The Optimal Number of Choices in Multiple-Choice Tests: Some Evidence for Science and Technology Education

Abstract

The purpose of this study is to compare the psychometric properties of the tests with different numbers of choices used in science and technology education courses. With this purpose in mind, 9 tests were developed consisting of 3-, 4- and 5-choice questions respectively on a science and technology subject and they were applied throughout 1 year to 41 pre-service teachers. The findings demonstrate that the level of reliability of the items with 3 or 5 choices was found to be higher than that of the items with 4 choices and no significant differences were found among other psychometric properties. In addition, according to the effect size values, the most effective test type was found to be the 3-choice test. According to these results supporting the literature, it can be said that using 3-choice questions in science education is more advantageous than 4- or 5-choice questions because they are easy both to prepare and analyze.

Key words: multiple-choice test, number of options, psychometric properties, science and technology instruction.

Introduction

Assessment is not only an indispensable part of the education process but it is also significant in revealing the extent to which this process is working (Bulsk, 2008; Popham, 2002). The most valued outcomes in this process are those concerned with pupils. Psychological tests are used mostly in order to assess students’