

Development and Optimization of German Diagnostical Tests in Mathematics for Vocational Training

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Abstract : Teachers working at vocational Colleges are often confronted with the problem, that many students graduated from different schools and therefore each had a different education. Especially in mathematics many students lack fundamentals or had different priorities at their previous schools. Furthermore, these vocational Colleges have to provide Graduations for many different working-fields, with different core themes. The Colleges are interested in measuring the different Education levels of their students and providing assistance for those who need to catch up. The Project mathe-meistern was initiated to remedy this problem at vocational Colleges. For this purpose, online-tests were developed. The aim of these tests is to evaluate basic mathematical abilities of the students. The tests are online Multiple-Choice-Tests with a total of 65 Items. They are accessed online with a unique Transaction-Number (TAN) for each participant. The content is divided in several Categories (Arithmetic, Algebra, Fractions, Geometry, etc.). After each test, the student gets a personalized summary depicting their strengths and weaknesses in mathematical Basics. Teachers can visit a special website to examine the results of their classes or single students. In total 5830 students did participate so far. For standardization and optimization purposes the tests are being evaluated, using the classic and probabilistic Test-Theory regarding Objectivity, Reliability and Validity, annually since 2015. This Paper is about the Optimization process considering the Rasch-scaling and Standardization of the tests. Additionally, current results using standardized tests will be discussed. To achieve this Competence levels and Types of errors of students attending vocational Colleges in Nordrheinwestfalen, Germany, were determined, using descriptive Data and Distractorevaluations.

Keywords : diagnostical tests in mathematics, distractor devaluation, test-optimization, test-theory

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