An aggregation strategy is proposed to potentially address practical limitation related to computing resources for two-level multidimensional item response theory (MIRT) models with large data sets. The aggregate model is derived by integration of the normal ogive model, and an adaptation of the stochastic approximation expectation maximization algorithm is used for estimation. This methodology is used to conduct an exploratory factor analysis of the 2007 mathematics data from Trends in International Mathematics and Science Study (TIMSS) fourth grade to illustrate potential uses. A comparison to flexMIRT and two brief simulations indicate the aggregate model provides accurate estimates of Level 2 parameters despite loss of information ensuing from key assumption.

The purpose of this study was to explore what may be contributing to differences in performance in mathematics on the Trends in International Mathematics and Science Study 2007. This was done by using a mixture item response theory modeling approach to first detect latent classes in the data and then to examine differences in performance on items taken by examinees in the different latent classes. An exploratory mixture 3-Parameter Logistic model analysis detected two latent groups in the data. The model considered in this study used internet access as a covariate to illustrate the effect of the covariate on latent class membership.


Recent studies have indicated, particularly in the European context, that students' mathematical successes on international tests of student achievement may not be attributable to the quality of classroom instruction, although, as is shown, this is unlikely to be the case in Flanders, the autonomous Dutch-speaking region of Belgium. Flemish students' mathematics performance on such tests have placed them at the head of the European rankings, warranting Flanders as a site of research interest that has been largely ignored by the international community. In this paper, drawing on analyses of four sequences of five lessons, taught by teachers construed locally as competent, I explore the nature of Flemish mathematics teaching. Framed by anecdotal reports that it reflects the structuralism of the now largely abandoned Bourbakian new mathematics movement humanised by the Dutch tradition of realistic mathematics education, the analyses focus on examining not only the extent to which these traditions are manifested in Flemish classrooms but the ways in which they interact. The dominant tradition seems to be that of mathematical structuralism mediated by teachers' use of realistic problems; a tradition not unlikely to underpin Flemish students' repeated successes. The results are discussed in relation to research highlighting the significance on students' achievement of the broader cultural milieu in which they and their teachers operate.

International surveys have served as agents of change for the introduction of reforms in curricula worldwide. The Israeli Ministry of Education set a goal of raising Israel's ranking in international surveys so that Israel will be among the 10 leading countries in the Program for International Student Assessment and Trends in International Mathematics and Science Study (TIMSS). The Ministry of Education therefore acted to reduce the gap between the intended and the attained science curriculum by intervening on two curricular levels: the intended and the implemented. Over the years, documents that contributed to the adoption of contents and skills from the international surveys were added to the science curriculum, until the publication of the new science curriculum. The intervention was successful and in TIMSS 2011, Israel ranked 13 out of the 42 participating countries. The present research examines the influence of international surveys on science education in Israel, over the course of time (1996–2011). Analysis of documents accompanying the curriculum shows a clear message that international surveys are standards that should be used for teaching, and every additional document closes the gap between the science curriculum and the international surveys.


A survey was used to explore science teachers perceptions of state (North Carolina), national (NAEP), and international assessments (TIMSS, PISA). Although familiar with state assessments, findings indicate that most science teachers were unaware of national and international assessments and felt their own students would not do as well as high-achieving students in other US states or nations. In addition, slightly less than half of the teachers felt their teaching corresponded with the 'world class' standards represented by NAEP, TIMSS, and PISA. This study also found that reviewing national and international assessments caused individual science teachers to question the nature and quality of their own curriculum, teaching, and assessments; as a consequence, several teachers used these "global" assessments as an innovative influence on improving science education "locally" in the their own classrooms.


By using TIMSS Grade 4 2011 science data for Serbia and Slovenia, this study examined which of two dimensions of science learning (self-confidence in science learning, or liking science learning), if any, was primarily related to students' cognitive achievement in science. This achievement was considered for three cognitive domains, namely: knowing, applying, and reasoning. The analysis revealed that in both
countries' achievement was mainly linked to self-confidence in each of the three cognitive domains. Because of positive correlations, classroom work may be improved by including, whenever possible, activities aimed at strengthening students' belief in their own ability to learn science. (English)


This paper identifies the amount of variance in mathematics achievement in high- and low-achieving schools that can be explained by school-level factors, while controlling for student-level factors. The data were obtained from 2679 Iranian eighth graders who participated in the 2007 Trends in International Mathematics and Science Study. Of the total sample, 1422 and 1257 students were from high- and low-achieving schools, respectively. Two-level hierarchical linear modelling was applied. The results indicated that of the total variance in mathematics achievement, 27.95 and 6.70% were due to between-school differences in the high- and low-achieving schools, respectively. Controlling for the school-level factors, the better-performing students were those with a higher level of confidence in learning mathematics in both samples. After controlling for the student-level factors, inadequacies in school resources and school type yielded the strongest link to achievement in the high- and low-achieving schools, respectively.


This article compares the effects of family background and school resources on fourth-grade students' math achievement, using data from the 2011 Trends in International Mathematics and Science Study (TIMSS). In order to ameliorate potential floor effects, it uses relative risk and population attributable risk to examine the effects of family background and low levels of school resources. Four findings stand out: (1) the percentage of vulnerable students decreases as GDP increases, but this relationship weakens at higher levels of GDP; (2) the relative risk associated with low socioeconomic status is positively related to GDP, but the relative risk associated with low school resources is unrelated to GDP; (3) the population attributable risk associated with some of the family and school risk factors tends to fall with rising GDP, but varies considerably amongst countries; and (4) family background effects are stronger than school resource effects in low- and high-income countries.

The main purpose of this study is to investigate how national ICT development level and individual ICT usage will influence achievements in reading, mathematics, and science for 4th and 8th grade school students. Large-scale international databases, including TIMSS 2011, PIRLS 2011, and PISA 2012, were employed in the current study. Hierarchical linear models (HLM) were applied to examine both country- and individual-level variables. According to the findings of this study, the national ICT development level is a significant positive predictor for individual academic performance in all three subjects for both 4th grade and 8th grade students, while the national economic development level was controlled for. Such finding indicates a similar trend of the ICT influences for both groups, although there exists a difference in terms of the extent of the relationships. In addition, individual-level ICT use is a significant predictor, even if students’ gender and socioeconomic status are controlled for; however, its influence is mixed across different student groups and subjects depending on the ICT usage type.

**PIRLS**


There appears to be a dramatic decline in attitude toward reading between 2006 and 2011 for ten year-olds taking the Progress in International Reading Literacy Study (PIRLS) examination. This ‘decline’, however, is probably not real but is the result of a change in the attitude questionnaire, mentioned only in the fine print in the 2011 PIRLS publication. The scoring of the 2011 version of the questionnaire was profoundly influenced by students’ report of outside school reading; the scoring of the 2006 version was not.


One of the major imperatives behind the comprehensivisation of secondary education was the belief that postponing the age at which students are tracked in different educational routes would mitigate the
effect of social background on educational outcomes. Comparative investigations of large-scale international student achievement tests in secondary education, such as PISA, have indeed suggested that individual test results depend less on social origin in countries that have postponed tracking age. However, a crucial pitfall in such cross-sectional studies is that many other factors influence the effect of social origin on achievement as well. In order to account for possible unobserved confounder bias, and to acknowledge the fact that part of the social origin effect already exists prior to the introduction of tracking, we apply a difference-in-differences analysis to data from PIRLS (primary education, 2006, N = 33, n = 171,486) and PISA (secondary education, 2012, N = 33, n = 235,378). Our results confirm that the introduction of tracking increases the effect of social origin on reading achievement between primary and secondary education. This lends further support to the argument that postponing the tracking age can foster social equity in educational achievement.


Good governance or “government effectiveness” (per the World Bank) is seen as a critical factor for the wealth of nations insofar as it shapes political and economic institutions and affects overall economic performance. The quality of governance, in turn, depends on the attributes of the people involved. In an analysis based on international data, government effectiveness was related to the cognitive human capital of the society as a whole, of the intellectual class, and of leading politicians. The importance of cognitive capital was reflected in the rate of innovation, the degree of economic freedom, and country competitiveness, all of which were found to have an impact on the level of productivity (GDP per capita) and wealth (per adult). Correlation, regression, and path analyses involving N = 98 to 201 countries showed that government effectiveness had a very strong impact on productivity and wealth (total standardized effects of β = .56–.68). Intellectual classes' cognitive competence, as indicated by scores for the top 5 percent of the population on PISA, TIMSS and PIRLS, also had a strong impact (β = .50–.54). Cross-lagged panel designs were used to establish causal directions, including backward effects from economic freedom and wealth on governance. The use of further controls showed no independent impacts on per capita wealth coming from geographical variables or natural resource rents. Finally, we discuss background factors and ways in which governance might be improved.

ICCS

Optimal classroom climates for civic education encourage the development of knowledge, skills and dispositions necessary for students to become involved citizens. One of the simplest and most common ways of measuring classroom climate in this field is to aggregate individual students' perceptions of classroom climate to the group level; however, little has been done to assess the quality of such aggregate measures. We examined data from the United States sample of the 1999 IEA Civic Education Study to determine the reliability of aggregate measures of the openness of classroom discussion climate as reported by students. Student and class-level correlates of within-classroom variability in students' reports were considered, and aggregate reports were correlated with student outcomes. Although the aggregated classroom climate measure had only modest reliability, we identified several within-classroom sources of variability in ratings. Classrooms were also more variable in their ratings if the average climate perceptions were lower on average, and if the classrooms served students with fewer educational resources at home. However, the aggregate measures did predict a variety of student outcomes even after controlling for within-group sources of variability.


In Chile, the influence of the socioeconomic make-up of classrooms on achievement has been extensively studied in mathematics and language, but less in currently important non-traditional subjects such as civic knowledge. This paper analyses the effects of the socioeconomic composition of classrooms on students’ civic knowledge achievement in Chile, using the International Civic and Citizenship Education Study 2009 and a multilevel methodology. This research finds positive influences of higher socioeconomic intakes of 36% of one standard deviation in test scores. These results suggest that in the socioeconomically segregated Chilean education system, these effects would contribute to widening the civic knowledge attainment gap between pupils attending affluent and less affluent schools. In addition, this research finds that, on average, students with a higher individual socioeconomic status are more sensitive to these influences and that socioeconomic composition effects are more acute in the private-voucher sector than in the public sector.


This article develops a composite indicator to monitor the levels of civic competence of young people in Europe using the IEA ICCLS 2009 study. The measurement model combines the traditions in Europe of liberal, civic republican and critical/cosmopolitan models of citizenship. The results indicate that social justice values and citizenship knowledge and skills of students are facilitated within the Nordic system
that combines a stable democracy and economic prosperity with a democratically based education systems in which teachers prioritise promoting autonomous critical thinking in citizenship education. In contrast, medium term democracies with civic republican tradition, such as Italy and Greece gain more positive results on citizenship values and participatory attitudes. This is also the case for some recent former communist countries that retain ethnic notions of citizenship. In a final step we go on to argue that the Nordic teachers’ priority on developing critical and autonomous citizens perhaps facilitates 14 years olds qualities of cognition on citizenship and the values of equality but may not be the most fruitful approach to enhance participatory attitudes or concepts of a good citizen which may be better supported by the Italian teachers' priority on civic responsibility.