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REVIEW OF OPINIONS OF MATH TEACHERS CONCERNING THE LEARNING ENVIRONMENT THAT THEY DESIGN

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Abstract:
Design of appropriate learning environment has a significant importance in creation of aims of the math teaching. In the design of learning environments, teachers play a significant role. The aim of this study is determination of opinions of the math teachers concerning the learning environment that they design. In accordance with this aim, an opinion form which is comprised of open-ended questions is applied on 30 math teachers who are in charge in Middle Anatolian Region in Turkey. The data which are obtained as result of the application have been analysed and presented by using frequencies and percentages. It is understood from the obtained results that teachers benefit from the textbooks and auxiliary test books for designing the teaching environment, and they don't often give a place to different teaching methods and techniques.

Keywords: Adult learning, applications in subject areas, secondary education, teaching strategies improving, classroom teaching, math teaching

1. Introduction

Math is defined plainly as "*isolated form of life*". Math teaching is always deemed important because of its weight hidden in this definition; the developments in scientific and technical fields have been attributed to its good-learning, and opposite circumstances have been attributed to its non-learning. Factors which make math important more expressly can be itemized: First of them concerns the will of human to live. Human wills to live, and after guaranteeing the life, wills to live quality (Skemp,

1986). The way of guaranteeing life becomes real by struggling with environmental incidents, and the way of enhancing the life quality becomes real by directing environmental incidents, natural forces, and creating useful inventions by making use of them. The second factor which makes math important is stable actions of natural assets and incidents, and having this stability being able to be explained only by math. Knowing the main structures which will be a ground to the scientific developments such as having golden ratio, which is observed in the biological structuring, equals to the value of infinite proper fraction (1.618....), having heavenly bodies making elliptical circles, having objects which are thrown inclined following parabolic routes, having light reflected in the same angle as the incidence angle etc.; is possible by finding the correspondent mathematical model. The third, perhaps the most important, depending on the above two reasons, is that taking on math, especially on problem solving, develops the abilities such as thinking, discussion and discernment of human. In these aspects, the math assures individual and the community in meeting their needs. The individuals of today's communities are more eager and insistent for taking their shares from knowledge and culture, comparing to once. Especially individuals of democratic communities want to form their futures by their own volitions. That's, increasing social demands require more math learning. Besides these natural reasons, the nature of math knowledge, mental development and needs of children, and the theories concerning the creation of learning caused movement in math education (Altun, 2006).

Educational institutions are very important institutions of which importance cannot be denied in development of the individuals which community requires. The most main item of these institutions is teachers. The teacher is key man, creator, survivor, realizer and implementer force of the education (Çağlar, 1991). While training teachers, philosophical and practical grounds have been established. These grounds generally relate to the perception of teacher profession by the researches (Ekiz, 2003a). Sometimes teaching has been deemed as a profession depended on the ability, and it is emphasized that required abilities should be acquired by the support of experienced teachers. Sometimes teaching has been deemed as a science, and teacher candidates are asked to exhibit their scientific knowledge by the virtue of the findings which are acquired as result of the researches. And again sometimes teaching has been deemed as an art, and teacher candidates are required to be creative, and query and examine their own applications systematically (Ekiz, 2003b). The philosophical opinion which is adopted while establishing the teacher training system that is in parallel with the education system should be the behaviour, content, education and examination situations which comply with the criterion of the basis of the philosophy in question. Otherwise, system may fall in contradiction in itself and prevent the realization of the

determined aims. Accordingly, teachers are required to be trained both before they come in charge and during they are in charge. Because the hitches in teacher behavior are the main factors in failures of the students (Oktar and Bulduk, 1999). Institutions which train teachers must be aware of the complicated structure of the teacher knowledge. This complication arises from the seeking of a logical balance between pedagogy and math and engagement of these with each other (Pressini, Borko, Romagnano, Knuth and Wills, 2004).

Beside teacher and program materials, also learning environment influences the learning of the students in math lessons (Bay, Beem, Reys, Papick ve Barnes, 1999). Teachers play a significant role in success and understanding of the lesson in math education. Behaviors of teachers towards math teaching are efficient on the behaviours of the students as well. The aims of the math teacher candidates must be getting rid of the conventional class environment and must be the math classes towards developing the thinking capacity. This aim is realized by the teachers who have studies concerning the research and who work together with students. Unless a difference is created in training of the students who are math teachers of the future, to achieve desired aims in Turkey for math training cannot be possible.

It is known that learning phases of an individual occur in various environments in their lifetimes. In addition to this, when learning environment is mentioned, primarily school and class come to the mind. There are numerous studies which indicate the direct effect of these learning environments on the students' learning and success. These researches in general handle the role of the learning environments on the learning and success, in physical and social aspects. In the studies it is seen that some part of these researches are those where physical conditions of the school or class are examined, and some part of them are those where the effect of school culture or class culture on the success of the student.

Under the perspective of the general properties of the learning environment design, the teaching design must be understood as the effort of ensuring the environment where the individual takes place efficiently in the center of the learning process (Akdeniz ve Keser, 2002). The learning environment is not efficient on the learning (Dorman 2001). In addition to this, a teacher faces two restrictions while designing such an environment. These are the restrictions which arise from the physical environment and the mental capacity of the students (Driver, 1988). When both learning environment and teaching design are considered, it is seen that physical environment influences the structure of these designs to a large extent. In this physical environment to be prepared, the individual must structure his/her own knowledge by interacting with visual materials, electronic tools, classmates or teacher (Güven and Karataş, 2004).

However, learning environment must not be considered only as the place where learning is realized. As technology, education technology as well as the use of material and their efficiency is a focus in the literature, the learning environment is restricted in four walls of a classroom (Kim, Grabovski & Shaharma, 2004). The condition of the classroom and the physical conditions relate to the learning environment. However learning environment is not that narrow-scoped. It contains all factors which influence learning process. Accordingly, the environment which is comprised by the interaction of the place, time, infrastructure, equipment and psycho-social factors, which takes place in the learning process and which influences this process; can be defined as learning environment (Acat, 2005). The learning environments, of which efficiency is emphasized on learning, are mentioned as the places where individuals use the current resources in an appropriate way for their aims in order to define the incidents which occur in the environment and to develop a meaningful resolution to the problems (Wilson, 1996). Wilson also states that the learning environments are not places where learning is imposed but the learning is fed and supported. This statement addresses the role of teacher to be a guide in the learning environment.

Besides teacher in the learning environment, analysis of many data concerning the student, defining the properties of the subject and other factors by determination, determining the realization level of learning, and the success which is achieved as result of the learning material and methods which are used, is important. More efficient learning environments may be created by rearrangement of the learning environments by considering these matters. The student achieves the learning aim regardless any uncertainty in the event of learning environments are pre-arranged (Yılmaz and Akkoyunlu, 2006). Accordingly, efficient learning environments can be created as result of the arrangements done this way, and students may be ensured to begin working by allowing opportunities to gain knowledge and ability for both their lives and higher educations (Emrem, 2008). In addition to this, the teacher is influenced from the belief that s/he has about math teaching, while designing the learning environment. These beliefs of the teacher candidates have important roles in formation of the learning environment that they will design when they become a teacher. Because, the learning environments to be designed by the teachers is a reflection of their beliefs about math teaching. In this context; institutions which train teachers have important roles. If beliefs of teachers about math teaching is ignored during university years, the surveys to be done about increasing the quality of math education shall be directed wrong or lack (Baydar & Bulut, 2002).

When secondary education science and math as well as elementary school math teaching departments of education faculties are examined, it is seen that math and

general education are focused at most. In these departments, field information, general education information and field education information must be given to the teacher candidates in a balanced manner. Equal distribution of these three fields within the curriculum is quite important for students. Teachers have a significant importance in training of individuals which are required by the community. Being able to have quality teacher shows that it is required to determine the current problems of teacher training programs by constant examinations.

In order to solve problems which arise in math education, handling the programs which train teachers is one of the common opinions of the trainers. In our country, the curriculum programs which are used in math education vary constantly. Whereas Cogan and Schmidt (1999) state that the teaching approaches which constitute a complicated system, are stable and resist against changes. Because of this, when teacher candidates face a new teaching approach can show a reluctant behaviour and choose teaching methods which they have seen on their own teachers (Cooney, Shealy and Arvold, 1998; Lampert and Ball, 1999). The main task of the teacher training programs of education faculties is supporting the education reforms by developing the knowledge and beliefs of the teacher candidates (Delice, Ertekin, Aydın and Dilmaç, 2009; Llinares and Krainer, 2006). In the places where education system is specified from the center, the aims and contents of the programs are determined and teachers are asked to implement accordingly. Teachers who are obliged to prepare their curriculum programs according to these contents encounter serious problems. Because teachers have to prepare daily lesson schedules by considering the environmental conditions and students. In this context, success of the teacher requires their scientific researches and conveyance of these researches to the students in practice. In this context, development of extra courses may be useful for the area, in order to train teachers who might take efficient roles during math training-teaching. For this reason, math lesson which is one of the courses for which it is deemed required to be developed in this study is discussed and aimed to make contribution to its development. It is thought that this study contribute to the field because it will grant math teacher candidates with ability to choose and implement efficient approaches in solving problems that they might encounter in the future and shall constitute a resource for the trainers who train math teachers.

2. Method

This study has been realized by using the private case study which is one of the qualitative research methods. This case study which is a qualitative research model can

be mentioned as a model in which one or several incidents, environments, programs, social groups or other systems which are connected to each other, are examined comprehensively (McMillan, 2000). In other words, case study is a research where an asset is defined and privatized depending on a place or time (Büyüköztürk, Çakmak, Akgün, Karadeniz and Demirel, 2008).

2.1 Working Group

Working group of this research is comprised of total 30 high school math teachers who are in charge in a big city in Middle Anatolian region of Turkey. Easy accessible sampling method has been used in determination of the teachers who will participate in the research.

2.2 Data collection tool

An opinion survey which is comprised of 5 open-ended questions and which is developed by using the studies that are conducted about the design of learning environment in the literature by the researches, has been used as data collection tool. For the field validity of the survey, recommendations of two field specialists have been benefited. Within this scope, open-ended questions which are prepared in the opinion survey that is prepared are given below:

1. *Which sources do you use in the preparation that you make about the subject that you will teach, before the lecture?*
2. *What kind of assessment do you make about the subject taught, after the lecture?*
3. *While conducting mathematical connection of a problem that you encounter in daily life, or while trying to solve by making use of math, what kind of studies do you do?*
4. *What kind of innovations that are done in math field, do you bring up in your lectures?*
5. *Which methods do you use while you are teaching? Do these methods that you use while teaching vary depending on the subject? What kind of variations do they show?*

2.3 Analysis of the Entries

The obtained data are analysed descriptively. The aim in descriptive analysis is arrangement of the achieved findings and presenting to the reader as interpreted. The data are systematically and expressly described in this analysis method, these descriptions are expressed and interpreted, the cause-and-effect relations are examined and various results are reached. The reached results can be engaged on the ground of themes and prospective estimations can be made (Sezgin- Memnun, 2015).

3. Findings and Interpretation

Detailed research findings which are obtained as result of the statistical analyses that are realized over the opinions of the math teachers who participated in the research and the interpretations which are made concerned to these findings are included in this chapter.

The teacher answers which are obtained as result of the descriptive analysis that is realized for the primary research problem like "*Which resources do you use before the lecture about the subject that you will teach*?" that is included within the scope of the research, are listed under 5 themes. The percentage and frequency values concerning these themes and opinions are presented in Table 1.

Table 1: Distribution of the Statements of the Teachers Concerning the Sources that They Use in the Preparation They Will Do About the Subject That They Will Teach

Sub Themes	**Frequency (f)**	**Percentage (%)**
Books and course books which are in parallel with the books of National Education Ministry	25	48.1
Books and tests which cover the questions which are in parallel to the retired questions.	22	42.3
Studies which are obtained as result of the internet query.	3	5.8
Analysis books	1	1.9
Academic releases	1	1.9
Total:	**52**	**100.0**

As it is seen from the above given table, most of the statements used by the teachers who participated in the research (48.1%) are the books and course books which are in parallel with the National Education Ministry books that they will use in the preparation before the lecture. A significant part of the statements of these teachers (42.3%) stated that they make preparation by using the books and test books which cover the questions that are in parallel with the retired questions. In addition to this, statements of some teachers (5.8%) are that they use the documents that are obtained as result of the net query as pre-lecture sources. Also, 1.9% of the teachers replied this question as analysis books, and 31.9% of them replied as academic releases.

The themes and frequency values concerning the replies of the teachers for the second research question which is asked to the teachers as "*What kind of assessments do you do about the taught lecture after the lesson*", are given in Table 2.

Table 2: Distribution of the Statements of the Teachers Concerning the Assessments They Make About the Taught Subjects after the Lesson

Sub Themes	**Frequency (f)**	**Percentage (%)**
Inherent query for whether or not the student understood the lesson	15	42.9
The understanding value of the acquisition	5	14.3
Engaging lessons with daily life	3	8.6
Seeking answers for what can be done for teaching the subject more efficiently	10	28.6
Seeking answers for the question of Is the time sufficient?	1	2.9
Examining the students and determining their deficiencies	1	2.9
Total:	**35**	**100.0**

Almost half (42.9%) of the teachers' statements to whom questions are asked, stated inherent query of whether the student understood the lesson, in the assessment that is made about the subject taught, after the lesson. Meanwhile, a significant part of the teachers' statements (28.6%) explained that they seek for an answer to what can be done for teaching the subject more efficiently. In addition to this, a part of their statements (14.3%) explained to which extent the acquisitions are understood and 8.6% of these statements showed the engaging lessons with daily life.

The themes and frequency values concerning the replies of the teachers for the third research question which is asked to the teachers as "*While conducting mathematical connection of a problem that you encounter in daily life, or while trying to solve by making use of math, what kind of studies do you do?*" are given in Table 3.

Table 3: Distribution of Teachers' Statements Concerning the Actions They Take While They Are Making Mathematical Connection of a Problem They Encounter in Daily Life

Sub Themes	**Frequency (f)**	**Percentage (%)**
I try to synchronize the subjects with daily life and try give examples from daily life	8	26.6
Problem solving logic is defined	12	40.0
I research pre-conducted studies	1	3.3
I equate	1	3.3
As math occupies a significant place in every field of life, I don't need to make any study	7	23.3
I use math while making daily works	1	3.3
Total:	**30**	**100.0**

26.6% of the statements of the teachers in their replies given about the studies they used while they are working to find out the solve of a problem that they encountered in daily life, by using math or by conducting mathematical connection are the statements concerning the synchronization with daily life, and 40% of them are the statements concerning the use of problem solving logic. Similarly, a significant part of teacher statements emphasized that math takes a significant place in 23.3% of daily life and accordingly there is no need to make any study. Also, 3.3% of the statements that take place in the research addresses that previously-made researches are searched before, and similarly 3.3% of the statements shows that equation method is used. In addition to this, the teacher who said that he would use math while making his daily works, mentioned that he would use ratio and proportion subject while he is cooking.

The themes concerning the fourth question asked to the teachers as "*What are the teachers' statements concerning the innovations done in math and that they bring up to the lesson?"* and the percentage and frequency values concerning these themes are given in Table 4.

Table 4: Distribution of Teachers' Statements Concerning the Innovations Done in Math Field and That They Bring Up In Their Lectures, To the Sub-Themes

Sub Themes	**Frequency (f)**	**Percentage (%)**
Use from technology	17	56.6
Theories	1	3.3
Innovations which will attract students	5	16.6
I follow-up closely the changing curriculum program and bring up the changes into the lecture	2	6.6
I follow-up new publications	4	13.3
I bring up innovations which will ensure more efficient permanent learning	1	3.3
Total:	**30**	**100.0**

According to the result of the research, teachers stated in their answers that they gave concerning the innovations done in math field and that they bring up to their lectures, 56.6% of the teachers stated that they make use of the technology, 3.3% of them makes use of the theories and 16.6% states that they are the innovations which will attract students. Similarly, while 6.6% of the teachers were answering that they would follow up changing curriculum program; and 3.3% of them mentioned that they bring up innovations which will ensure more efficient permanent learning. In this context, some of our teachers who state they make use of the technology expressed that the number of

the questions which may be solved during the lecture has increased due to technology. For this reason, they asserted that the students see more question types in a short while. For the last, the percentage and frequency values concerning the replies of the teachers for the fifth research problem that is researching the teachers' statements concerning which methods do they use while teaching; are given in Table 5.

Table 5*:* Distribution of the Statements of the Teachers concerning which methods they use while teaching

Sub Themes	**Frequency (f)**	**Percentage (%)**
Induction deduction	8	21.6
Teaching over the example	5	13.5
Problem solving	5	13.5
Teaching question answer example	12	32.4
Smart blackboard	5	13.5
Structuring approach	2	5.4
Total:	**37**	**100.0**

As it can be understood from Table 5, 21.6% of the teacher's statements are induction-deduction to the question asked concerning which methods do they use while teaching. 13.5% of these statements are those mentioning that teacher teaches over an example and again 13.5% mentions that teacher uses problem solving method. Similarly, while the statements in which teaching, question-answer and example methods are used was 32.4%, the statements of teacher candidates who say they use smart blackboard are 13.5%. Also, the percentage of the statements of the teachers' candidates who state that they use structuring method is 5.4% of the total percentage. Also, some of the teachers who answered the fifth question which researches which method do the teachers use while teaching, said that they solve the first example as question-answer type, and they ask students to solve the rest of the questions in a similar way. They stated that they motivate the students this way.

4. Conclusion and Suggestion

In this study, secondary school math teachers' opinions were examined and examinations are done concerning the learning environments that they designed. As result, teachers' being using the course books often in designing course environment shall cause them to be restricted for the examples to be given and explanations. Lack of use of different sources and materials shall cause the prepared learning environment to be more book-based, that's authoritarian. This doesn't match with the structuring

approach which is emphasized in our math curriculum. These sources are those which are present in teachers' hands most of the time. Instead getting prepared only with these sources, it is required to make many researches in order to acquire comprehensive knowledge about the pre-lecture subjects. This acquired result matches with the results of the research which is done by Uğurel, Güzel and Kula (2010). According to these authors, the opinions of the teachers about learning activities are determined and the knowledge sources of teachers are mainly the course books. Most of the teachers to whom research questions are asked, answered that they use books and test books which contain retired questions and parallel questions, during the pre-lecture preparation period. This situation indicates that teachers don't have a researcher identity in the preparation that they do prior to the lecture. It is required to get teachers adopting the learning and teaching by researching both before charge and during the charge, in order to eliminate education system which is based on rote learning that is comprised of repeated knowledge. Accordingly, it is an important factor to train teachers in a researcher manner during their education before they come into charge and getting them worked in their own branches compliant to the education given in the universities. Today, by the virtue of rapidly developing technology, to access the desired information is much easier. To make a research in math field, to be aware of new inventions, to follow-up current studies is not a difficult situation for teachers and teacher candidates.

Teachers are required to keep researching about the subjects also after the lecture. Once conveyance of the subject to the students ends, the researches about that subject must not end, contrary, efforts must be shown to get more knowledge and to enrich teaching. Not only during the conveyance of the knowledge, but also constant knowledge collection must be in question. Research must be constant. The findings acquired as result of this research is done about the assessments of the teachers after the lecture about the subject handled, about whether or not the students understood the subject, and whether or not students have deficiencies. Math is an integral part of daily life. Students must be get adopted about that the math is an integral part of daily life in order to get them rid of their prejudices which occurred, got occurred, against math lesson, in order to get them approaching positive towards math and getting them showing success in this lesson. Math must not comprise of discrete symbols and relations that is comprised of certain forms, formulas and equations only. Trying to teach math without making engagements with daily life affects the understandability and learnability of it in a negative manner. It is required to provide students with the thought of that math lesson are necessary. Information about the use of math in daily life must be given to the students with the reasons such as getting math lesson loved by

the students and getting student success rates increased, removing negative prejudices and increasing the motivation etc. For this reason, forming mathematical connection of a problem that you encounter in daily life, or trying to solve it by making use of math, is a required function for math teachers. When the answers given to the third open-ended question of the research "*while you are conducting the mathematical connection of a problem that you encounter in daily life, or while trying to solve it by making use of math, what kinds of studies do you do*" are examined, it is revealed that most of the teachers don't make research sufficiently. Such that, some of the math teachers who participated in this research thinks that there is no need to make any study as the share of math is significant in all fields of the life. Current knowledge is acquired when research is made. Presence of the knowledge is not enough for conveyance to the students. One of the most important factors to increase the student success is teaching math in an understandable manner. Öztürk and Güven (2012) state in their study that, no matter how many tool and technological equipment is available in a learning environment, their use in time and in place can reach at the desired aims only by guidance of the teachers. It is also mentioned that having teachers creating discussion environment beside guidance, assessing the process rather than the product, materializing the subjects and engaging with real life, shall contribute to the creation of efficient learning environments. Even if there are no tools or technological equipment available, also recognizing the students in the learning environment only can be sufficient for creation of efficient learning environments.

Math has a significant place in science world. Math which is the most important science in all fields from medicine to the technology, maintained this development process throughout the history. In the aspect of the teachers, to follow up innovations done in math field and to bring these innovations up to the lectures shall be useful for increasing the attraction of the students for the lesson. Most of the teachers who participated in the research evaluated bringing innovations which will attract students up to the lecture or making use of the technology, as a positive manner. Sangwin and Kocher's (Sangwin and Kocher 2016) results show that transcribing existing paper-based mathematics examinations into an electronic format is now feasible for a significant proportion of the questions as currently assessed. The most significant barrier to using contemporary automatic assessment is the requirement from examiners that students provide evidence that they have used an appropriate method. Learning is not an event which occurs instantaneous, it occurs in time. Student's encountering stimulant, perceiving, receiving, processing and memorizing are main items of this process. First of all, teaching the subject so as to attract the student and ensuring student to perceive it, shall increase focusing on the lesson. The methods used by the

teacher while conveying knowledge to the student, is very important on the ground of understanding of the student. Alkan (1992) defines the arrangement of the learning environment as running the environment where education occurs, people in the environment and other items in a productive and healthy manner for the predicted aims, and emphasizes that not only teacher but also other factors are efficient within this process. Güven and Karataş emphasizes in their study that, by getting constructionist knowledge theory started to be used in common in math education, student is in the centre of the learning, new knowledge cannot be given to the individuals by getting told externally by an adult, it is required to design learning environments which are supported specially with electronic and visual materials in order to get new knowledge adopted by the students; come to the forth. Materials which are used in these designed environments must be used not as a presentation tool but as a sources in which student can structure his/her knowledge.

As result of the study that was done, the teachers stated that they support the classroom environment that they design with materials, but they incline to use these materials not as a learning tool but as a tool which enriches and facilitates the teaching (Güven and Karataş, 2004). Problem solving is a method which is preferred by some part among the methods used by the teachers while teaching. Perceiving the behaviours of the students would help him/her in determination of the method and approaches of the teacher during the problem solving process, and arranging the flow of the lesson which is included in the learning process of the learning environment and which influences this process. As result, it is understood from this study that in the event of efficiency of the student on the learning is put forward while designing the learning environment, the academic success of the student would increase.

References

1. Acat, B. (2005). Regulation of Student-Centered Learning Environment Education Size. V. International Educational Technology Conference. Sakarya Turkey.
2. Akdeniz, A.R., & Keser, Ö.F (2002). Assessment of the Constructivist learning environment with qualitative and quantitative methods. Changing Times and Changing Needs, First International Education Conference. Dogu Akdeniz University, North Cyprus.
3. Altun, M. (2006). Developments in Mathematics Education. Uludağ University Faculty of Education Publication. *XIX*(2), 223-238.

4. Bay, J.M., Beem, J.K., Reys, R.E., Papick, I., & Barnes, D.E. (1999). Student's reactions to standards-based mathematics curricula: The ınterplay between curriculum,teachers and students. School Science and Mathematics, *99*(4), 182-188.
5. Baydar, S.C. ve Bulut, S. (2002).Importance of Teachers Beliefs about Nature of Mathematics and Teaching of Mathematics in Mathematics Education. Hacettepe University Faculty of Education Publication. *23*, 62-66.
6. Büyüköztürk, Ş., Çakmak, E.K., Akgün,E.Ö., Karadeniz, Ş. ve Demirel F. (2008). Scientific Research Methods. Ankara. Pegem Akademi Publication.
7. Cogan, L., & Schmidt, W.H. (1999). An examination of instructional practice in six countries. In G. Kaiser, E. Luna, ve I. Huntley (Eds.), *International Comparison in Mathematics Education* (pp. 68-85). London, UK: Falmer.
8. Cooney, T., Shealy, B., & Arvold, B. (1998). Conceptualizing belief structures of preservice secondary mathematics teachers. *Journal for Research in Mathematics Education*, *29*(3), 306-333.
9. Çağlar, D. (1991). Atatürk Faculty of Education A Research on Teaching Practice. *M.Ü.* educational sciences journal, *3*.
10. Delice, A., Ertekin, E., Aydın, E. ve Dilmaç, B. (2009). An investigation of the relationship between epistemological beliefs and mathematics anxiety of student teachers. International Journal of Human Sciences, *Volume:6 No:1.*
11. Dorman, J.P. (2001). Associations between classroom environment and academic efficacy. *Learning Environments Research*, *4*, 243-257.
12. Driver, R. (1988). Constructivist approach to Curriculum development. In P. Fensham (Ed.), Developments and dilemmas in science education. London: Falmer Press.
13. Ekiz, D. (2003a). An analysis of the content of ıte curriculum for the primary phase in Turkey: Theoretical underpinnings and practice. *Journal of Kastamonu Education Journal*, *11*(1), 31-52.
14. Ekiz, D. (2003b). Class teacher thoughts about the models of teacher education candidates. National Education, *158*, 146-160.
15. Emrem, S. (2008). Creating Positive Learning Environment Role of the Teacher-Student Interaction Umeda. Yeditepe University, Faculty of Social Sciences, İstanbul.
16. Ernest, P. (1989). The knowledge, beliefs and attitudes of the mathematics teachers: A model. *Journal of Education for Teaching*, *15*(1), 13-33.
17. Güven, B. ve Karataş, İ. (2004) Middle School Mathematics Teacher Trainees Classroom Designs Primary education *Online*, *3*(1), 25-34.

18. İlgar, L. ve Gülten, D.Ç. (2013). The necessity and importance of teaching students to use mathematics in everyday life issues. *İZÜ* Journal of Social Sciences, 1-10
19. Kim, K., GrabowskiZ B.L., Sharma, P. (2004). Designing a classroom as a learner-centered learning environment prompting students' reflective thinking in K-12. The 27th Association for Educational Communications & Technology, Chicago, IL, October 19-23.
20. Lampert, M., & Ball, D. (1999). Aligning teacher education with contemporary K-12 reform visions. In L. Darling-Hammond ve G. Sykes (Eds.), *Teaching as the learning profession. Handbook of policy and practic*e (pp. 33-53). San Francisco: Jossey-Bass.
21. Llinares. S., & Krainer, K. (2006). Mathematics (student) teachers and teacher educators as learners. In A. Gutierrez ve P. Boero (Eds), Handbook of research on the psychology of mathematics education: Past, present and future (pp. 429-459). Rotterdam: Sense.
22. McMillan, J.H. (2000). Educational Research: Fundamentals forth consume (3th ed.) New York:Longman.
23. Oktar, İ. ve Bulduk, S. (1999). Evaluation of the behavior of teachers working in secondary schools. Journal of National Education, *142*,
24. Öztürk T. ve Güven B. (2012). Etkili Bir Matematik Öğrenme Ortamının Sahip Olması Gereken Özelliklerine Ilişkin Öğretmen Görüşleri. X. Ulusal Fen ve Matematik Eğitimi Kongresi, Niğde, Türkiye,, 27-30 Haziran 2012.
25. Peressini, D., Borko, H., Romagnano, L., Knuth, E., & Wills, C. (2004). A conceptual framework for learning to teach secondary mathematics: A situative perspective. *Educational Studies in Mathematics, 56*, 67-96.
26. Sangwin C. J. and Kocher N., (2016) Automation of mathematics examinations. Computers & Education 94 (2016) 215-227.
27. Sezgin-Memnun, D. (2015). Examination of faith for solving mathematical problems of middle school students. University Faculty of Education Journal *34*(1), 75-98.
28. Skemp, R.E. (1986). The psychology of learning mathematics. UK: Penguin Books.
29. Uğurel, I., Güzel, B.E., Kula, S. (2010) Mathematics Teachers' Opinions and Experinces Related to Learning Tasks. Buca Educational Faculty of Journal 28.1-21.

30. Yılmaz, M. & Akkoyunlu, B. (2006). The Effect of Different Learning Environments on Retention. Eurasian Journal of Educational Research, 23, 209-218.
31. Wilson, B, G, (1996). Constructivist Learning Environments: Case Studies in Instructional Design. Educational Technology Publication. Englewood Cliffs, New Jersey 07632.