

**Exploring the Ethical Aspects of TIMSS
International Learning Assessments**

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Abstract

The main objective of this study was to examine the feasibility of a new and hidden factor in the 2011 TIMSS questionnaire for students, teachers, and principals. Additional objectives were: (a) to examine the relationship of the dimensions of this factor to the student's achievement in mathematics in the TIMSS 2011 tests; and (b) to examine the relationship between school external and internal variables and students' scores in mathematics in the TIMSS 2011 tests.

The theoretical framework of this study was based on Kaptin's (2004) study comparing codes of ethics of 105 of the world's largest companies and organizations to reach a common denominator of norms, objectives, values and behaviors and to extract the meaning of the term "ethical culture". Thus, the central research question examined whether the term "ethical school culture" and its various dimensions could be extracted from TIMSS questionnaires. Extraction of this factor was done in two stages. In the first stage, a comparison was made and a common denominator of the concept of "ethical school culture" was found based on Code of Ethics documents for educators from five of the seven participating countries. In the second stage, a comparison was made between the common dimensions found in the Code of Ethics documents and statements extracted from the TIMSS questionnaires for the student, teacher and principal.

Following this research question, and after finding different dimensions of the TIMSS school ethical culture, we examined the relationship between school ethics and its various dimensions and the achievements of eighth graders in the TIMSS math tests as expressed in the seven countries. In addition, we examined whether an integrative model can be created that includes the variables of the school's ethical culture and external and internal school variables. In this study, seven of the 45

countries participating in the 2011 TIMSS study were sampled. The final sample included 43,791 students, 2,334 teachers and 1,504 principals.

In analyzing the empirical data collected by TIMSS, a factor analysis was used. Initially, an exploratory factor analysis was used, followed by confirmatory factor analysis to gather distinct content factors representing different aspects of a school's ethical culture. The confirmatory factor analysis formed the basis for examining the model's equations by which students' achievements can be predicted. In this manner, it is possible to assess how this culture relates to academic achievement in practical subjects, i.e., mathematics. The challenge in the TIMSS data relates to their multi-level structure, in which students' data are nested in each country's schools in which the study was conducted. To this end, two levels of measurement were established: one was the level of the student based on his/her answers, and the other, the level of the school based on the responses of teachers and principals.

Multilevel analysis is the development of a regression model that assumes that the intercept and the other regression coefficients are not fixed for each unit in the sample, but random variables between different schools. As part of the formulation of the research parameters, the questionnaires of the students, the teachers and the principals were examined to formulate a model for comprehensive hypothesis testing. Testing the hypotheses is an extension of the measurement model. Its validation part is based on the structural equation modeling approach. According to this approach, a set of equations is estimated simultaneously, and thus, the hypothesis is tested. In this way, not every hypothesis is examined as an independent model, but all hypotheses are integratively examined in a comprehensive model.

This tool was chosen to examine the dimensions of the school's ethical culture and their perception by students, teachers, and principals among the different countries. In other words, this tool makes it possible to test the hypothesis that there is a global "ethic culture" concept that transcends cultural boundaries on a national level. Finally, through the structural equations approach, it is possible to formulate a series of representative factors for the dimensions of the school's ethical culture, and to examine them against the students' achievements, according to the hypotheses that emerged from the theoretical analysis of the subject.

The findings of this study confirm the existence of a group of variables that represent the "ethical school culture" facet of the TIMSS questionnaire. This facet includes four dimensions of the TIMSS questionnaire: the ethical dimension of caring for the student, the ethical dimension of teacher professionalism, the ethical dimension of teacher collaboration, and the ethical dimension of cooperation with the students' parents. In addition, a comparison of themes extracted from the country's code of ethics documents to the items appearing in the TIMSS questionnaire added another dimension, which is inappropriate behavior in the school.

In various simple models, which examined the relationship between each of the achievements of the students' dimension separately, a link was found between the five dimensions of the school's ethical culture in different ways and in different countries, and the students' achievements in mathematics. Finally, we examined an integrative model that linked the variables of the school's ethical culture, and internal and external school variables to scholastic achievement. The findings of the model show that students' achievements can be linked to three groups of variables: school-external, school-internal, and school ethics.

In order to examine whether the dimensions of ethical culture are global and common among the countries selected for this study, it was found that in light of the theoretical test comparing the Code of Ethics documents of five of the seven countries, there were common elements and principles for the four dimensions of ethical culture. However, it turned out that each component has a different weight, and therefore their implementation is different in different countries. In other words, an ethical school culture is characterized by global and common values, but their implementation is expressed differently in each country, because of each country's unique cultural characteristics.

Over the years, the dominance of two major groups of variables school-external (Coleman et al., 1966; Gamoran, 2001; Liu, Wu, & Zumbo, 2006; Shen, 2005; Wang, 2004) and school-internal (Dumay & Dupriez, 2007; Scheerens & Bosker, 1997; Scheerens, Bosker, & Creemers, 2001; Teddlie & Reynolds, 2000) were examined. However, this study raised the importance of ethical behaviors in school culture and their contribution to student achievement. Additionally, this study also shows that internal and external school variables together with ethical factors are interrelated and are related to academic achievement in mathematics.

This research examined some of the covert ethical aspects of the TIMSS questionnaires. These aspects however, do not express all the elements of the school's ethical culture. Future research should examine other ethical aspects of school culture and their relationship to students' achievements in direct or mediated models.