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| **SCED 404 RESEARCH PROPOSAL****SUBMITTED TO** **PROF. AYŞENUR YONTAR TOĞROL** |

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Survey Research Proposal

Secondary School Preservice Mathematics Teachers’ Attitudes towards Mathematics

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Abstract: This study examines the attitudes including math anxiety, math interest, self efficacy and motivation to teach mathematics of preservice secondary school mathematics teachers. There are 300 participants for this research and research design is cross sectional survey. Participants are chosen by random selection technique and they are senior students of secondary school teaching mathematics department from all universities in Turkey having teaching maths department. After research is conducted, the data will be analyzed using SPSS program.

INTRODUCTION

 Mathematics course is seen sometimes as a nightmare and sometimes as an enjoyful game by students and also by teachers. I am curious about this situation because my department is secondary school teaching mathematics and I want to do research about, especially, teachers’ attitudes towards mathematics. There are some questions which come to my mind about this subject: “What do mathematics teachers think about mathematics?” or “ Do experienced mathematics teachers enjoy while they are teaching math courses?” or “Are preservice teachers’ attitudes towards mathematics more positive than experienced teachers or not?” Answers of these questions are important for mathematics education in school because positive attitudes of mathematics teachers improve both learners’ and teachers’ achievement in math courses.

The attitudes of just preservice teachers are taken into account because I wonder that how the attitudes of secondary school mathematics preservice teachers built during their university life and their points of view to mathematics are stressed in this research, because positive attitudes about math can be beneficial for teachers to improve their instruction and being open to novelties for mathematics courses. Secondary school preservice mathematics teachers are the future teachers and they will have effect on their students’ attitudes towards mathematics courses and teachers’ attitudes also affect their teaching performance in the class; therefore their thoughts about mathematics are considered.

SIGNIFICANCE OF RESEARCH

 This research will be helpful to get different attitudes of teachers about mathematics both for experienced and preservice teachers. The results of this research can be beneficial while preparation of secondary school mathematics curriculum because the results of this research can display some lacknesses of teachers or their anxieties in some units of mathematics courses so they can give more importance to these units in the curriculum and they can try to develop themselves in these math course units.

 Moreover, there are many research about preschool teachers or preservice primary school mathematics teachers’ attitudes towards mathematics; however, in the secondary school part, there is no much research so I chose this research topic to have general or different ideas of preservice secondary school mathematics teachers. The results of this research can be helpful to make comparison between the attitudes of experienced teachers and future teachers. By doing so, some differences or some factors that affect the attitudes towards mathematics can exist. Therefore, the significance of this research is to have general idea about preservice secondary school mathematics teachers’ attitudes towards mathematics and benefit from these attitudes for the construction of mathematics courses.

PROBLEM STATEMENT /HYPOTHESIS

 Concerning the reason of doing this research and need for knowing the attitudes of future mathematics teachers for the development of mathematics instruction, my problem statement is “What are the attitudes which are related to math anxiety, mathematics interest, self efficacy and motivation to teach mathematics of preservice secondary school mathematics teachers towards mathematics?” In this research problem, when it is said “attitude” , it should be understood that attitudes towards mathematics are math anxiety, math interest, self efficacy and motivation to teach mathematics. Also, independent variables are preservice secondary school mathematics teachers’ attitudes towards mathematics which are math anxiety, self efficacy, math interest and motivation to teach mathematics.

There is no hypothesis for this research problem because attitudes of preservice math teachers will be revealed with this research and there is no general attitude towards mathematics for every preservice teacher or I don’t want to change their attitudes towards mathematics therefore, in this research, research hypothesis does not exist.

DEFINITION OF KEY TERMS

Some terms are seen so much in this research, thus these are the definitions of terms. Attitude is “evaluating a particular entity with some degree of favor or disfavor.” (Eagly & Chaiken, 1993) In this research, attitudes towards mathematics are stressed. Also, participants of the research, preservice teachers, are senior students in secondary school teaching mathematics department. Attitudes towards mathematics include in this research math anxiety, math interest, self efficacy and motivation to teach mathematics. Firstly, math anxiety is defined as “panic, helplessness, paralysis and mental disorganization that arises among some people when they are required to solve a mathematical problem.” (Hunt, 1985) Also, self efficacy is used in this research and it is defined as “people’s judgements of their capabilities to organize and execute courses of action required to attain designated types of performances.” (Bandura, 1986) Math interest is a kind of hoby that people are interested in it. Another definiton is that “motivation is existence as part of one’s goal structures, one’s beliefs about what is important, and it determines whether or not one will engage in a given pursuit.” (Ames, 1992) This vocabulary will be helpful during the research.

REVIEW OF LITERATURE

 In Turkey’s education system, mathematics courses are given so much importance. Mathematics courses’s curriculum is dense and teachers try to teach mathematics in the best way and they try to teach everything in the curriculum and don’t want to miss any unit ; however, this situation affects their performance in the class because they cannot show the enjoy of mathematics to their learners and they feel under pressure in the class. If a mathematics teacher of a class has positive attitudes towards mathematics course, he or she displays his or her positive attitude and teaches math course enthusiastically. Also, preservice teachers’ attitudes towards mathematics are important since they are prospective teachers and will have importance effect on their students mathematics achievement, therefore there are many research conducted in this topic. In these research, it is shown that teachers’ beliefs and attitudes have important effects on students’ attitudes towards math and their achievement. (Aiken, 1972) With respect to the difficulties of mathematics instruction, preservice teachers have positive attitudes towards math and they say : “mathematics helps people think logically and it is enjoyable for them.” (Koca Özgün , 2002) On the other hand, some negative attitudes of preservice math teachers towards mathematics are revelaed with an interview study and the preservice teacher Dudu is passionate for her own teaching maths experince even if she has negative attitudes towards mathematics. She explains her opinions about mathematics: “I feel so frustrated and overwhelmed by my lack of understanding of mathematics and formulas make me sick.” (Mapolelo,1998) These negative attitudes towards maths can contribute to math anxiety and teachers can avoid of teaching difficult subjects. There is a research about preservice elementary maths teachers attitudes and it is explained that: “If prospective teachers relate math anxiety to more abstract secondary mathematics then it was feasible that they reduce the mathematical content in elementary teaching to basic number operations.” (Gellert, 2000) Self efficacy of preservice teachers and their math anxiety are related to each other and they can be signals of each other if we think attitudes of teachers. “Low level of confidence to teach maths by preservice teachers is indicative of math anxiety.” (Perry, 2011) Also, there are some researchers saying that the longitudinal study should be applied to preservice teacher from the beginning of their university year until the end of their university life so that we can obtain more real data and prepare the teaching programs with respect to the results of this research. (Camacho, Socas & Hernandez , 1998) Finally, since attitudes towards mathematics is a general concept, it is divided into four general categories: value, enjoyment, self confidence and motivation. (Sweeting, 2011) Most common result of these studies is “ teachers having high self confidence in math attribute the their success and enjoyment of mathematics to students.” ( Kalder & Lesik, 2011)

METHODOLOGY

* SAMPLING:

The problem of research is what are the secondary school preservice mathematics teachers’ attitudes consisting of math interest, math anxiety, self efficacy and motivation to teach mathematics towards mathematics, therefore, sample of this research is senior students from teaching mathematics departments. More specifically, the sample is chosen from all of secondary school teaching mathematics department of all universities. These universities are Atatürk University, Balıkesir University, Başkent University, Boğaziçi University, Cumhuriyet University, Dicle University, Doğu Akdeniz University, Dokuz Eylül University, Gazi University, Karadeniz Technical University, Marmara University, Ondokuz Mayıs University, Selçuk University, Yeditepe University and Yüzüncü Yıl University. (Retrieved from <http://www.hangiuniversite.com/bolumler/matematik-ogretmenligi>) Some of these universities are private and some of them are state university. However, this difference is not important for this research because different attitudes of preservice teachers from different universities is a beneficial thing for this research. Instead of chosing research population from some determined universities, my population is all universities in Turkey because my study is survey study and I want to make some generalizations with respect to research results so it is good to have a big population for the research. As it is expressed, secondary school teaching maths departments are present in these universities. If it is considered the number of research population, it is great to examine the quota of these universities for department of secondary school teaching mathematics. The sum of the quotas of these universities is 377 students. However, sometimes these departments don’t have the desired number of students and the number of secondary school teaching mathematics department senior students can be less than the quota of these departments, therefore, sample of the research is chosen as approximately 300 senior teaching mathematics students and this population is chosen randomly via using random numbers table. I will write the names of students to the random numbers table and they will be chosen randomly because I want participants to have equal chance to being selected for the research and there are no specific criteria for the participants of this research thus random sampling technique is suitable for this study.

* INSTRUMENT

The name of the instrument for this study is Attitudes Towards Mathematics (ATM) and it has four subcategories that consist of questions concerning motivation to teach mathematics, math anxiety, math interest, self efficacy of secondary school preservice mathematics teachers. Attitudes towards mathematics instrument is developed by the researcher. Instrument is a questionnaire consisting of 60 questions, 15 questions in each part, and it is chosen as questionnaire because it is easy to collect a large data and it is easy to answer survey questions for the participants of the research. Also, ATM instrument include likert scale items having five choices, and the choices for the answers of survey questions are *strongly agree, agree, disagree, strongly disagree and don’t know.* In order to collect reliable data, questions are chosen clear so that participants easily understand questions and reflect their attitudes towards mathematics explicitly. In the math anxiety part of survey, questions are closely related to some fears of preservice teachers about mathematics and fear of possibility that teachers couldn’t solve math questions of their students. In the math interest section, participants are asked to answer questions related to teachers’ interest in mathematics not just the course part but the use of mathematics in real life. Also, survey questions examine the attitude of preservice secondary school mathematics teachers about history of mathematics or mathematicians. In the motivation part, it is desired to obtain knowledge about preservice teachers’ motivation and passion to teach mathematics and the effects of motivation to their performance. Finally, in the self efficacy part, teachers can have opportunity to question their self efficacy in teaching mathematics and they can display some lacknesses or some anxieties.

* RESEARCH DESIGN &PROCEDURE

The design of this research is cross sectional survey. Because the researcher doesn’t have control over independent variable which are attitudes including four concepts, this study is nonexperimental, and the researcher cannot see the change of variables together, design of the study is selected as survey design. My aim in this study is to obtain different attitudes of preservice math teachers. The intervention or manipulation of participants’ attitudes is not the focus of this research; therefore cross sectional survey study is applied just one time to participants and it is the snapshot of current attitudes of secondary school preservice mathematics teachers about mathematics. Also, because the change of attitudes of participants over time is beside our problem, longitudinal study is not preferred for the research. Survey includes these parts: mathematics interest (history of math or mathematicians) , math anxiety, self efficacy and being motivated for mathematics teaching. Totally, there are 60 questions in the survey, each part includes 15 questions. Survey questions are divided into four parts because these parts are most common attitudes towards mathematics and attitude is a general concept and I want to specify it in the survey so that participants can answer survey questions with respect to these specific four categories.

For the application part of this survey study about preservice teachers’ attitudes towards mathematics, firstly we prepare our questionnaire and choose sample as it is stated above. Before applying this survey, of course required permissions are taken from heads of secondary school teaching mathematics departments of universities explained above. Then, we apply this survey to approximately 300 preservice secondary school mathematics teachers. Before application of the instrument, we give short information about the study. For instance, I say the purpose of study and want participants to answer questions honestly and don’t look at other participants’ answers beacuse it is said that confidentiality of this research is important for me and anyone will see it their answers to survey questions. Because this study is about obtaining knowledge about attitudes of preservice teachers about mathematics, participants should feel themselves comfortable and free while they are answering the questionnaire. There shouldn’t be any information about the questions’ possible answers because this situation decreases the reliability of this research. After, data is collected from participants, data is analyzed in order to reach a result of the research.

DATA ANALYSIS

 After conducting the research and collecting the data from participants, some results of this research are revealed. In order to analyze data, statistics program SPSS is used. Since there is no pretest or posttest, only answers of participants to survey questions are examined with respect to preservice mathematics teachers’ choices in the questionnaire. Thanks to SPSS program, reliability coefficient of questions is calculated, also choices in the questions which is preferred most is shown by data anlaysis. In the data analysis part of the research, our aim is to gain knowledge about types of attitudes like math anxiety, math interest, self efficacy and motivation to teach mathematics, thus data is analyzed in terms of these attitudes, whether preservice teachers have these attitudes or not, and preservice secondary school mathematics’ teachers’ attitudes are revealed as positive or negative via data anlaysis.

CONCLUSION

 The main focus of this research is to obtain attitudes of preservice secondary school mathematics teachers including math anxiety, math interest, self efficacy and motivation to teach mathematics and cross sectional survey design is used in this study. The result of this research could include different opinions about mathematics or they can be similar. The main point is that this study will be beneficial for both experienced teachers and preservice teachers and also for students since this result of the research will display preservice mathematics teachers’ needs, positive attitudes or negative opinions in mathematics and these teachers try to improve their self efficacy in mathematics instruction.

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