DETERMINATION OF PRESERVICE SCIENCE TEACHERS' SELF EFFICIENCY

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Abstract
This study carried out in order to determine tecnological, pedagogical and content knowledge of preservice science teachers. Case study approach was used. 52 preservice teachers, in 4th grade of Faculty of Science Education, participated in the study. We asked preservice teachers choose subjects from elementary science curriculum and ready lesson plans. This preliminary study was conducted to determine teachers' pedagogical competences. Then preservice teachers were asked to prepare lesson plan and are offered a broad opportunity to experience like a real teacher. A variety of data sources were used to characterize the participants’ intentions and instructional practices, including classroom observations, lesson plans and the TPCK confidence-science instrument. Results indicate that preservice teachers used digital images, videos, animations, and simulations to teach process skills. FATİH Project in Turkey, targeted in particular has become extremely well-equipped classrooms, but there is need of well-trained teachers who can used technology to engage students in science.

Key words: preservice teachers, tecnological knowledge, pedagogical knowledge, content knowledge
Introduction

Rise to the level of a country is directly proportional to the quality of education. The young minds which are most important source of raw material of countries should be processed and evaluated the right way. The teachers are basic elements of education systems. Teachers will provide the best education of future architects (students), well-trained teachers. So, the targets of science teacher preparation programs are very important. Training, observation/assessment, involvement in a development/improvement process, study groups, inquiry/action research, individually guided activities, and mentoring work in different combinations in the field and no one model can cover all the features of teachers’ professional development (Guskey (2000). The preservice teachers need to develop both a depth and breadth in the content knowledge that assumes basic skills and broad general knowledge of the subject along with knowledge of inquiry in the specific discipline. It is important to know how preservice teachers organize and inter-relate these subject matter facts, concepts, and principles (Marks, 1990). Science teacher preparation programs expect their preservice teachers have pedagogical content knowledge (PCK) characterized by Shulman (1986). The development of technology preservice teachers need to develop an overarching conception of their subject matter with respect to technology and what it means to teach with technology—a technology PCK (TPCK) (Niess, 2005). Technological Pedagogical Content Knowledge (TPACK) to interprets the junctions among knowledge of pedagogy, content, and technology as the types of knowledge required for teachers to integrate technology into teaching and learning in meaningful ways (Koehler & Mishra, 2005; Koehler, Mishra, & Yahya, 2007; Abbitt, 2011).

In teacher preparation programs numerous experiences must be provided to engage the preservice teacher in investigating, thinking, planning, practicing, and reflecting (Niess, 2005). The beliefs of the preservice teachers can structure their teaching for good or ill, directly or indirectly (Bell, Lederman & Abd-El-Khalick, 2000; Waters-Adams, 2006). Teachers' beliefs are inextricably undertaken with teachers’ subject matter knowledge and understanding of instruction (Gess-Newsome, 1999). Micro teaching for the first time in the 1960s, in order to improve the quality of teacher training, developed as part of an experimental program. Microteaching, which aims to simplify the complexity of the normal laboratory method of teaching and learning processes. Micro teaching practice, preservice teachers are offered a broad opportunity to experience, the candidate will provide professional development and change of behavior in the direction desired media, events and experiences are considered as the basic objective (Oliver,1993; Mellon and Dence, 1971; Gürses, Bayrak, Yalçın, Açıkyıldız and Doğar, 2005). Micro teaching has an important place in preparation for the teaching profession. For the purpose of pre-service teachers, teaching a topic rather than to apply a technique (Madike, 1980)

Preservice teachers are encountered the first class experiences in School Experience and Teaching Practice Programs in Turkey Teacher Preparation Programs. School experience courses place great emphasis teachers’ level of education they need to make the teaching and assessment of professional competence (Sands, Özçelik ve Gardner, 1996). However, these courses can not capture teachers the opportunity to observe the self-and other friends. Sometimes one or two teachers to attend as an observer, observing classroom environments in the same environment, taking on the role of the teacher supplement the efforts of the school experience. Preservice teachers develop their pedagogical knowledge, better equipped to take steps as a teacher in classroom environments. Use of micro teaching at education faculties, preservice teachers can achieve an opportunity to evaluate their efficiency. Classmates, a student is considered to be an example of setting the course for at least 40 minutes to realize the rehearsal process of teaching the teachers. Preservice teachers observing each other more than one learning environment, encounter different teaching strategies, as well as their peers and the course instructor will conduct self-evaluations and pedagogical deficiencies watching videos. The subjects chosen from Elementary Science Curriculum will be useful in
terms of improvements of content knowledge of preservice teachers. Possible deficiencies in pre-service teachers' scientific knowledge and understanding is important. But does not, in itself, guarantee the making of a good teacher of science (Newton and Newton, 2010). This study carried out in order to determine technological, pedagogical and content knowledge of preservice science teachers and also carried out to live such an experience like peer assessment.

Methodology of Research

In study, case study approach was used. 52 preservice teachers, major in 4th grade of Faculty of Science Education, participated in the study. The study had two parts. In preliminary study, we asked preservice teachers choose subjects from elementary science curriculum and ready lesson plans. This preliminary study was conducted to determine teachers' pedagogical competences. Then the preservice teachers continued voluntary work 40 (26 female, 14 male) people. It asked preservice teachers to prepare sample lesson plans that they believe to be engaging. Preservice teachers were grouped in pairs and were asked to prepare lesson plan and are offered a broad opportunity to experience like a real teacher. Attempted to establish a classroom environment during the applications. Micro teaching has been conducted. Preservice teachers were provided to evaluate their peers. One preservice teacher takes on the role of the teacher teaching class, while the rest of the preservice teachers has been the role of a students. Applications without any intervention by the three researchers monitored and observation schedule filled. All lessons were recorded with the camera. Recordings can then perform the self-evaluation has been given to teacher candidates working class.

Data Collection Tools

A variety of data sources were used to characterize the participants’ intentions and instructional practices, including classroom observations, lesson plans and the TPCK confidence-science instrument. In this study, classroom observation form was used in order to analyze practices that preservice teachers use and determination of preservice teachers' technological pedagogical content knowledge. The observation schedule has been adapted into Turkish from Newton, Driver and Osborne (1999). The observation schedule are examined by three science teachers and and the final form of the schedule was completed. Changed form of the observation time is 60 minutes to 40 minutes because of lesson periods in Turkey. Added activity; use of technology. While scoring the schedule a mark is placed during each 30s interval but in this study a mark is placed during each 60s. There are three sections to the schedule, the first of which is devoted to the basic unit of analysis: the Pupil Activity (PA). Entries in this section capture the main types of activity in which pupils are engaged during their science lessons. There are two further sections: Pupil Working Group (PWG), which allows a record to be kept of how pupils are grouped; and Pupil and Teacher Interactions (P&TI), which is designed to capture the nature of verbal interactions that are occurring (if any) between the teacher and pupils.

The TPCK confidence-science instrument has been adapted into Turkish from Graham, Burgoyne, Cantrell, Smith, Clair and Harris (2009) by Timur and TaŞar (2011). The Ranges Belonging Confidence for Likert Type Scale like: 1.00–1.79, not confident at all; 1.80–2.59, slightly confident; 2.60–3.39, somewhat confident; 3.40–4.19, fairly confident; 4.20–5.00, completely confident.
Results of Research

Findings from the analysis of TPCK confidence-science instrument are listed below:

Table 1. Descriptive analysis of the TPCK confidence-science instrument

<table>
<thead>
<tr>
<th>Dimensions</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>TPCK</td>
<td>3.2</td>
<td>0.811</td>
</tr>
<tr>
<td>TPK</td>
<td>3.91</td>
<td>0.146</td>
</tr>
<tr>
<td>TCK</td>
<td>3.63</td>
<td>1.183</td>
</tr>
<tr>
<td>TK</td>
<td>4.02</td>
<td>0.409</td>
</tr>
</tbody>
</table>

Analyzing the table, it was seen mean scores of preservice teachers from the TPCK confidence-science instrument were collected within the range moderate trust factors (3) - The much trust (4).

When lesson plans in the preliminary study which was conducted to determine teachers’ pedagogical competences was analyzed, it was seen different science subjects were chosen by preservice teachers. preservice teachers choose subjects from elementarly science curriculum and ready lesson plans. The frequency of different science subjects and units are examined in Table 2 below.

Table 2. The frequency of different science subjects and units

<table>
<thead>
<tr>
<th>Science subjects</th>
<th>The units</th>
<th>The frequency in the preliminary study</th>
<th>The frequency in the main study</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physics</td>
<td>Electricity in Our Lives</td>
<td>7</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Forces and Movement</td>
<td>7</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Light and Sound</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Phases of matter and heat</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Chemistry</td>
<td>Properties of and Changes in Matter</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Atoms, Elements and Compounds</td>
<td>9</td>
<td>2</td>
</tr>
<tr>
<td>Biology</td>
<td>Human Organ Systems</td>
<td>12</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Reproductive, growth and development of organisms</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cell division and Genetics</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Habitats and Communities</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Needs and Characteristics of Living Things</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Environment and human</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Matter and Energy for Living Things</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Natural processes</td>
<td></td>
<td>1</td>
</tr>
</tbody>
</table>

Analyzing the table, it was seen that Biology such a large percentage of 50% was the most perceived discipline in the preliminary study. "Human Organ Systems" had been the subject of the most preferred biology subject. When lesson plans of the main study were analyzed it was seen Physics (n=10) and Biology (n=9) discipline were more preferred and only 2 subjects tend to prefer Chemistry.

Activities done by preservice teachers’ course as follows:

Group 1

Topic: Digestive system

Practical: 0-2nd minutes of pre-service teacher course on the previous lesson asking questions and began a brief description of the subject. The preservice teachers taught the topic digestive system by using projector.
During lecturing question and answer were established to interact the students. 15-17th minutes of the exercise the entire class attended. 17-21st minutes teacher continued lecturing. 22 to 23rd minutes of the lesson demonstration test were made and 23 to 28th minutes the teacher experiments, and the students only attended by the class by watching. The teacher made the remarks during the conduct of science experiments, and interact the student with question and answer. Lecture continue in 28 to 32 minutes. In 33rd minute concept map and homework was given and in 35th minutes the lecture was over.

**Group 2**

*Topic: Elements and Compounds*

Practical: Preservice teacher presented his lectures up to 26th minutes in computer. He answer all the questions in his representations, the students were not but only listeners. He then gave an open paper test to the student. Preservice teachers completed his course in 40 minutes. Preservice teachers use the method of science and technology using computer and gave the lecture straight on elements and compounds.

**Group 3**

*Topic: the Power of Taking exams off*

Practical: The teacher started the lesson with the question and answer technic and continued twelfth minutes the lesson for interaction question and answer technic. Students made exercise the lesson for 12-24 minutes on the blackboard. Students was watched the demonstration experiment for a 5-minute period, and the experiment is explained in the question and answer technique. Animation was shown about topic and as it was being shown using the method of question and answer technic. continue to affect the lesson. The lesson was finished in 36 minutes. Teacher ensured the active participation of students in the course and tried the students worked in a student-centered course.

**Group 4**

*Topic: Senses*

Practical: The teacher started the lesson by reminding the students what they studied in their last lesson. To raise the students’ motivation the teacher told to the students a short story about sense organ and the teacher ask the whole class about the story (0-4 minutes). The lesson was continued for 4-18 minutes. The teacher gave a chance for the students to talk a little bit (in between 14-15 minutes). From 19-25 minutes of the lesson one of the student influent the student about topic in a way that it could be seen on the blackboard, and he ask to the students effective questions and they listen to the answers provided. Later on the answer’s effectiveness participated the whole class (from 25-28 minutes). The lesson was continued from 26-29 minutes. After the lesson was finished, a video related to the topic was shown (between 30-34 minutes) and questions were asked to the whole class. The students answered the questions individually, this way the lesson was ended.

**Group 5**

*Topic: Environment and human*

Practical: The teacher started explaining the topic of Environment and Human, the lesson went on from the first 3 minutes to 14 minutes with the questions and answers technic and by using game, puzzle, and visual tools, the students were active up to 35 minutes of the lesson. By using these active materials the successful students were rewarded with a chocolate by the teacher. In the last 6 minutes the lesson was summarized by showing a video which explain the vitamin of orange. In the last 2 minutes of the lesson the students were ask to plan a concept map. The teacher used the method of constructivism method. Nominating the student through reinforcement is important for the teacher as it allows him to include the students in the learning process.
Group 6
Topic: The Refraction of a Light
Practical: The teacher starts the lesson by nominating the students. To find out what the study already know the teacher asked the whole class questions. From what the teacher brought in the class a simple test was took and the teacher gives feedbacks on the result of the test. In the 15 minutes of the lesson an art video test was shown and the teacher gives additional information. Up to the last minute of the lesson the teacher used computer and blackboard. In the last 2 minutes of the lesson an objective test was given to the students and analyzes was given. The student was just including in the lesson by just asking questions and this is not like the traditional way of lesson.

Group 7
Topic: How the Universe and the World Comes together?
Practical: The teacher past the first 5 minutes by explaining the intellect or the idea of science, to seven minutes of the lesson he stops and answers questions related. A visual test was made between the 7-10 minutes of the lesson, the teacher continue to explain science. In between 10-25 of the lesson questions and answers goes by. The teacher nominated the class by showing animation and summarizing the lesson from 25-35 minutes of the lesson. The lesson was explained somewhat to traditional class.

Group 8
Topic: Every living thing is the result of photosynthesis: Glikoz
Practical: As the teacher wanted to take the attention of the students he started the lesson by asking the students about their everyday life (in the first 4 minutes). The lesson continues by asking and answering questions method (from 5-15 minutes). The teacher showed a video test (from 16-20 minutes). After watching the video questions and answers followed and the teaching continue with the explanation of the topic (between 20-30 minutes). And in the last 7 minutes the teacher by showing the video he happened to explained the lesson again, thus the lesson come to an end. The teacher connect the whole living things as product of photosynthesis; even though explaining Glikoz by using technology the lesson is still traditional approach.

Group 9
Topic: Circulating System
Practical: After the teacher used warm-up in the first minute he started to explain the topic by using animation. In the first 4 minutes of the lesson the whole class was affected. After the class was affected the explanation of the lesson continues for 12 minutes. In between 12-15 minutes a test which the teacher planned was taken. The lesson continues in the same way. From 20-30 minutes questions and answers went by. The teacher again explains the notion of science in 2 minutes by using animation. In the last 5 minutes a known branch of a tree with a purpose was technically analyzed and answer was given.

Group 10
Practical: Trainer and Organizer’s System
Practical: As the teacher wanted to know and see what the students know, the teacher started the lesson by asking questions. From 4-18 minutes of the lesson animation is used and after a ward the teacher was pausing the lesson to include the students in the lesson. A small group of 3 students’ activity was given. This activity allows all of the students in the test by using a projection to show the test. There was interaction between 21-42 of asking and answering questions, also from 25-35 one group of the students was presented, this presentation include whole of the class. The lesson continues with a short game of asking questions and the lesson is finished after collecting the answers.
Group 11
Topic: Support and Movement System
Practical: The teacher started the lesson by asking question in the first 5 minutes of the lesson, the teacher then continues the lesson with visual test and asking questions. At the 14 minutes of the lesson the teacher provide a video and the lesson proceeds up to 23 minutes of the class. Then a 10 minutes exercise and questions and answers were given. For summarizing the lesson in the last seven minutes animation is given. Somewhat near traditional lesson was given.

Group 12
Topic: Electric Current
Practical: In the first 5 minutes the teacher started the lesson by explaining the notion of science and the students were passive. From 6-7 minutes of the lesson the teacher explain what is shown with animation. At 11 minutes of the class a video was given followed by questions and answers up to 21 minutes of the lesson. In between 21-36 minutes the students were asked to do an effective class-work together by asking and answering questions. From 36-40 minutes of the class video and animation was provided. The lesson was completed somewhat near to the traditional class.

Group 13
Topic: Mirrors and Users
Practical: The teacher past the first 3 minutes by introducing the concept of science, the teacher pauses to 7 minutes to answer important question. At the 7 minutes the teacher gave a small group activity, the teacher then continues the explain science. From 10-23 minutes the teacher gave different sort of questions, although the questions were answered by the teaching. A class-work was given between 23-25 minutes of the class and answers were provided. In the last five minutes of the lesson (from 35-40) the teacher used animations and summarized the lesson. The lesson was completed is somewhat near to the traditional class.

Group 14
Topic: Electric Current
Practical: The teacher started the lesson by asking the students the preview lesson in the first 3 minutes. From 9-35 minutes of the class the teacher influence the student in small group to have a test, sooner after the test questions and answers followed and the teacher use the idea of science and explain the conditions. The teacher used animations are art in the last 5 minutes and summarized the lesson. The students were active and the teacher was exposing them during the test and because the result was provided by the teacher, the method used is not far away with traditional one.

Group 15
Topic: Matter’s Conditions and Heat
Practical: In the first 20 minutes the teacher taught about science and answer question that were effective and necessary, the lesson continues with class-work and practical test. At the end of the class in the last 4 minutes a quiz was provided. Even thou in the last minutes of the lesson the students happen to be constructivism students, the topic was explained by the teacher there was not a chance for the students to come up with an outcome. The lesson was traditional.

Group 16
Topic: Light
Practical: The lesson started with animations, unstop, intentionally the lesson continues. Because there had to be a practice part in the 17 minutes of the lesson, there was interaction in the class, and the practice part was explained by the teacher. The students were active for 2 minutes. The second half of the lesson continues with animations and the class is the center of the teacher (the teacher is more active) thus the
lesson was finished. The lesson was plan for the students to be the center of the lesson (class) but the plan did not work.

Group 17

Topic: Simple Machine
Practical: The teacher started the lesson by explaining the concept of science in the first 8 minutes, from 9-22 minutes of the class the teacher used animations view and went on them one by one explaining them. Within allow himself to ask question just for 2 minutes about simple machine and collecting the answer he gave more information. From 31-36 minute of the class the teacher gave a small group discussion (activity) and the lesson continues thus he finished the lesson. The teacher tried to make the students center of lesson but it was not satisfactory (enough).

Group 18

Topic: Magnetic Effect on Electric Current
Practical: The teacher provided the class with a video to raise the motivation of the students after watching by a group discussion. The given video raises the curiosity of the students. From the first 15 minutes the students had a chance to practice and answers question. As the lesson proceed practical test and animations given enlarge the discussion of the topic. Thus the students were actively included in the lesson; students were the center of the lesson. The other groups on the contrary, were just guide in the lesson, after they had discussion and the idea of science test they then explained to the class. It was a constructivism class; the students were center of the lesson.

Group 19

Topic: Colors of Light
Practical: In the first 2 minutes intentionally effective lesson was started, the teacher gave animations with science information. The students had a test in between 5-10 and they connect the test with the lesson. Questions and answers followed between 11-17 minutes of the lesson between the students and explanation of the notion of science is explained by the teacher. From 18-20 minutes there were small group discussion between the students and the teacher and the teacher gave information on science. From 23-30 there were class work. And between 31-32 minutes a short video was provided and from 33-40 the were sharing idea through argumentative method. As the teacher was exposing the student superfluous materials (tools) and test effective lesson they had. In the last 8 minutes of the lesson argumentative discussion went by in the lesson. The teacher tried to make the students center of the lesson.

Group 20

Topic: Respiratory system
Practical: The teacher make a scientific introduction for 2 minutes, and the carry out a test after having watched a video. A scientific notion was explained from 8-10 minutes and from 10-20 they went through questions and answers while they were watching a video (by pausing the video in between). They watched another video between 21-22 minute, and they had questions and answers about the video. Thus it continues from 27-33 minutes another video by using six cap techniques while the video is playing they were asking and answering questions. Thus they come to the finished the first half of the lesson. From34-38 minutes the students watched another video while playing a game and there they end the lesson. It takes 5 minutes of the teacher to explained concept, idea or notion of science. The students happened to be the center of the class room.

Analyzing the classroom observation form, the percentage of time interval of lessons devoted to each activities were listed Table 3. Activities unused by preservice teachers are not included in the table.
Table 3. The percentage of time interval of lessons devoted to each activities.

<table>
<thead>
<tr>
<th>Activities</th>
<th>The percentage of time interval of lessons (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0-5 min.</td>
</tr>
<tr>
<td>Pupil Working Group (PWG)</td>
<td></td>
</tr>
<tr>
<td>Whole class activity</td>
<td></td>
</tr>
<tr>
<td>Small group activity</td>
<td></td>
</tr>
<tr>
<td>Pupil Activity (PA)</td>
<td></td>
</tr>
<tr>
<td>Set exercises</td>
<td>10</td>
</tr>
<tr>
<td>Observing a demonstration</td>
<td>10</td>
</tr>
<tr>
<td>Pupil and Teacher Interactions (P&amp;TI)</td>
<td></td>
</tr>
<tr>
<td>Explanation of scientific idea by teacher</td>
<td>40</td>
</tr>
<tr>
<td>Questions and answers interactions</td>
<td>33</td>
</tr>
<tr>
<td>Deliberative instructions</td>
<td>6</td>
</tr>
<tr>
<td>Using technology</td>
<td>19</td>
</tr>
<tr>
<td>Evaluation</td>
<td>13.8</td>
</tr>
</tbody>
</table>

Analyzing the table, it was seen that 'explanation of scientific idea by teacher' (40%) and 'question and answer interactions' (33%) were more preferred by preservice teachers at the beginning of the lessons. The percentage of 'using technology' was found 19. Then, 'observing a demonstration'(10%, 5-10 time interval; 20%, 10-15 time interval) and 'using technology' (15%, 5-10 time interval, 20%, 10-15 time interval) were used by preservice teachers. 20-25 time interval, 'explanation of scientific idea by teacher' (5%) was reduced. The time interval from 20 to 30, preservice teachers chose 'a small group activity' and 'the whole class activity'. The most used 'whole class activity' was between 30 to 35 minutes. 'Evaluation'(13,8%) was used only the last 5 minutes of the courses.

The percentage of total lesson time devoted to each activities were examined in figure 1. below.

![Figure 1. The percentage of total lesson time devoted to each activities](image-url)
Analyzing the figure, the mean percentage displayed in the PA, PWG, P&TI rows of Figure 1 indicate that the major percentages of total lesson time devoted to each activities was spent using technology (23%), questions and answers interactions (22%), explanation of scientific idea by teacher (18%) while very little time was spent small group activity (1%).

Discussion and Conclusions

Results indicate that all preservice teachers used technology. Additionally, they used digital images, videos, animations, and simulations to teach process skills. Researchs suggest using these technologies promotes student learning, achievement gains in science, and supporting students’ understanding of abstract and complex concepts (Bell, Maeng and Binns, 2013; Trundle and Bell, 2010; Linn, Lee, Tinker, Husic, & Chiu, 2006). But it is important that how technology used by teachers (Brown, 2007). Preservice teachers in this study used technology to support the traditional methods like the researchs (Pflaum, 2004; Cuban, Kirkpatrick, & Peck, 2001). Fatih project, targeted in particular has become extremely well-equipped classrooms, but there is need of well-trained teachers who can used technology to engage students in science.

In the process, lesson plans were presented in groups. Last preservice teachers that experienced as lecturer were more successful than the initial preservice teachers. Among the reasons for these circumstances is to have a chance to fix the mistakes were done by their peers. This is more school experiences to accede preservice teachers will contribute their self efficacy. We also observing their peers can provide to learn from each other. During their school experience, preservice teachers observe one or sometimes two experienced teachers. Observing more school experiences will develope the pedagogical knowledge of preservice teachers. During the training of preservice teachers would be helpful to have these applications.

In the lessons experiments were carried out by the preservice teachers and sometimes students (preservice teachers in the role of students) with the guidance of the teacher. However, almost all the preservice teachers to be drawn from the experiment are given by the preservice teachers directly. Therefore, preservice teachers can not recede from traditional methods.

According to Lemke (1990), a lesson is a social activity and it has a pattern of organization, a structure. The teacher and the students have to do some work to get it started. But there is no absolute criterion for when a lesson really does begin. However, teachers in real schools when the first moments of lesson can not use active due to factors such as providing classroom order, classroom book filling, class attendance. Because of the dead time of the lessons 40 minutes sometimes up to 35 minutes may be reduced. In this study attempted to define the actual course of 40 minutes was determined in a classroom environment. But, the students were not the real. The preservice teachers acted as students. All of the preservice teachers paid attention to teacher and there weren’t classroom book filling, class attendance. This aspect include the limitations of this study.

From the findings of the preliminary study determine the pedagogical competencies of preservice teachers; it was seen that Biology such a large percentage of 50% was the most perceived discipline. "Systems" had been the subject of the most preferred biology subject. When lesson plans of the main study were analyzed it was seen Physics (n=10) and Biology (n=9) discipline were more preferred and only 2 subjects tend to prefer Chemistry. In both studies, Biology was the most preferred discipline Chemistry was the least preferred discipline. This can be because of preservice teachers' thoughts about more qualification themselves in Biology discipline and Biology topics in terms of daily life more comfortable associating sample available. Among the reasons to prefer less Chemistry discipline may be preservice teachers'
inadequate in content knowledge of Chemistry and difficulties of finding materials. In an investigation of the reasons of this difference between the disciplines should examine more comprehensive.

Beginning of the science lessons is very important. In recent years, 5E and 7E model were accepted and implemented in our country began in 2004 with the Science and Technology curriculum. According these models, the beginning of the lesson is the time that can be attracted attention of students and can be determined the students' prior knowledge. Targeted, students desire to inquiry (Boddy, Watson, & Aubusson, 2003). In this study,'explanation of scientific idea by teacher' (40%), 'question and answer interactions' (33%) were more preferred by preservice teachers. The percentage of 'explanation of scientific idea by teacher' (40%) is thought provoking. Because, in this step concepts or scientific ideas shouldn't be defined by teachers (Smerdan & Burkam, 1999; Çepni, Akdeniz & Keser, 2000; Çepni, Şan, Gökdere & Küçük, 2001).

After the input stage of the course, it is expected from the students to design experiments, to establish hypotheses about unanswered questions. Experiments and group discussions can be used at this stage (Kabapınar, Sapmaz ve Bıkmaz, 2003; Özmen, 2004). According to the constructivist approach, the students should be active and the teacher should be passive. Experiments should be designed by students. But, in this study, 'observing a demonstration'(10%, 5-10 time interval; 20%, 10-15 time interval) was used by preservice teachers. Preservice teachers at this stage chose 'animation, videos and technology' (15%, 5-10 time interval, 20%, 10-15 time interval) to satisfy the curiosity of the students used traditionally. Although the low percentage, preservice teachers chose 'a small group activity' (7%, the time interval from 20 to 25) and 'the whole class activity' (5%, 20-25 time range; 12%, 25-30 time interval). The use of the method of argumentation in Science lessons can help students to learn science concepts in a meaningful way (Alexopoulou & Driver, 1996; Bell & Linn, 2000). In this study, practices of preservice teachers should not be considered as true type of argumentation. However, some of the preservice teachers, especially (group 18, group 19) showed that efforts to implement the method. All the time range of the most used 'whole class activity' was between 30 to 35 minutes.

According to the constructivist approach, the process of assessment shouldn't include not only the beginning or end of the course. In this study, preservice teachers asked questions to learn prior knowledge of students at the beginning of the lessons. But, they used assessment and evaluation techniques(13,8%) only the last 5 minutes of the courses. Analyzing the whole study, it was seen that the major percentages of total lesson time devoted to each activities was spent using technology (23%), questions and answers interactions (22%), explanation of scientific idea by teacher (18%) while very little time was spent small group activity (1%). This demonstrated the preservice teachers taught more teacher-centered lessons. Suggests that if preservice teachers observe each other more than one learning environment like this study, they can encounter different teaching strategies and will conduct self-evaluations and pedagogical deficiencies. Preservice teachers can make changes and improve their teaching practices (Dawson et al., 2001). The findings of this study suggest that micro teaching may provide an effective structure for preparing preservice teachers.
References


