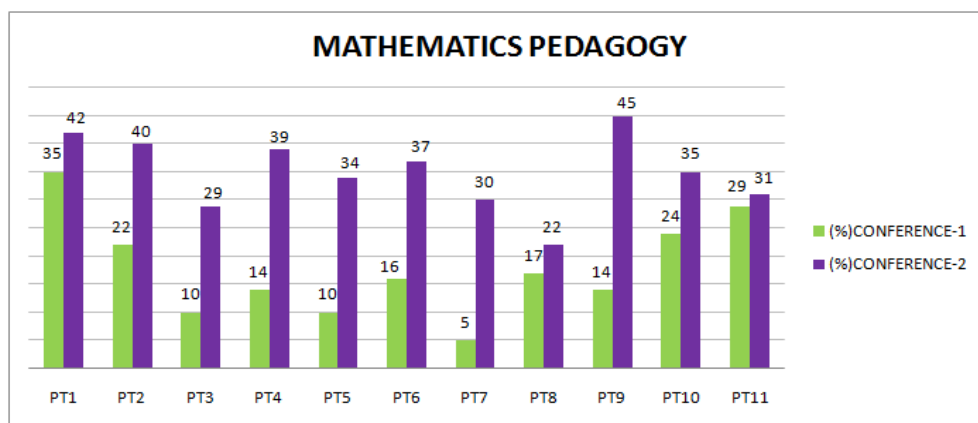
The details of the 6 topics of conferences in order to content are examined below in detail.

**General pedagogy and pedagogy of mathematics:** Conversations including concepts such as motivating students, using assessment and evaluation methods effectively, managing group work, tasking students on the board and managing the operations on the board, using materials, and ensuring effective participation of students in the lesson were coded as general pedagogy. When the content ratios of the general pedagogy category were examined, 20% of observed for the first conference and 14% for the second conference. The changing the rates between two conferences of prospective teachers is seen in more detail in the Graph below.



Graph 9. Comparison of Conversations of the General Pedagogy Category

When the graph is examined, while general pedagogy were mentioned more in the first conferences of 9 prospective teachers, only for two prospective teachers more talking were observed for the second conferences. Therefore the general rate is decreases for this category from the first conferences to the second one. On the other hand, in Graph 10 pedagogical content knowledge which is named as the mathematics pedagogy is observed more in the second conferences. This means that mathematics pedagogy talking is increased from first to second conferences. In the mathematics pedagogy, mathematical misconceptions and teaching approaches to mathematics categories, conversations based on the use of materials and approaches that facilitate mathematics learning were examined.



Graph 10. Comparison of Conversations of the Mathematics Pedagogy Category

In the first conference of PT3, while the university supervisor commented on the prospective teacher's deficiencies in general pedagogy, in the second meeting these comments were replaced by the comments on mathematics pedagogy.

#### 1. Meeting:

University supervisor: This is a very complicated instructions for a fifth-grade student. When you say "Divide twelve identical pieces into three", the children already know that it will be four. However, you said that "divide the items into three such that each group has four items" In this sentence there are two unknowns; what is group number what is the number of items involved in each group.

#### 2. Meeting:

University supervisor: The using three symbols was very nice. You didn't emphasize that there are three couples there...There was a lot of topics that you can make clear, but you skip and passed.

Likewise, in the first conference of PT10, while the conversations about general pedagogy were more frequent than the mathematics pedagogy, in the second conference, the talking focused more on mathematics pedagogy.

#### 1st Conference:

University supervisor: Why don't you let them help each other? Everyone tries to do it alone. Why are you trying to do it all by yourself? After all, peers can support each other. There's such a thing as group work.

#### 2nd Conference:

The Peer: I think the biggest mistake of you is asking such question; "Name triangle ABC." When naming triangles you said that it doesn't matter which side comes to the bottom as if it doesn't matter. This is very wrong and even the girl sitting in the middle got it wrong because you misled it..

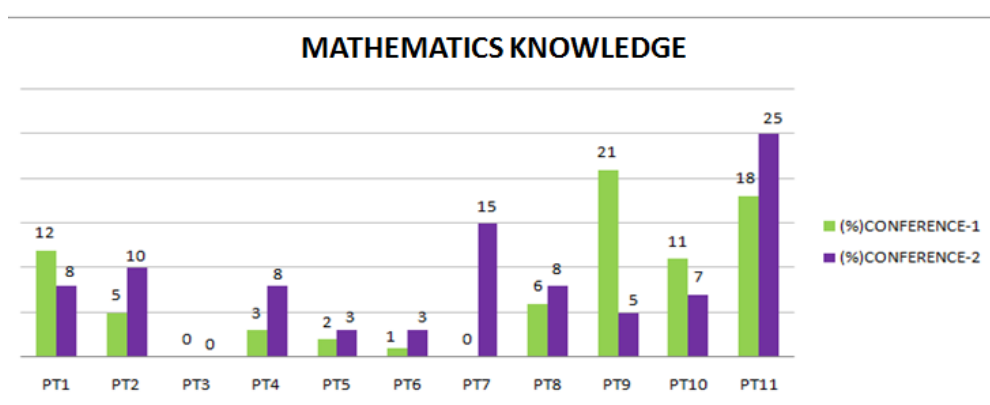
The differences between the first and second conferences can be interpreted as while the prospective teachers were spending more time in classrooms they getting used to management issues and they did not feel anxious about students or in other words general pedagogy. However, instead they realized that their poor pedagogical content knowledge and lack of different strategies of teaching mathematics.

**Mathematical Knowledge:** If mathematics and mathematical knowledge are mentioned directly in the conferences, these are coded as mathematical knowledge. Considering the both conferences with 7% and 8% this

category observed very rare. The comparison of the frequency of talking about this category of each prospective teacher for two categories is shown in Graph 11.

When the graph is examined, it is seen that for 3 prospective teachers mathematical content was mentioned more in the first conference, while for the other 7 PTs second conference involves more mathematical knowledge. On the other hand, in the two conferences of PT3 there was no mathematical knowledge based talking observed.

From this point of view, it can be said that prospective teachers did not have any problems in their lessons about their mathematics knowledge. Therefore in the conferences not that much talking about the subject matter knowledge.



Graph 11. Comparison of Conversations of the Mathematics Pedagogy Category

However, it was seen that subject matter knowledge was discussed by the university supervisor and the prospective teacher was warned in a few times in the conferences. This can be showed the critique of university supervisor to PT11 in the post-course conference.

University supervisor: For example, when you take the symmetry of the point you called the new points as A', B', then you get another symmetry by the x axis in the same plane you called these points again A', B'. You gave four different points with the same name. These are scientific mistakes.

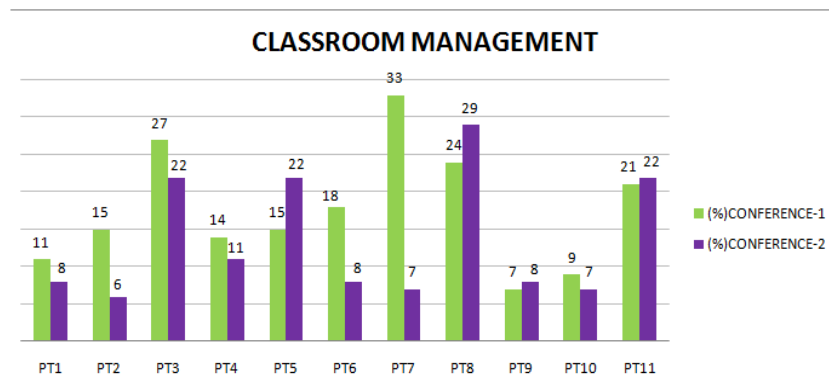
Similarly, in the post-course conference of PT2, a mathematical mistake was expressed by the peer of the prospective teacher as follows.

The Peer: while you are examining the solids faces you said that the surface is bigger than the faces of the solid but this was wrong.

Among the conferences Mathematics Knowledge category were less discussed than others. This may be because of the prospective teachers' general mathematical knowledge is sufficient and they do not have mathematical problems during the teaching in the classroom.

**Classroom Management:** In the conferences the talking about disciplining the students in the classroom, effective time management, control of useful noise during the activities, and dealing with students individually are discussed and coded as classroom management. While this category has 17% in the first conferences, it was decreased to 14% in the second conferences. The rates of each of the prospective teachers in two conferences are shown in detail in Graph 12.

When the graph is examined, it is seen that although classroom management observed mostly in the first conferences for 7 prospective teachers, only 4 prospective teachers the situation is vice versa. The fact that the prospective teachers frequently talk about classroom management in the first conferences because of their lack of classroom experiences. The most underlined concept in classroom management by the prospective teachers was not using time effectively. This subject caused prospective teachers to criticize themselves and to be criticized by the conference participants.



Graph 12. Comparison of Conversations of the Classroom Management Category

There were also topics about paying attention to the students individually both a strong properties and poor classroom management skill. An example of PT1's explanation:

University supervisor: You did not observe left part of the class, you completely missed that part. You just interacted with those 3 or 4 students not all classroom.

An example of a peer for PT5 lesson in the post-course conference as follows:

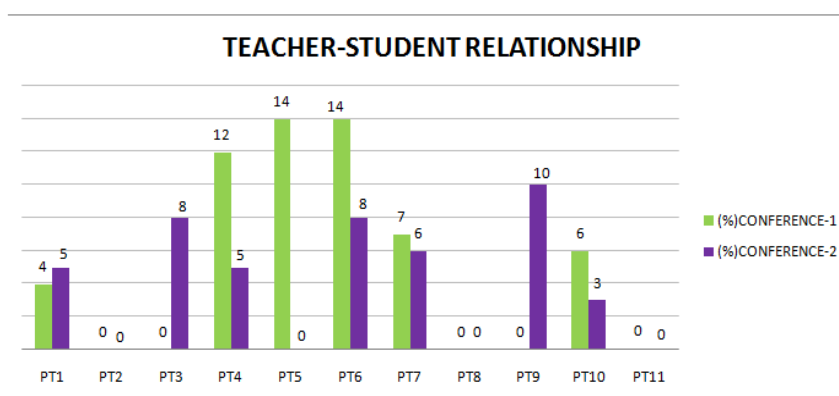
The Peer: The reason that she couldn't completed the lesson in time was because she did not maintain class control. As far as I could see in the classroom, 4 or 5 people paid attention, and the rest talked among themselves.

Regarding the effective use of time, the university supervisor emphasized conference meeting for PT9 as;

University supervisor: You actually used the time very well and you completed your evaluation stage and finished lesson on time.

Although the concept of classroom management is an area where prospective teachers are very anxious and often criticize themselves, it has not been discussed as much as it is thought in the conferences in general. Nevertheless, among the mentioned topics time management and not being able to control the whole class were emphasized frequently.

**Teacher-Student Relationship:** Although it seems like a concept similar to the classroom management issues, in the discussions, the concepts such as dealing with the emotional development of the students, establishing rapport with the students and addressing them by their names, being able to talk in and out of class, and acknowledging the students are coded as teacher-student relationship. The intensity of the conferences where these concepts are discussed has the lowest rate among all contents and was determined as 6% in the first meetings and 4% in the second. Graph 13 shows how frequently each of the 11 prospective teachers mentioned these concepts in both conferences.



Graph 13. Comparison of Conversations of the Teacher-Student Relationship Category

When the graph is examined, it can be seen that there was no mention in any of the conferences of 2 prospective teachers and these concepts were not mentioned in the first meeting between 2 prospective teachers. In addition, while the prospective teacher who has the evaluation meeting where the discussions in this category are the most common among the first meetings is PT5, it is seen that no discussions were made in this context at the second meeting of the same prospective teacher.

Based on all these situations, it can be said that actions such as extracurricular conversations with students and creating a sense of connection to students are not seen as important by prospective teachers compared to other subjects. For example, by asking about the state and memory of his students and asking some of his students "It seems like you are not in a good mood today, why?" it has been observed in the examinations that there are very few prospective teachers who show personal interest. This situation was brought to the agenda at the evaluation meeting of PT1 as follows.

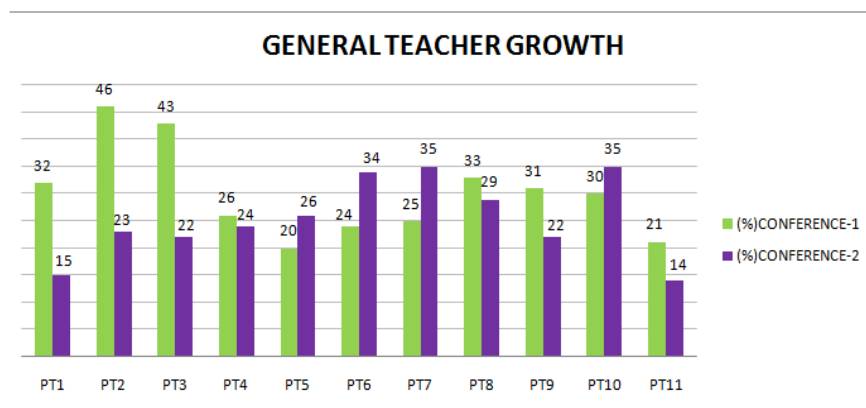
University supervisor: Being cheerful and asking children "How are you?" was a good way to make engaging the student to the lesson. .

This situation was discussed in the meetings and it was determined that the focus of the prospective teachers was on training the lesson plans and making the lectures better. In the conference meeting of PT7, a comment on the positive effects of personal dialogues with students was mentioned.

PT7: I noticed that you used frequently “You did very well, thank you.” That is very nice of you and pupils like these kind of courtesy. You make them being part of the lesson.

Although the category of Teacher-Student Relationship emerged in some of the prospective teachers' conferences, it could not be observed in others. Personal relationships will help to handle classroom management issues properly and usually students like kind teachers and because of this property they could be interested in the lesson. Yet, prospective teachers have not been able to do this very often. This situation may have overcome by trying to improve the lesson plans of prospective teachers and ignoring their relationships with their students.

**General Teacher Growth:** The issues such as determining the roles of the teacher in the conference conversations, the professional development comments of the prospective teacher, realizing when to use which strategy, revealing his/her development, his/her feelings about being a teacher, and determining the aspects he/she needs to develop are coded as general teacher growth. When these concepts are compared with other contents in general, it is seen that the first conference has the highest concentration of conversations with a rate of 30%, and the second meeting has a rate of 25%. This reveals that teacher development is mentioned frequently in the conferences. Graph 14, in which the differences between the conferences of each prospective teacher are examined in detail, is given below.



Graph 14. Teacher Development Category.

When Graph14 is examined, it is seen that the content of the first conference of 7 prospective teachers is higher than the second conference on teacher development, while 4 prospective teachers mostly talk about teacher development in the second conference. However, it is also seen that there is a ratio in such a way that there is not too much difference between the two conferences of these 4 prospective teachers. For example, 26% of the codes were

determined as teacher development in the first of the two conference meetings of PT4 and 24% of the codes were determined as teacher development in the second meeting.

In the conference of PT8, the interpretation of the university supervisor who mentioned what the prospective teacher should do to have a teacher role can be seen.

University supervisor: You are asked about the classroom security incident. So, the issue of fairness and security is very important. In class, children can hurt each other. You need to detect and intercept dangerous activity immediately.

Similarly, in the conference meeting of PT6, the CT commented on how the prospective teacher showed improvement compared to the previous lecture as follows:

Cooperative Teacher: I think it is impossible to miss the progress compared to the previous one. You were more serious in the class the last time. You were a bit gentler this time. Your feedback was better.

In another conference meeting, how the development of PT1 compared to the previous lecture was evaluated by the university supervisor from the meeting participants is given below:

University supervisor: In fact, you are making very good progress. That's what I noticed. I wasn't satisfied with your last lesson. Because it was like you weren't taking it seriously. But here, I saw that you took it very seriously, that your preliminary preparation was sufficient, as the teacher said, that you cared about the lesson, and that you were more teaching-oriented in your communication with the students.

In this category, it is determined that prospective teachers often have conversations about teacher development at the conferences. On the one hand, this is an expected result. Because the general purpose of the teaching practicum course is the development of prospective teachers. It is expected that the prospective teachers will be able to make self-evaluation and be aware of their development, or that this development will be stated by the cooperative teachers based on their observations, similarly, the development will be supported by their peers, and finally, it will be appreciated by the university supervisor. For all these reasons, intensive discussion of teacher development content is an expected result.

### **Discussion, Conclusion & Suggestions**

In this study, in which the conversations in 4-person conferences attended by mathematics teachers, relevant academicians and a peer were evaluated after the prospective teachers' lectures, and the conversations were evaluated in terms of their content and types.

It was determined that the more inquiries were made in the second set of meetings than in the first, which reveals the general structure of the comments made to the prospective teachers in the meetings. The inquiries consist of open-ended questions of the university supervisor and are questions aimed at the prospective teacher to make comments about the learning processes of his/her students. The questions of the other participants of the meeting are mostly yes/no questions. The cooperating teachers mostly used evaluative supervision approach. Their evaluations

generally affirmative and they confirm prospective teachers were doing well. Similarly, [Borko and Mayfield \(1995\)](#) found that cooperating teachers did not challenge prospective teachers to think critically about the mathematics after the teaching. Considering the task of training teachers for cooperating, it was concluded that it could not make an effective contribution to the training of prospective teachers. Cooperative teachers are understood not only as practitioners but also as teacher educators who need specific supervision training even though cooperating teachers and college supervisors play different roles with the prospective teacher, by working together, they can influence the improvement of mathematics prospective teachers. [Fernandez and Erbilgin \(2009\)](#) ascertained that the prospective teachers may benefit more if the cooperating teachers' messages were more in harmony with those of the college supervisor. As a result, the STs expected very little useful feedback based on questioning out of the conferences with their mentors, and cooperative teachers. [Thobega and Miller \(2007\)](#) found that cooperating teachers were perceived to use the nondirective style of developmental supervision, whereas most university supervisors seemed to favor the collaborative style.

Based on the assessing type of feedback, it was observed that prospective teachers made more negative evaluations in their first meeting conversations compared to the second. Positive comments emerged in the context of the changes they made about the criticisms they received at the first meeting. Conferences' evaluations show a cluster in pedagogical knowledge and classroom management. Classroom management appears to be the most challenging topic for prospective teachers within the scope of the teaching practicum course. In the conferences examined in this research, classroom management emerged quite a lot both as the subject of the evaluation and in the examination of the contents of the conversations. [Peterson et al. \(2005\)](#) tried to find out the factors that inhibited secondary mathematics prospective teachers and CTs from discussing mathematics-specific ideas. The researchers stated that CTs and prospective teachers believed that the taught mathematics was open so that the other topics such as classroom management issues were more important than talking about mathematics. Classroom management styles were discussed both in the reflections of the prospective teachers and in the comments of the meeting participants. The cooperative teachers in [Leatham and Peterson's \(2010\)](#) study identified a classroom as a primary goal of prospective teachers teaching and interacting with students or understanding the students' thinking as secondary issues. Although many CTs may agree that learning to manage time and understand students' comments and questions are two main goals of the internship, our data indicate that CTs may have different expectations. In a case study with two prospective teachers and their cooperative teachers, [Fernandez and Erbilgin \(2009\)](#) found that cooperating teachers discussed mostly classroom management issues in their conferences with prospective teachers and they never discussed specific issues to mathematics content.

Describing types of feedback is mostly observed when the PSTs tried to explain themselves to conference participants about their teaching. While prospective teachers made explanations about the course in the first meetings, they mentioned about the learning environment they created in the classroom and explanations for themselves in the second meetings. The reason for this difference may be due to the possibility of increased awareness of prospective teachers about the teaching environment and their teaching actions.



Suggestion type of feedback has occurred in both conferences almost to the same degree because this type of feedback is the main idea of the conferences. According to [Bates et al. \(2011\)](#) supervisors have a powerful effect on the identity, self-perception, and proficiency of future teachers. Therefore, the suggestions made by future teachers are better.

Describing and emotional conversations are the least occurred types of feedback in the conferences. In the conferences, definitions of concepts or making direct observations or the feelings of prospective teachers were rarely mentioned. Although describing the classroom and teaching moment is the most important category that can provide the prospective teacher with a learning environment, there are very few data on the matter. This may be a sign that prospective teachers are less equipped to theoretically examine pedagogical situations. In post-course conferences, CTs prefer to concentrate on the evaluation of the lesson conducted by the prospective teacher and not generally focused on the next lesson ([Douglas, 2011](#); [Hoffman et al., 2015](#)). Because of this, post-course conferences became less effective for PTs' learning when reflection on the teaching is not proposed ([Gibbons & Cobb, 2017](#)). Therefore, making self-reflection is important for PTs' professional development. Moreover, feedback from CTs and peers on PTs' teaching also necessary to improve teaching skills ([Lee & Wu, 2006](#)). The provided feedback give opportunities to PTs' understand their skills during the learning process and how they can develop these skills in future practice ([Thurlings et al., 2013](#)).

In the emotions category, the fact that there are more data, especially in the first meeting, is that prospective teachers focus on the emotional dimension of their profession and the emotional consequences of their first lectures in the real classroom before their development and mathematics course components. Aligned with the findings of [Lopez-Real et al. \(2001\)](#), topics that are discussed between supervisors and student teachers revealed that these topics are mostly concerned with "personal aspects" such as presence, enthusiasm, commitment, and general attitude. In the conferences, prospective teachers are found not to establish an emotional connection with their students and the classroom in general due to their focus on carrying out the lesson plans and the process, and very few conversations were made on these issues. These conversations were also brought together with the name of teacher-student relations and very few conversations occurred in this category. In addition, CTs believed that PTs already had the mathematical knowledge they needed to teach, and this was reinforced by the fact that PTs were sometimes reluctant to reveal gaps in their mathematical knowledge to their CTs.

According to the content of the conferences the general pedagogy appeared mostly in the first conference yet the mathematics, pedagogy more frequently appeared in the second one. Recent research has also suggested that CTs may rarely discuss issues specific to mathematics during their conferences with PTs. [Fernandez and Erbilgin \(2009\)](#) followed the post-course conferences that two PTs held with their CTs. CTs and PTs discussed mostly classroom management issues, and the two CTs were never discussed mathematical content in their conferences with PTs. This situation also shows how the focus of prospective teachers changes. In their first lectures, prospective mathematics teachers who are generally interested in being teachers focused more on how to teach mathematics in their second lectures. Although mathematics teaching knowledge is mentioned frequently, a very limited number of conversations were held in the context of mathematics knowledge. Some cooperating teachers did not discuss mathematics with the

PTs because they believed the mathematics was straightforward and the PTs had already mastered the content, they found classroom management issues new for them, or the PTs and CTs did not feel comfortable discussing more personal matters with each other. In the general mentoring procedure, CTs mostly give emotional support (Kemmis et al., 2014), and they often discuss general pedagogical issues rather than content-based teaching practice (Valencia et al., 2009). Few mentoring procedures focus more on instructional issues, such as how to improve lesson planning and teaching quality (Giebelhaus & Bowman, 2002; Gold, 1996).

Most PTs prefer the cooperative supervision style in which they believe that PTs should be given considerable autonomy in the teaching experience. The main idea underlying this belief is that PTs are professionals who have to learn making difficult discussions and taking responsibility on their teaching. When problems are encountered, the CT encourages the PT to explore possible solutions and come up with their own decisions. This supervision type is nondirective and needs independence and problem solving on the part of PTs.

Finally, the category of teacher development is mentioned frequently, in which the comments of prospective teachers on their development are gathered. It is not surprising that there are many conversations in this category since the main purpose of the conferences is the process of enhancing prospective teachers' awareness of their teaching actions and theoretical knowledge of the teaching process. The more non-directive and collaborative were the relationships between CTs and PTs, the more positive were the attitudes of PTs toward teaching as a profession and themselves as teachers (Ibrahim, 2013).

### **Recommendations**

The results of this study are limited to the analysis of the data from the prospective teachers at the conferences after only two lectures. For prospective teachers to increase their self-inquiries, eliminate their deficiencies in classroom management, develop their skills in the teaching profession, examine the student emotions in the classroom more, and prepare themselves better for this process in the future, the number of these meetings that the prospective teachers can evaluate themselves can be increased.

Although a positive criticism of the prospective teachers during the meeting increases their self-confidence, a negative criticism may cause the prospective teachers to feel inadequate. Therefore, the fact that the content of the meeting consists of suggestions that will contribute to the development of the prospective teachers rather than criticism and that contain clues about how they should overcome their deficiencies regarding their teaching processes may enable the prospective teachers to be more competent in the future.

Before the lecture, the lesson plan evaluation can be made with the university supervisor to eliminate the general pedagogy and mathematics pedagogy knowledge problems of the prospective teachers and to eliminate the time management problems that are quite common in the lectures. The university supervisor may ask the prospective teachers for a pre-course expectation report and a post-course feedback report on their expectations. It can be ensured that prospective teachers have a lecture experience during their undergraduate education.

In the conferences, as a result of the inquiries made about the teaching processes during the lesson, the prospective teachers made explanations about these processes, and as a result of the inquiries made about how the lessons could be improved, they made suggestions to themselves about how they could realize and correct the mistakes they made during the lesson. [Lyle \(1996\)](#) states that supervision provides scaffolding in student teachers' zone of proximal development.

Instead of making inquiries that require an explanation for the prospective teachers to contribute to their development, the number of inquiries that will enable them to make self-reflections can be increased.

The fact that the prospective teachers are observed by many people during the lesson may stress them and cause them to get anxious. This may negatively affect the performance of the prospective teachers. To prevent this, the lectures of the prospective teachers can be recorded with a camera, etc. and comments can be made by watching the video with the meeting participants after the course.

### **Ethic**

This research was conducted in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and ethical standards.

### **Author Contributions**

This article was written with the joint contributions of three authors.

### **Conflict of Interest**

No conflict of interest was reported by the authors.

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