WHY SCHOOLS MATTER

A Cross-National Comparison of Curriculum and Learning

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For
Keara
Maegan
Chip
Ruth
Alex
Emily
Brent
Alexis
Bradley
QiChen
QiWen

We wrote this book with you and all of America's children in our thoughts, knowing that schools do matter.

PREFACE

CURRENTLY THERE SEEMS to be no lack of material critical of the state of education in the United States, particularly regarding science and mathematics education. We know from many sources that U.S. performance in mathematics and science has not been particularly strong by international standards. Many in the United States have not been pleased with this relatively undistinguished position. Numerous reform efforts have arisen to address various perceived vulnerabilities in our education system. Although some of our previous work has documented the unsatisfying relative performance of U.S. students in mathematics and science, our goal has not been to demean U.S. education, teachers, or students but rather to identify weaknesses in such a way that meaningful and effectual policy could be crafted. What is not needed is yet another book chronicling yet another way that our education system is failing the students it serves. Even less needed is another book that decries the inadequacies of our system without clear and reasonable suggestions for remedial policy direction.

In this book we seek to offer fresh hope and direction to reform efforts by focusing on a fundamental aspect of education accessible and amenable to education policy and change—the curriculum. We document in detail aspects of the mathematics and science curriculum in the United States and other Third International Mathematics and Science Study (TIMSS) countries. In the course of this examination, we've been able to demonstrate very dramatic results on the strength of the relationship of curriculum to learning. The idea that curriculum—that aspect of education specifying what students are expected to study and learn—plays a critical role on the education stage may seem almost laughably obvious to some but has been all but dismissed in much research and many education reform movements. Curriculum is at the very center of intentional learning in schools, specifying content and directing students in their efforts to understand mathematics and science. This, we argue, is *why* schools matter: schools matter because the curriculum-learning opportunities they provide students have a profound impact on the mathematics and science students actually learn.

In this book we examine how curriculum affects student learning through in-depth analyses of information from TIMSS. Certainly in the popular media in particular, the main message communicated concerning TIMSS has related to the horse-race aspect of the ranking of countries' students on the TIMSS mathematics and science assessments. Here we use this information on students to explore more fully the role that curriculum plays in their learning. We begin by presenting and discussing a conceptual model of how curriculum may affect what students learn. We then detail the various ways in which curriculum was measured in TIMSS and how these various curriculum measures differed from one country to another. One of the surprising discoveries documented here was the degree to which different curriculum measures for a single country presented contrasting curriculum portraits. This may well be a reflection of the education system in a country and the way in which the system disseminates curricular policy. Finally we move to formal analyses documenting relationships among curriculum measures and how these are related to what students have learned. The major conclusion to all this work is that even controlling for many student background differences, these curriculum measures are strongly related to what students learn. This is why we believe schools matter and why an important reform effort needs to be directed to detailing a challenging and coherent curriculum across all the years of schooling for all students.

ACKNOWLEDGMENTS

WE GRATEFULLY ACKNOWLEDGE the International Association for the Evaluation of Educational Achievement (IEA), under whose auspices the Third International Mathematics and Science Study (TIMSS) was conducted. We would not have been able to write such a book without the dedication of the people within each of the countries that were responsible for collecting the data. We also express our appreciation to the International Study Center at Boston College for its role in the collection of the data and ensuring its quality. The work presented in this work was funded by the National Science Foundation (NSF) through a grant (REC-9550107), and we gratefully acknowledge this support. However, the authors alone assume responsibility for the results and interpretation presented in *Why Schools Matter.*

Two individuals who were instrumental in funding our project are Kenneth Travers (now back at the University of Illinois) and Larry Suter (both NSF officers) who were willing to take a risk in funding a new idea and corresponding methodology for the measurement of curriculum on an international scale—something that had never been done before. Without their courage in terms of providing NSF support, this book and its substance would never have been possible.

Over the last ten years, many people have contributed to different parts of the work presented here. We acknowledge their intellectual contribution and express an appreciation for their involvement. These include Christine DeMars, Gilbert Valverde, Leonard Bianchi, Pamela Jakwerth, Senta Raizen, Ted Britton, and Leigh Burstein.

We also appreciate the supportive work provided by Jacqueline Babcock, Marlene Green, and our cadre of undergraduate and graduate students who helped in the preparation of tables and graphs. These include Christine DeMars, Shelly Naud, Wen-Ling Yang, Maribel Sevilla, Vilma Mesa, Meng-Jia Wu, and Sarah Kuper. We are also grateful to Larry Suter, NSF project director, and Richard Shavelson of Stanford University, who read an earlier draft and made helpful comments. Finally, we express our deep appreciation to Torsten Husen, whom we consider to be the father of the fundamental idea that opportunity to learn is an important component of international educational research.

THE AUTHORS

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Richard is married and has one daughter who is finishing eighth grade. She serves as his motivation for improving our understanding of the educational process.

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reporting for both studies. He was the chair of the sampling and methodology committee for the TIMSS during its initial design stages. He has worked with a number of state assessment programs and with national and international assessment projects in Latin America. His specialties are assessment survey design, sampling, and data analysis.

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