

Abstract

This diploma thesis deals with problems of mathematical skills. Unlike previous research carried out in Czech education, this diploma thesis focuses on university students. Specifically, the focus is on aspirants of the bachelor degree studying geography at the Faculty of Science of Charles University in Prague. The main aim of this work is to determine the mathematical skills, with which students have the greatest problems, if these problematical skills change over time, whether they are problematic independently of the group of the students or each student group has problems with other mathematical skills.

In order to meet the goals the credit tests of mathematical geography were used. Because this type of test is not commonly used to determine the level of mathematical skills, it was necessary to develop an own assessment methodology. In total, 1920 credit tests were analyzed from the six academic years 2011/2012 to 2016/2017.

The results show that the most problematic mathematical skills are „unit transfers”, „using the appropriate formula in the correct form” and „calculating the angles”. GeKa + FGG and UZ students also have problems with „formulating a verbal answer or reasoning”. All studied study fields did together the smallest proportion of mistakes in mathematical skill „expression the unknown from the formula”, „fitting into the formula”, „correct use of units” and „knowledge of graph of goniometric function”. Overall, it is very difficult to trace a certain trend in changing the error rate in mathematical operations. However, in many cases after a failed academic year, the year was much more successful. The greatest difference in the error rates between the different study fields was found in the mathematical skill „formulating a verbal answer or reasoning”. Otherwise, the error rates for the studied mathematical skills between different study fields did not differ much. Overall, the smallest proportion of mistakes in mathematical skills was made by GeKa + FGG study fields.

The results of this diploma thesis can help mathematics teachers to focus more on developing and practicing the most problematic mathematical skills in their lessons.

Keywords: mathematical literacy, mathematical geography, cross-curricular links, mathematical skills, didactic test