

Chapter 1

TIMSS IN CONTEXT: ASESMENT, MONITORING, AND MOVING TARGETS

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Writing in the early 1970s one of the architects of the early IEA studies outlined the dilemma facing practitioners and policymakers in education alike.

At all levels in an educational system, from the teacher in the classroom, through the administrator to the policymaker, decisions have continually to be made most of the time on the basis of very little factual information. (Postlethwaite, 1974).

Educational policy is formulated and implemented at all levels of the education system even where system-level constraints such as a centralized curriculum restrict what schools and teachers might do. Discretion at the school and classroom level always remains. How and on what basis policymakers, administrators, and teachers make decisions in the educational arena is at the heart of international comparative studies of education like TIMSS. In order to more fully understand the significance of studies like TIMSS it is worth considering the way in which interest in and the impact of studies like TIMSS have evolved.

Over the last 15 years most of the developed countries of the world have initiated or experienced significant reforms in education and the wider public sector (The World Bank, 1999). Similarly, in many low- to middle-income countries, educational reform as a means of enhancing social and economic well-being has received increasing amounts of attention. This is in part attributable to the almost universal recognition that the performance of a country's educational system is a key element in establishing a nation's competitive advantage in an increasingly global economy. Education is conceived of as being implicated in a country's economic, social, and personal development and is considered one of the key means whereby inequities, social and economic, can be reduced. Perhaps the most dramatic expression of this sentiment is contained in the report from the United States, *A Nation at Risk*, in which the authors point to the threat of economic decline as supplanting the past threat of aggressor nations (United States National Commission

on Excellence in Education, 1983). Education and the decline in educational standards were cited as the cause of economic decline in the face of intensified global competition. The authors write:

If an unfriendly foreign power had attempted to impose on America the mediocre educational performance that exists today, we might well have viewed it as an act of war. As it stands, we have allowed this to happen ourselves ... we have, in effect, been committing an act of unthinking, unilateral educational disarmament. (United States National Commission on Excellence in Education, 1983, p.5)

Although a model which ascribes economic decline in a simplistic way to a decline in educational standards is likely to be of limited value in addressing or understanding either educational or economic policy concerns, this debate served to draw attention to real concerns about educational performance, not only in the U. S. but also in many OECD countries. It is the concern for excellence (together with concerns of equity and efficiency) that has given rise to greater intensity of focus on education and educational policy development.

While education has been receiving an increased priority in the public policy arena in many countries, it has also been facing the reality that, like many other areas of public spending, there are real limits to the amount of funding that is available for educational development. What funding is available is accompanied by increasing demands for accountability and a better understanding of the relationship between educational expenditure and educational outcomes. The fullest and perhaps most extreme expression of these concerns is reflected in publications like *Reinventing Government* (Osborne & Gaebler, 1993) in which the authors argue for an educational marketplace that should be shaped by the twin imperatives of efficiency and effectiveness. The implicit argument is that increased provision and improved instructional quality are likely to produce greater numbers of better-prepared students, which in turn will result in a more internationally competitive and better-prepared workforce. The role that TIMSS might play in such an argument is to place the focus more narrowly on the assessment of quality in mathematics and science, and presumably, therefore, on the production of more productive and high-quality scientists, mathematicians, and engineers.

In general, however, what is reflected in the kinds of concerns expressed above is a shift in focus from managing issues related to the expansion of educational systems in terms of student numbers, to one of managing issues of quality and excellence. In the case of those countries in what might be described as a less advanced stage of educational development, this has meant not surrendering to the imperatives of educational expansion at the expense of considerations of quality. The change in emphasis is noted by Tuijnman and Postlethwaite (1994) who argue that, while the history of large scale assessment dates back to the early 1960s, there was a significant development toward a more systematic focus on national

monitoring with the release of reports such as *A Nation at Risk*, the release of the results of IEA's Second International Science Study, and later, again in the United States, the report from the conference of the governors of the 50 states in Charlottesville, Virginia, which sought to frame national goals for education with a strong emphasis on quality. In short, investment in education and the related policy development, it was argued, could no longer be carried out as an act of faith.

As interest in global competitiveness and local accountability has increased, so too has interest in international comparisons of educational performance. What then is the significance of, and what are the benefits of participating in international comparisons of educational achievement, and how does the Third International Mathematics and Science Study meet these expectations?

TIMSS is intended to monitor the success of mathematics and science instruction and the context in which it occurs in each of the countries that participated in the project. Three major conceptual elements drive the TIMSS design. These elements include the intended curriculum (the curriculum as described at the policy level), the implemented curriculum (the curriculum as students experience it at the school and classroom level), and the attained curriculum (the curriculum as represented by student outcomes). Through the mechanisms of a curriculum analysis, a video study, achievement tests, and background questionnaires that gathered information from schools, teachers, and students, the conceptual design was realized, providing a unique opportunity to observe and examine how mathematics and science instruction is provided in some 40 countries. What is significant is that the TIMSS design provided for an examination of those policy variables related to schooling, curriculum, and instruction that are affected by policy intervention. Furthermore, it established international benchmarks for achievement and key policy variables that allow countries to monitor their performance in an increasingly global community.

While the emphasis in comparative studies of educational achievement is often seemingly focused primarily on the achievement data, the interpretation of such system level data is not straightforward. The significance of the extensive data collected by the multiple strategies employed by TIMSS lies in the fact that countries that do not take into account the differences in the respective education systems when introducing policy reform based on comparative data risk not only disappointment, but also the possibility of developing policies that are potentially counter-productive in addressing perceived educational needs.

Moreover, the data collected through the background questionnaires allows policymakers to address particular policy needs and concerns related not only to the quantity, quality, and content of mathematics and science instruction but also to identifying factors that may be linked to achievement or to sub-populations of national importance (such as gender and ethnicity). While it is not always possible in the international context to collect data on, for example sub-groups of interest that are internationally comparable (e.g., ethnicity), the TIMSS design permits the

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