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**The effect mentor and mentee interaction in problem solving and problem posing processes**

The classroom interaction between mentor (teacher) and mentee (candidate teacher) plays an important role in teaching and learning process in all parts of education at all grades. Problem solving and problem posing are also important elements in learning and teaching process. All problems that you encounter first and you don't know how to solve them. The aim of the study here to explores and describes how mentor –mentee interaction develops the abilities of problem solving and problem posing. Research on the study with prospective mathematics and English teachers from Suleyman Demirel University is measured quantitatively by using likert scale instrument. The results indicate that the regular and effective interactions with mentors and mentee give more positive significances in the problem solving and problem posing situations.

**Key words:** Mentoring, problem solving, problem posing.

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**Мәселені шешу және қоя білу процесінде тәлімгерлік пен болашақ мұғалімнің арасындағы әсерлі және өзара қарым-қатынасы**

Оқу және білім беру процесінде, барлық білім беру бағытында, бағаларға маңызды әсер ететін тәлімгерлік (мұғалім) пен болашақ мұғалімдердің арасындағы қарым-қатынас. Мәселені шешу және қоя білу білім беру процесінің маңызды элементі болып саналады. Бастапқыда кездесетін барлық мәселердің шешімін білу қиынға соғады. Сулейман Демирель атындағы университеттің математика және ағылшын тілі пәндер мұғалімдерінің әлеуеті сандық Лайкерт өлшемімен өлшенді. Нәтиже қортындысы бойынша, мәселені шеші және жағдайға байланысты туындаған мәселелерге тәлімгерлік пен болашақ мұғалімдердің жүйелі және әсерлі қарым-қатынасы оңды нәтижелер көрсетті.

**Түйін сөздер:** тәлімгерлік, проблеманы қоя білу, мақсат қоя білу.

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**Эффект и взаимодействие между наставником и подопечным в решении проблем и в процессе постановки задач**

В обучении, в учебном процессе, во всех руслах образования и на оценки важную роль играет взаимодействие между наставником (учителем) и подопечным (будущим учителем). Решение проблемы и постановка задач, также являются важными элементами в процессе обучения и учебного процесса. Все задачи с которыми вы сталкиваетесь, изначально ни кто не знает как решить. Исследования по изучению потенциала учителей математиков и учителей английского языка университета имени Сулеймана Демиреля измеряются количественно с помощью инструмента шкалы «Лайкерт». Результаты показывают, что регулярные и эффективные взаимодействия с наставниками и подопечными дают более позитивные значения в решении проблем и проблем создаваемых ситуацией.

**Ключевые слова:** наставничество, решение проблем, постановка проблем.

**THE EFFECT MENTOR  
AND MENTEE  
INTERACTION IN  
PROBLEM SOLVING  
AND PROBLEM POSING  
PROCESSES****Introduction**

[5] five factor model of mentoring provides a framework for analyzing mentors' personal attributes and mentoring practices. The five factor model identifies five categories of mentoring practices which were derived from the mentoring research literature. The five factors are: Personal Attributes, System Requirements, Pedagogical Knowledge, Modeling from Informal Proceedings 30-3 (BSRLM) available at bsrlm.org.uk © the author – 32 and Feedback. The model suggests that mentors need to exhibit personal attributes that enable them to support mentees by instilling positive attitudes and confidence in them, be encouraging, friendly, take keen interest in the work of the mentee and be able to listen attentively to the problems that the mentee may face during their school based training [5, 6] also argues that mentors need to articulate System Requirements, that is, school and national policies and curriculum documents, so that pre-service teachers can plan quality lessons and implement curriculum requirements and policies. Furthermore, [5, 6] appears to suggest that mentors must have good pedagogical knowledge and practices not only for teaching in their own classroom, but also in educating the mentee in both the subject content knowledge as well as the pedagogical practices. Mentoring practices associated with Pedagogical Knowledge can «focus on planning, timetabling, preparation, implementation, classroom management strategies, teaching strategies, [mathematics] teaching knowledge, questioning skills, problem solving strategies and assessment techniques in [secondary mathematics] education context» [5, 6]. Effective modeling involves the mentor displaying enthusiasm for teaching the subject. It involves the mentor using effective hands-on activities, good classroom management strategies and having good rapport with students

Problem solving is generally considered as an important part in understanding and teaching of mathematics in National curriculums. »Solving problems is not only a goal of learning mathematics but also a major means of doing so. In everyday life and in the workplace, being a good problem solver can lead to great advantage. Problem solving is an integral part of all mathematics learning» [13]. Problem solving is a major theme of doing mathematics and teach-

ing students to think is a primary important fact [10, 4]. So, doing mathematics and solving problem is nearly same meaning. According to Polya, there are four basic phases of problem solving (a) Understanding the problem is the first phase and basic idea is to determine unknown, given data and condition (b) devising a plan is the second phase of problem solving. In this stage, the students should obtain a plan of solution (c) carrying out the plan is the third phase follow steps to apply the plan developed in second phase (d) looking back is the last phase after finding the solution, you should examine the result or method and use it for some other problem. In addition to these, Cognitive and constructivism insist on the importance of improving students' mathematical problem solving ability. Cognitivist say that students' problem solving ability should be increased and developed by dealing with the unstructured problems in learning. Cognitive psychologists and cognitive scientists also try to make theories of students learning and mathematics educators try to understand how their students interact with mathematics [10].

Problem posing on the other hand is defined as the generation of new problems for a given situation or the reformulation of a given problem [8, 7]. The main aim of problem posing is to make the students so active, social learners and more creative in learning process. Problem posing education is a student dominant education opposite to the traditional learning and teaching methods in which teacher dominated namely «banking education» [11]. Problem posing is not only formulation of new problems from a given problems but also to produce new problems from a given situations it might be a picture or a figure. [4] acknowledged the role of problem posing «Students in grades 9-12 should also have some experience recognizing and formulating their own problems, an activity that is at the heart of doing mathematics. For example, exploration of the perimeters of various rectangles with 24 cm<sup>2</sup> by means of models or drawings». One of the important parts in mathematics education is to show ways to the students or to provide opportunities to develop their problem posing abilities [1].

Problem posing used in mathematics instruction provides students creativity and exceptional mathematics ability, improving students' problem solving, develop their mathematics understanding and finally be a part of the instruction [7]. The students will be more active in the lessons by expressing themselves.

In the way of learners and problem constructing. For example, while they write their own questions, they improve their grammar in their own language as well as their cognitive ability. Problem posing as

a classroom activity enlarges students' capacity in many perspectives such as teacher student interaction that helps to understand the concepts discussed. Teachers' aim is to provide opportunities for the students to be more active and motivate during the instruction. Educational psychologist advice all teachers to be more interact with the students in all lessons to open their minds. Because like an educational psychologist teacher try to understand the way how the student to learn the new subject or to improve missed points that is learned before. The relation between problem posing and problem solving is in stated in the book of the art of problem posing «Problem posing is deeply embedded in the activity of problem solving» [1]. In this study we try to investigate how teacher-student relations or interactions affect the students problem solving and problem posing abilities in the way of cognitive perspective that is considered as a high level of thinking ability. The study basically depends on the problem posing behaviours of the students by answering the questions and making the new questions for a given situations. During the problem solving lectures, we solved the questions together with the students who are given a chance to ask and express themselves more. The effect is measured by a post test that is applied at the end of subject. The subject was thought to the students in secondary school years and they don't remember more and with more misunderstanding. So, the help of more interaction during the problem solving sections teacher realized that many missed points can be corrected. Moreover during the sections of P.S. interaction between the peers has a positive consequence to correct the missing points of the same subjects.

### Methodology

The main goal of our research was to explore the relationship between mentor (teacher) and mentee (teacher candidate) interaction in terms of problem solving and problem posing processes for given situations. The interaction is just increased during the experimental case in problem solving and problem posing sections.

### Sample and population

This study includes candidate (preservice teachers) Mathematics and English teachers that were registered in Suleyman Demirel University. Based on 100 students views from practical placements which includes schools or educational centers the personal and pedagogical attributes are compared. The classes

of subjects are divided into two ways of surveying before practices and after practices.

### Research model

In this study, a quantity experimental methodology is used based on likert scale. According to the method the gathered scores of students are compared by just comparison between pre-post test results. The groups are divided at randomly and they are both from same departments.

### Data collection and Analysis

Data is collected by results of mathematical achievement exams that are just knowledge exams. Both groups have 2 hours problem solving lessons per week. With one group that is control group I solved the questions by traditional methods I used normally for each year but, with the experimental group I used the problem posing methods that Brown, Walter and Polya's advises during the

problem solving techniques by more interaction with the students. Although I solved less number of questions because of more interaction with many students, the post-test gives interesting results. Data is also evaluated through SPSS/PC 16K statistics program for Windows.

### Results and Discussion

Results indicate that the average differences between pre-test and post test for experimental group is significantly high the average value of the pre-test result for experimental group is 14.55 but this results changes for post-test that is 17.52. This shows that the difference is in a positive way. Therefore the interaction between student and teachers is more affective way to solve the questions and produce questions. But on the other hand this difference for control group does not give significant results. It means that traditional method means no more interaction in the class during problem posing and solving sections changes nothing.

**Table 1** – Mean scale scores and Cronbach alphas for the five factors (n=80) of SDU

Factor	Mean scale score	Cronbach alpha
Personal Attributes	3.45	.95
System Requirements	3.21	.89
Pedagogical knowledge	3.33	.98
Modeling	3.19	.98
Feedback	3.43	.96

### Conclusion and Recommendations

The purpose of the study was to control the effects of interaction between mentor and mentees in the way of problem posing abilities that how posing and solving of a problem is developed by doing this activity during the problem solving sections. The findings are not different from the literature. Our conclusion is similar with the Brown Walter mostly because he said that If problem posing atmosphere is constructed during any educational activity the students get more self confidence and they become more creative. One way is to create problem posing activity in the classroom giving more chance to preservice students to ask many questions and by the way they create new questions but if the teacher are considered more autocratic persons this environment cant be created. The mental ability of the preservice students is also more affected by interaction because if they check their ideas with teachers and their peers, they

will have a chance to correct the mistakes or misunderstandings quickly. The metacognition stage of the students (mentees) is mostly developed by producing a problem posing and solving atmosphere. This study also showed that providing enough support personally and sharing constructive feedback during the problem posing activities is extremely important for preservice teachers. As a suggestion mentors provide teaching, supervision, and advice, especially with regard to research and career paths.

To sum up, by the students gain more motivation, more and correct knowledge base, more creativity, more problem solving and posing abilities, more self confidence and more positive attitudes to the lesson. And may be the important one is regular cognitive development.

The teachers, by interaction, can alter student behavior by systematically and get the individual differences that are more emphasized by educational psychologist.

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