

Foreword

In taking *Research on the Role of Technology in Teaching and Learning Statistics* as the theme of its 1997 Round Table conference, the International Association for Statistical Education (IASE) has continued its tradition of provoking widespread international debate about contemporary issues facing statistical educators. The purpose of IASE's Round Tables, however, has never been limited to mere discussion. Rather, the intention has always been to derive working recommendations that may be adopted world-wide.

As these *Proceedings* demonstrate, this conference proved to be no exception. The convenor, Joan Garfield, and her team of advisors developed a stimulating programme of presentations, and there were always abundant opportunities for debate and for the elaboration and development of ideas. The delegates were drawn from many countries and represented a wide range of interests and expertise, including statistical, mathematical, and science education; psychology; software design; curriculum development and assessment; and teacher training.

The theme confronted delegates with six main questions to address:

- What constitutes educational technology?
- What may be expected of current and future educational technology?
- What use, and in some cases misuse, is being made of technology in statistical education?
- What has research shown us about the role of technology?
- What do we still need to know?
- What methodologies are appropriate for evaluating the effectiveness of technology in education processes?

There was an early acknowledgment that technology should not necessarily involve radically different thinking about its role in the teaching/learning process than that afforded to any other teaching innovation. The same general educational principles should apply. However, educational technology *does* afford us with a greater variety of strategies for *teaching* statistics. Moreover, it offers us new ways of *doing* statistics. Our education processes often reflect somewhat conservative (if not actually reactionary) ideas of what statistics is and how it should be taught. The changing nature of statistics is an ongoing challenge, often demanding quite radical reforms in statistical education. However, technological innovation is just one aspect of this, and, not surprisingly, therefore provoked a number of Round Table recommendations that could be seen to have a more general applicability; for example, those aimed at countering inadequate teacher preparation; inappropriate curriculum content and structure; less than optimal teaching and assessment methods and materials; and, more particularly, the paucity or lack of synthesis of good quality research to guide *any* developments in statistical education.

It was recognised that we almost certainly cannot predict all types of educational technology that will be available to future readers of these *Proceedings*, such is the speed of advances in this field. Delegates were therefore at pains to build longevity into their recommendations by not restricting their discussions to specific examples of technology in present-day use. Similarly, technological resources are not evenly distributed and access to them depends greatly on geographic location and economic circumstances.

FOREWARD

Delegates tried to produce recommendations that would address this fundamental variability, but that would also provide robust guidance for readers, whatever their personal access to technology.

An agenda for future research in the role of technology in statistical education was constructed and appropriate methodologies were debated. Finally, the delegates turned their attention to identifying ways of disseminating the results of research more effectively and ways of influencing teachers, institutions, and governments to adopt educational practices that are shown to be optimal. Speed of implementing developments was seen to be important, especially in the fast-developing field of technology. However, delegates were mindful that it is necessary not only to provide the infrastructure and finance to support technological innovations, but also to change attitudes and expectations about statistical education.

The tension between educators' needs and commercial offerings in terms of software development was identified as a key problem area. Market-leaders continue to produce widely-used software products that simply are not fit for their statistical purpose either because they use incorrect computational algorithms or because they encourage bad statistical practice on the part of the user. The existence of such software places a great responsibility on statistics educators to provide students with the kind of statistical literacy that will protect them from such pitfalls. How can we educate our colleagues, though, so that they will not perpetuate the problems by basing their teaching around faulty software? How can we educate the general public and, more particularly, employers not to buy and use software that is statistically unsound?

It is not only in the development of software to *do* statistics that problems are encountered. Poor quality, or outdated, software to *teach* statistics is also being produced. Moreover, delegates expressed concern that there are still examples of large amounts of money being hastily "thrown" at development projects of dubious educational or statistical merit, in response to what is perceived as the "technology expansion crisis in education." Clearly, IASE has an important role to play in encouraging more dialogue and collaboration between software developers (both commercial and public sector), funding bodies, and educational specialists. Hopefully, this *Proceedings* will prove to be influential in this respect.

In the meantime, it is my pleasure, on behalf of both IASE and its parent organisation, the International Statistical Institute, to thank Joan Garfield for her excellent work in convening the Round Table. Thanks are also owed to her and to Gail Burrill for their efforts in editing these *Proceedings*; and to the delegates themselves who conducted much of the internal refereeing of papers prior to the final versions being produced. Lastly, on behalf of all the delegates, I would like to express great appreciation for the warm welcome extended to us by the Statistical Education Research Group at the University of Granada. Carmen Batanero, Juan Godino, Angustias Vallecillos, and their colleagues contributed enormously to the success of the Round Table. Their efficiency and hospitality were outstanding.

Anne Hawkins, June 1997

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