Mathematics Education in Different Cultural Traditions- A Comparative Study of East Asia and the West

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The 13th ICMI Study

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Preface

1. BACKGROUND

This volume is the final outcome from the 13th ICMI Study Conference held at the University of Hong Kong in October 2002. Such Study Conferences have been organized by ICMI on a regular basis since the 1980's and have focused on topics deemed to be of significance, in terms of both theory and practice, for the international mathematics education community. Recent years have seen an increasing interest in comparative studies across nations, particularly in terms of students' achievement and performance, as witnessed by such large-scale projects as TIMSS and PISA. Reports from such studies have generated much discussion and not a little controversy. Whilst they undoubtedly provide valuable and rich sources of data, many educators have felt the need to interpret such findings within the subtler context of the underlying cultural traditions of the participants. The perspective of different cultural traditions is also an important one when we consider the broader aspects of mathematics education, not simply the measurement of performance, in an international context.

The ambitious idea of a comparative study conference organized through ICMI, and a subsequent Study Volume, was first suggested by Professor Dianzhou Zhang to the Executive Committee of ICMI in 1997. The main premise of the proposal was that the study should use the lens of different cultural traditions through which to make analyses of mathematics education in an international context. An International Programme Committee (IPC) was formed in early 2000 and its first task was to produce a Discussion Document about the proposed study. Since this document formed the

framework for the Study Conference, and indeed was the initial framework for the present Volume, we have included the full text at the beginning of this volume. For logistical reasons it was realized at the outset that it would be impossible to cover a wide range of different cultures and the decision was made to limit the study to East Asia and the West.

2. THE STUDY CONFERENCE

After dissemination of the Discussion Document to the international community, a large number of papers were received by the IPC as possible contributions to the study. Eventually 42 papers were selected and their authors were invited to attend the Study Conference in Hong Kong. These 42 papers were published by the Faculty of Education of the University of Hong Kong in a 'Pre-Conference Proceedings' in October 2002. As with previous ICMI Study Conferences, it was not intended that these papers should necessarily form the subsequent Study Volume arising out of the conference. Rather, they would form the *starting points* for discussion, out of which further elaboration of the papers could be undertaken, or new collaborations for other papers could be established. Based on the range and emphasis of the papers, the conference was organized around five themes. These themes are shown below together with the group leaders for each theme:

Context (FAN Liang-huo, Walther FISCHER)
Curriculum (Margaret WU, ZHANG Dian-zhou)
Teaching & Learning (Colette LABORDE, LIN Fou-lai)
Values & Beliefs (Alan BISHOP, Katsuhiko SHIMIZU)
Textbooks (PARK Kyungmee, LEUNG Koon Shing Frederick).

However, in addition to this organized framework, certain sessions were timetabled as 'Ad-hoc Discussion' sessions. The intention was to provide the opportunity for discussions to take place between participants from different groups, as a kind of cross-fertilisation process. These ad-hoc discussions also proved to be very fruitful.

3. STRUCTURE OF THE STUDY VOLUME

By its nature, a Study Conference has a fluid and organic structure that is likely to produce on-going change throughout the study. This comparative study conference was no exception and the final structure of the present Volume is the result of the changing emphases and concerns that took place

during the study. The main themes identified above have been adhered to, but the chapters focusing specifically on textbooks have been incorporated into the broader theme of Curriculum. In the same way, the original subsection on Assessment (in the Discussion Document) has also been subsumed into this theme. Hence this volume consists of four major sections:

Context of Mathematical Education
Curriculum
Teaching and Learning
Values and Beliefs

There is also an 'Introduction' section that includes the Discussion Document and a chapter by Frederick Leung that 'sets the scene' for the whole Volume. Finally there is a last section that we have called 'Outlook and Conclusion' in which, apart from the editors' attempts to provide some overall conclusions arising from the previous sections, we include a chapter that considers, albeit briefly, methodological issues, a chapter on some other cultures, and a final chapter by Alan Bishop that asks the reader "what comes next?"

4. OTHER PERSPECTIVES AND FUTURE RESEARCH

It is inevitable in a volume such as this, that one's initial wide-ranging and ambitious intentions can never be entirely fulfilled. However, this can also be looked at in a positive light in the sense that it can provide some signposts for the directions that further work in this area could focus on. Here we identify just three possibilities.

4.1 Technology

Under the section "Aspects of the study" in the Discussion Document, the use of technology in the teaching and learning of mathematics was not specifically highlighted. However, the sub-section 'Methodology and media' gave clear indications that this topic was an important one to consider. And in the wider context, discussions on the impact of globalisation are often linked to advances in technology. Within the international mathematics education community, increasing attention has been paid to the impact of technology in conferences and journal papers. Indeed, recent years have seen the establishment of new international journals with a specific focus on this area of mathematics education. It was therefore rather a surprise to us that we did not receive more papers on this topic after the initial call for papers

and that this area was not explored more fully in the Study Conference. This volume does include three chapters in Section 3 (Teaching and Learning) that specifically focus on technology and distance learning and other chapters do touch on technology but not as the main focus of interest. Whatever the reasons for this, we feel that this should be a fruitful area for further comparative research in mathematics education

4.2 Teacher education

By contrast with the technology aspect above, the Discussion Document did propose a specific subsection on teacher education. In fact, the full heading for the subsection was 'Teachers, teacher education, values and beliefs'. While there were many papers in the original submissions for the Study Conference that focused on values and beliefs and on the cultural influences on teachers' instructional practices, we were again surprised by the lack of comparative studies on the preparation of teachers. That is, what differences and similarities exist in the preparation and training of mathematics teachers between East Asia and the West? For example, in terms of both the emphases in the respective teacher education curricula and the expected roles of the teacher that are inherent in such curricula. Questions such as these are touched on implicitly in some of the chapters but we suggest that the specific area of teacher education is one that could be another fruitful area for further research.

4.3 Comparisons of other cultural traditions

As we have described earlier, this volume is essentially limited to the comparison of just two cultural traditions, East Asia and the West. Even within this limitation it is clear, as discussed in some of the chapters, that no simplistic homogeneity of cultural tradition exists under these two broad categories. We certainly hope that this volume will be considered as a valuable contribution to the comparative study of the cultural influences on mathematics education across these two particular traditions. However, we hope it may also be seen as a starting point for further research into similarities and differences *within* these broad cultural traditions and also as a stimulus for work that looks at *other* cultural traditions across the global context. We have attempted to give at least a flavour of this broader perspective in Chapter 2-1 and Chapter 2-8 and in Section 5 of the volume.