III. HOW WILL THE STUDY BE OPERATIONALISED ?

another. It is not a simple import-export business. As an old Japanese proverb puts it: *We cannot easily plant a good seed of another field into our own field.*

In summary, we are hopeful that this study can achieve the following:

1) By contrasting the different traditions, we gain a deeper understanding of various aspects of mathematics learning and teaching. For example, we may gain an insight into the cognitive processes of 'doing mathematics', such as learning about place values, or grasping the concepts of abstract representations in algebra.
2) By contrasting different traditions, we develop a process of self-reflection on our traditional ways that we often take for granted. There is the opportunity to take a fresh look at our usual practices and beliefs, and, in the process, we gain a better understanding about our own traditions.
3) By contrasting the different traditions, we share between us the latest educational development and research. We learn from each other's successes and failures, and develop a common goal for improvement for the coming years.

III. HOW WILL THE STUDY BE OPERATIONALISED?

This study is rather different from the earlier ICMI studies in that it is specifically concerned with comparing practices in different settings and with trying to interpret these different practices in terms of cultural traditions. It is also the intention of the IPC to ensure that the study will result in various products and outcomes including, of course, a book for the ICMI series, but equally important is the process by which the study will proceed. This means that there is a need to create certain kinds of activities for engaging the participants in operationalising the study, and through these activities to develop specific kinds of contributions to the study. The IPC has identified the following as being some of the most important activities and contributions for this study.

III.1 IDENTIFICATION AND ANALYSIS OF PREVIOUS STUDIES

As has been pointed out in the previous section, there is clearly a need to build on the several previous studies which have been carried out on East/West differences, and we wish to encourage contributors to the conference to be aware of the available background literature. In particular we note that there have been various achievement-based studies such as SIMS and TIMSS, and other studies such as PISA etc.

Contributions and proposals will therefore be useful which give some synopses and critical analyses of these studies. In particular, as well as focusing on the various ideas and results that have come from these studies, we will have an interest in the methodologies used in them. Most of the analyses performed on the data of these international comparison projects have been quantitative in nature, and we are more interested in a qualitative aspect which seems to have been ignored so far. The development of productive cooperative researching is one of the outcomes we seek and awareness of previous cooperations will be very helpful in this development.

III.2 Joint contributions

In the same spirit we wish to encourage joint contributions from colleagues who are already engaged in East/West cooperative or comparative activities, as well as from those who wish to use the study as an opportunity to begin to engage in such activities. Previous international conferences such as PME, HPM, ICME have already provided some contexts for cooperative international activities and it will be important to build on those activities. These conferences have already demonstrated the value of building trust between cooperating colleagues, as well as the importance of taking advantage of the different backgrounds and knowledge of the participants.

The nature of this ICMI comparative study is such that it will be highly dependent on trust and productive cooperation between the participants, and we realise that this kind of cooperation can take time to develop. There is much to learn from each cultural tradition before one can begin to seek meaningful contrasts and to develop productive explanations. In some senses the IPC sees this study as being an opportunity both to take stock of the progress made so far in this area, and also to sow the seeds for future cooperative research and development. Developing joint contributions is one way in which study participants can begin to engage in the spirit of this ICMI study, and seeking these is one way in which the IPC and ICMI can help to foster future collaborative ventures.

III.3 Case studies

In a sense this ICMI comparative study is one large case study, as has already been mentioned, so the IPC sees the need for there to be several case studies, with a comparative flavour at the heart of the study, which focus on specific aspects of mathematics education (see Section IV). Thus it is important that participants are aware of the nature and value of case-study activity in order to develop the study to its fullest potential. It is only through such case-studies that the richness of educational and cultural interactions can be presented and interpreted.

The case studies hopefully will demonstrate the observation and understanding of a range and variety of typical phenomena in the different traditions, together with their importance in mathematics education. Cases should not only focus on demonstrating and analysing differences but will also explore aspects of similarity between the traditions. The depth of analysis made possible by such case studies will help to challenge the naive policy and practice of attempting to merely copy and transport specific practices from one tradition to another.

As well as welcoming contributions regarding previous case studies and the presentation of current comparative case studies, the IPC sees this study as creating the opportunity for the development of future comparative case study activity. It will welcome proposals for such work.

III.4 Variety of documentation

The IPC is aware of the value and importance of including a variety of documentation in this study. Mathematics education reveals itself through various media and materials. Government publications and documents demonstrate intentions, values and contextual features of a system's policies and practices, but in order to study the influences of the different traditions to the depth desired it is necessary to seek further documentation. The IPC will therefore also welcome contributions which are based on other kinds of documentation.

Textbooks give more information about intended practices as well as about the roles of the teacher and the students but other teaching materials are also revealing. Videotapes of classrooms are increasingly being used as research data in cross-cultural research studies. Aspects of student achievement are well used in comparative studies, but can give misleading and shallow information if not adequately interpreted through deeper cultural and social perspectives. Data on students' and teachers' attitudes, beliefs and values will be particularly interesting for this study as these often reveal more about the significant aspects of difference between cultural traditions.

III.5 Different perspectives on mathematics

Differences in mathematics education intentions and practices are often stimulated by the different influences coming from various groups of professional working in and with the area of mathematics education. In addition different cultural traditions view mathematics itself in different ways, as has already been pointed out in an earlier section.

In this study therefore the IPC wishes to seek contributions from people who work in different parts of the mathematics education community. In a rich comparative study such as this, different perspectives are crucial, and colleagues who work in areas such as mathematical applications, informatics, and the history and philosophy of mathematics are encouraged to participate.

III.6 Different perspectives on the study of mathematics education

In the same sense as in the previous point, there are several different approaches to the study of mathematics education which need to be recognised in this study. Although the IPC sees case studies as being important kinds of contributions, it also does not seek to restrict the methodology of the studies presented. It recognises value for example in psychological, sociological, and anthropological approaches as well as in contributions from other areas of the educational sciences.

The IPC is also aware that as this comparative study develops, particular differences in methodology between cultural traditions may become revealed, for example concerning the position and role of researchers. It is conscious of the dangers of applying certain methodologies from one cultural tradition inappropriately in another cultural tradition. The IPC therefore hopes that one outcome of this study is an increased awareness in the international mathematics education community of the need for cultural sensitivity in carrying out future comparative studies.

IV. ASPECTS OF THE STUDY

IV.1 Context

Mathematics education does not take place in a vacuum, but there is always a host of different contexts within which the practice of mathematics education takes place. These contexts may be social, political, economic, philosophical or ethical, but they are of course all related one way or another to the underlying cultural values. What are the elements within these contexts which are relevant to mathematics education? What are the 'givens' from which we organize our mathematics education, and what are the constraints within which we carry out the education?