THE PROFILE OF A FRESHMAN YEAR STUDENT OF A TEACHER TRAINING COURSE IN TERMS OF HIS/HER ATTITUDE TO MATHEMATICS

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Abstract

It is generally assumed that the quality of teachers, and thus also that of educational processes in schools is conditioned by the quality of the students that apply for teacher training courses. There are several common features characteristic for applicants in the Czech Republic that have been established in the long run: a vast majority among them are women; a significant part of the students see their studies at the teacher training faculty only as an alternative to their preferred field of study; attitudes of prospective teachers to their profession are differentiated (based on gender, etc.), and there are regional differences among the applicants. The above mentioned claims might be complemented with those that are frequently used about teacher training courses students: teacher training courses are only their second choice, without actually aspiring to become teachers by profession. Teacher training courses are generally considered as seemingly easier, a significant part of the students do not work as teachers after graduating from the school.

The goal of this contribution is to describe the attitude of teacher training students to the study of mathematics directly after starting the teacher training courses. That is why we have shown here the results of a survey carried out among 134 freshman year students in the winter semester of the 2016/2017 academic year that filled out a questionnaire probing into the following aspects of their future profession: what influenced their decision to choose the teacher training faculty the most; what advantages and disadvantages the students see in working as teachers; expectations from the upcoming years of study; if they are worried about certain mathematical disciplines; their relationship to ICT, etc. The research results are interpreted according to common characteristics such as the subjects studied, age, city of residence, etc.

Keywords: teacher, teaching, mathematics, prospective math teacher, teacher training faculty.

1 INTRODUCTION

The reason for examining the issue consists in the current professional debates and social discussions about the current topics (not only at schools but also in the academic and political scenes) about portrayal of prospective mathematics teacher training. The results of the international Programme for International Student Assessment (PISA) and Trends in International Mathematics and Science Study (TIMSS) surveys demonstrate a long-term considerable worsening of Czech pupils in mathematics. In this context, the opinions on the position of mathematics and the situation regarding teacher training are changing. Each mathematics teacher for instance should be well aware of what the concept of mathematical literacy means and what mathematical competencies he/she should develop in his/her pupils. However, unless the teacher himself/herself has these competencies already during the pre-service training, he/she will hardly develop them in his/her pupils. Such pupils will then have only a formal attitude to mathematics, will not understand its applications in practical life, and will choose such fields of further studies where it is possible to avoid mathematics [7]. This leads to speculative decisions such as a mandatory school-leaving exam in mathematics to prevent the domination of humanities.

In recent years a number of studies have been reported which have explored the reasons why people choose to become schoolteachers [1], [5], [3], [6] or also on the other side – the portrayal of graduate teachers’ portray [2]. This paper is intended to identify portrayal of freshmen at department of mathematics at teachers’ training faculty. We believe that examining influences that shape attitudes, values, and goals of entering freshmen could help improve their training.
2 METHODOLOGY

During the first lesson of the academic year 2016/2017 freshman year students of the Mathematics Department of the Faculty of Education of Palacky University Olomouc were asked to participate in a research project to establish the various aspects that influence the selection of a department, expectations connected to it, and the students' attachment to mathematics as such. In this research we used a questionnaire of our own construction, the header containing the basic identification data about the respondents – gender, study program, age, permanent address, and the question whether his/her parents were teachers. The questionnaire also included 14 questions to be answered in various ways: scale (5), selected (3), semi-open (3), dichotomic (2), and open questions (1). The questionnaire was conceived in such a manner to enable the identification of as many determinants as possible that form the profile of prospective math teachers for elementary schools and junior high schools.

2.1 Research sample

A total of 134 respondents took part in the research, all of them freshman year students of three programs of study, partly provided by the Department of Mathematics: Education for elementary schools (EES) – 79 respondents, Mathematics focused on education (MFE) – 38 respondents, and Teaching mathematics in junior high schools (TMJHS) – 17 respondents.

The following chart shows the percentage of respondents as split into the individual groups, and according to their gender (chart 1). The research has confirmed the generally stated fact that there is a significant predominance of women in Czech schools, as the chart makes it clear that women made up 89% of the respondents. The most significant difference was in the EES group in which women made up as much as 96%.

2.2 Working hypotheses

In accordance with the topic of this article we will further analyze the following four questions of the questionnaire:

- The ninth question of the dichotomic questionnaire was: Did you take your graduation exam in mathematics? The options were yes or no.

- The tenth question, in which the students were supposed to state the extent of their happy expectations prior to starting their studies of the areas of mathematics – I look forward to studying various areas of mathematics. The answers were supposed to be on a four-grade scale: rather yes, yes, rather not, or not.
• In response to question 12 the students were supposed to state what discipline of mathematics they were most afraid of: I think that my biggest problem will be studying algebra, mathematical analysis, and geometry.

• The last question of the questionnaire explored the extent of the intended implementation of digital technologies into the future teaching of mathematics: Am I planning to use information technologies in my teaching of mathematics? The four possible answers were rather yes, yes, rather not, or not.

While processing the data the following four working hypotheses were set:

• Most students of the EES group did not take the high school graduation exam in mathematics, whereas most students in the MFE and THJMS groups did.

• All the freshman year students studying various disciplines of mathematics look forward to studying mathematics.

• There is no statistically important difference among the freshman year students as to their fear of studying algebra, mathematical analysis, and geometry.

• All the freshman year students studying various disciplines of mathematics are planning to use information technologies in their teaching of mathematics.

2.3 Results

2.3.1 High school graduation exam in mathematics

Based on the character of the individual programs of study we expected to get different answers to the question regarding graduation exam in mathematics. While the subject of mathematics is included in the set of all the other subjects that an elementary school teacher has to teach, the MFE and THJMS students have mathematics as one of the two main subjects they are studying. Thus we assumed that most of the EES students did not graduate in mathematics, whereas most of the MFE and THJMS students did. The test for independence confirmed this hypothesis since the p-value turned out lower than 0.0001. Whether the students took their high school graduation in mathematics or not depends on the field they studied. Also the chart shows that only 15% of the EES students graduated in mathematics, whereas 79% of the MFE students and as much as 94% of the THJMS students did (Chart 2).

2.3.2 Looking forward to studying the disciplines of mathematics

To verify the hypothesis we used Fisher's exact test that does not require all theoretical frequencies to be larger than 5, since this condition was not fulfilled in our test. Therefore it was necessary to merge the frequencies of “rather not” and “not”, and “rather yes” and “yes”. Also, independence was rejected here since the p-value was smaller than 0.0001. The fact that the students look forward to studying
mathematics depends on the field they are studying. The EES students look forward to it much less than the others. The chart clearly shows that the EES students mostly have negative expectations (64%), compared to 89% in the MFE students and as much as 94% in the THJMS students (Chart 3).

![Chart 3: Cheerful expectations prior to studying the disciplines of mathematics](image)

2.3.3 Fear of selected disciplines of mathematics

In this case independence was also rejected after applying the research tool, since the p-value was calculated to be 0.0035. The discipline the students are afraid of the most depends on the field of study (Chart 4). Whereas the EES students are mostly afraid of mathematical analysis (73%), the MFE students are afraid of geometry (47%), and the THJMS students of algebra (59%).

![Chart 4: Difficulties studying the disciplines of mathematics](image)

2.3.4 Planned use of ICT technologies in future teaching of mathematics

To verify the hypothesis we used Fisher's exact test, and merging the frequency of “rather not” and “not”, and “rather yes” and “yes”. In this only case independence was not rejected, since the p-value was equal to 0.1467. Although, according to Chart 5 it might seem that there is a significantly higher percentage of students that want to use information technologies among the THJMS students (76%), this difference is not statistically significant – 53% of the MFE students and 50% of the EES students.
3 CONCLUSIONS

From the above mentioned results of our research we can have a rough idea of the profile of a freshman year student at the Department of Mathematics of the Faculty of Education of Palacky University in Olomouc – if he/she is a prospective elementary school teacher, mathematics is, more or less, a necessary evil for him/her. This student looks forward to working with children. However, he/she has never had a positive attitude to mathematics, did not choose it as his/her high school graduation subject, nor is looking forward to studying it in the future (he/she is especially afraid of mathematical analysis). Teachers of mathematics in junior high schools have a significantly more positive attitude to mathematics. Most of them chose it as their graduation exam subject, and are most afraid of studying algebra.

A challenge for further research may be the various causes of these differences and possible approaches how to eliminate these fears of freshman year students of education for elementary schools [1] summarizes one of the ways in the form of working with the belief of prospective teachers). It is important to bear in mind that it is not about forming a benchmark, since the work and personality development of a teacher is a very specific phenomenon that cannot be stereotypically described. However, forming a general profile of a starting mathematics teacher might significantly help increase the quality of their pre-gradual preparation.

ACKNOWLEDGEMENTS

The paper was written under the support of the Grant Fund of the Dean of the Faculty of Education of Palacký University in Olomouc.

REFERENCES


