FIFTEEN YEARS OF IASE: MISSION AND INSTRUMENTS

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Statistics education (interpreted in the broadest sense possible) promotes the understanding of the basic concepts of statistics in society at large, as well as in other discipline areas and /or in other professional bodies and contributes to giving statistics more visibility. In order to further the improvement of statistics education at all levels and in all contexts, the International Statistical Institute (ISI) established in 1949 the Committee on Statistical Education, which ceased to exist in 1991 when the International Association for Statistical Education (IASE) was founded. In this paper we describe the work carried out by this association, and its role in promoting both statistics education and research in statistics education. It is mainly based on information available on the IASE web site, editorials and reports in the yearly IASE Reviews.

MISSION STATEMENT OF IASE

On the web site of IASE, http://www.stat.auckland.ac.nz/~iase/index.php, is the following statement about the mission of IASE. First it seeks to improve statistics education at all levels from elementary (primary) school through to the training of professionals, and to increase the uptake of statistics education world wide. Second IASE fosters international cooperation, and stimulates discussion and research. It disseminates ideas, strategies, research findings, materials and information using publications, international conferences, and increasingly, this website.

Since 1991 the scope of purposes and of instruments of IASE has been expanded. The specific objective of the ISI Education Committee (1948-1991) was the creation of international training centres and development of programmes.

In 'The coming of Age of Statistical Education' Vere-Jones (1995) gives his views on the role of IASE. He discusses a threefold purpose

- IASE is a professional group representing the interest of statistics teachers
- IASE is a research organisation promoting research into statistics education
- IASE is an organisation representing the statistics community in education matters

The third role was mainly envisaged by the Education Committee. Particularly in transition countries, the strategy was to approach the National Statistics Societies in order to encourage them to create their Statistics Education Committee and to make evident their willingness to commit themselves to the diffusion of teaching statistics. It was the first role, the professional one that the Association was primarily set up to fulfil. Concerning the second role as a research organisation Vere-Jones had serious doubts. Since the creation of IASE in 1991, all Executives Committees have emphasised the research component in statistics education and tried to find a balance between these different roles.

Up to now three periods can be discerned in the mission of ISI/IASE concerning 'Statistics Education.' The early period, from 1949 to 1976, of the Education Committee of ISI, was largely dominated by "concerns for augmenting the supply of statistical staff for government." During the second period, from 1976 to 1991 attention turned to promoting statistics education in schools and universities. With the creation of the IASE as an ISI section, the third period 1991-2006 is characterised by broadening statistics education to informal learning contexts and by advancing research-based knowledge of statistics education (Ottaviani, 1999; Ottaviani and Batanero, 1999). The development of statistics education research within the IASE activities may be followed through the ICOTS Conferences. In fact a textual analysis on the titles of ICOTS papers from 1982 to 2002 (Ottaviani, 2002) has shown that, from an academic beginning due to its strong link with university professors, the conferences moved to dealing with teaching/learning problems and came to enlightening students' problems and their performance. Teaching by real data, suitable computer packages, and research methods were emphasized to grasp the concepts of statistics and probability. In higher education the attention was on

introductory courses and on courses of applied statistics for students of the experimental sciences. In more recent years, the proposal of instructional models suitable for statistics and probability, and the necessity to assess students have enhanced the interest of ICOTS attendants towards research.

This expansion of the scope of statistics education goes hand in hand with the expansion of people interested in IASE. IASE has now approximately 500 members, 20% of whom belong to ISI and 80% who do not. The membership is largely made up of teachers, lecturers and professors of statistics, applied and government statisticians and education researchers. One can say that statistics education attracts many people outside the traditional statistics community. In the editorial of *SERJ*'s November 2004 issue, Jolliffe and Gal (2004) expand statistics education to all educational levels, to out-of-school contexts, to learning, understanding and using stochastics. This expansion of the scope of issues and topics sought in manuscripts suitable for the IASE journal, is certainly also true for the mission of IASE.

The core business of IASE remains improving the teaching, learning, understanding, using stochastics in classroom-based contexts and advancing the scientific discipline 'research in statistics education.' In this way all kind of people interested in statistics education, if they are user, consumer or producer of statistical and statistics education knowledge find a home at IASE. The broadening from teaching to learning and broadening to formal and informal contexts reflects that learning and using occurs as well at the workplace, home and society at large as at school.

THE INSTRUMENTS OF IASE

With this mission in mind following instruments have been set up

- Cycle of meetings
- Statistics Education Research Journal (*SERJ*)
- International Statistical Literacy Project (ISLP)
- IASE Web site

Cycle of 4 Types of Meetings

A four year cycle of 4 types of meetings are organised by the IASE consisting of ICOTS, Satellite and ISI Biennial, Roundtable, Satellite and ISI Biennial, and again ICOTS.

The major events the IASE organises are the International Conferences on Teaching Statistics, ICOTS, which are held every fourth year and cover all aspects of statistics education. Since ICOTS-6 in 2002 there is a refereeing option for people submitting a paper. ICOTS conferences are attended by a broad range of people interested in statistics education and reflect the three roles of IASE. The other major events are the Round Table Conferences, also held every four years, which concentrate on a particular research topic. During these five days meetings focus is on one particular theme from a research approach. The number of participants is restricted to about 50 and all discussions are held in plenary sessions. Within the ISI Biennial Sessions, about 12 meetings on statistics education are organised by the IASE. These meetings, which are open to non ISI/IASE members, provide an opportunity to reach an audience of statisticians who are attending the large ISI conferences. During these Biennial Sessions the General Assembly of IASE is held. There is also a growing interest in Satellite Meetings associated with the ISI. These two- day satellite meetings focus on a specific theme and are organised before the ISI Biennial in the neighbourhood of the ISI Biennial venue. Since 2003 there is a refereeing option for people submitting a paper.

Associated with the IASE are also the statistics education sessions at the International Conference on Mathematical Education, held every four years and the International Research Forums on Statistical Reasoning, Thinking, and Literacy, held every two years.

Within this wide range of events, there is the opportunity to meet at least once per year at international meetings both to share experience and learn about the latest developments and research in the discipline. While ICOTS conferences and ISI/IASE Biennial Sessions offer several different themes and attract a large group of people, the Round Tables and Satellites concentrate on one theme and have a restricted number of participants. We will give some details of these meetings.

IASE Round Tables

Round Table Conferences were initially organized by the ISI Education Committee since 1968. The theme of the first IASE Roundtable, held in 1996 in Granada (Spain), was "Research on the role of technology in teaching and learning statistics." Four broad issues emerged during the course of the conference: (1)The need for information on existing software so that users know what is available and developers can avoid re-inventing the wheel, (2) The changing role of classroom teachers, including their 'replacement' by technology in certain contexts and their training needs with respect to the use of technology, (3) One of the biggest challenges in conducting research on the role of technology is the need for appropriate assessments methods to evaluate student learning and (4) The scarcity of good empirical research on the role of technology in statistics education indicates a need for agreement on appropriate methodology.

The theme of the second IASE Round Table, held in Tokyo (Japan) in 2000, was "Training Researchers in the Use of Statistics." During the conference following broad issues emerged (Batanero, 2000): (1) Statistics is misunderstood and misused by researchers who do not fully grasp the essence of statistical thinking and do not sufficiently appreciate the role of statistics in the research process, (2) Successful courses for researchers will encourage a critical attitude towards data and statistical analyses and stress the importance of obtaining good quality data; methodology should be based on encouraging participation and interaction, and working with data set in their own research areas and (3) Future statisticians feel they lack abilities for communicating with clients, and managing a consulting session; consultancy practices carried out by students stimulate a culture favorable to value statistical consultancy for future researchers.

The theme of the third IASE Round Table, held in Lund (Sweden) in 2004, was "Curricular Developments in Statistics Education." Three broad types of issues were addressed: (1) Research, What do we know and what do we need to know? (2) Policy, Who is responsible for developing and putting in place a curriculum? and (3) Practice, What is important to teach, when should it be taught and how? (Burrill, 2005). Roundtable participants formed working groups around central themes they identified as important in considering curriculum development in statistics education. Some of the concerns expressed by the working groups are (pp. 275- 287): (1) At high schools the commonalities and the differences with mathematics need to be emphasized, and courses need to be structured with the aim of statistical literacy for citizenship for some and the likelihood of further study in statistics for others, (2) Teachers need to understand that statistics is different from mathematics as well in thinking as in teaching, (3) Post-Secondary Introductory Statistics Courses should build on the students' backgrounds, be strongly related to data, contribute to the students' development in statistical thinking, take account of current educational and statistical practice, and provide a strong basis for future statistical learning, (4) Adult numeracy statistics courses is an important strand of adult "numeracy" when considering literacy and numeracy programmes for citizenship and work, (5) Research into professional development should be a high priority, (6) More appropriate assessment tools are needed, (7) Comparative studies of statistics education in different countries can learn us a lot about influences of the context and the culture, (8) Research should provide evidence or empirical support, not mere rhetoric, (9) Observational studies or quasi-experimental designs can be informative and convincing as well as randomized experiments; qualitative research methodologies can yield insights that are empirically grounded and (10) Research in the strict sense is not the only way to gain new knowledge. We need more informal research that can be carried out by teachers and curriculum authors. Sharing informal experiences of what works and what does not is also needed.

These Round Tables give participants the opportunity to share and discuss their views on emerging issues in statistics education and to make recommendations to the statistics education community. By the end of these five days conference, a strong sense of community emerge among participants expressed by a shared vision of the research that needs to be done and an enthusiasm for new collaborations and research networks.

IASE Satellite Meetings

The driving force behind these Satellites is former president Brian Phillips. The first IASE Satellite Conference was held before the 53rd Seoul ISI Biennial Session in 2001. It gave the opportunity for 60 participants to enjoy 15 presentations given by people who had a special interest in "Statistical Literacy." The approach was non-technical, suitable for a non-specialist audience who would like to learn how to make better use of probability and statistical ideas in their everyday and working lives in areas in which chance and risk are involved (Phillips, 2005).

With the success of the first satellite meeting, a second Satellite Conference was held just before the 54th Berlin ISI Biennial Session in 2003. The theme of the meeting was "Statistics and the Internet. Refereeing added an important dimension in improving the academic standing of the 17 papers. Topics included an overview of Internet resources for statistics education, the use of the Internet in statistics classes and in teaching and assessment, research on how students learn or about what they learn in teaching environments based on the web, and challenges for statistics education at the Internet age.

The third IASE Satellite Conference was held in 2005, and preceded the 55th ISI Biennial Session in Sydney. The theme was "Statistics Education and the Communication of Statistics." The 24 presentations included discussions of the main components in statistical communication and the relevance of statistical communication in the general education of citizens. This satellite was also of interest to people concerned with interpreting sociological, economical, political, scientific or educational reports, predicting sports results, by policy makers, journalists, health professionals and others from the general population (Phillips and Weldon, 2005). The overall message in the talks was that communication of statistics is a topic that is more important to students than our course outlines usually suggest. We need to help students distinguish between the technical meaning and everyday meaning of the statistical jargon we all use.

These short satellite meetings are proving very popular, giving participants the opportunity to spend up to two days focusing on a special interest topic before immersing themselves in the sometimes overwhelming atmosphere of an ISI meeting. Each has been intended to be of interest to a wide cross section of society including teachers, educational administrators, and researchers in statistics education.

Statistics Education Research Journal (SERJ)

The *Statistics Education Research Journal* (*SERJ*) is a peer-reviewed research journal of IASE and is published electronically twice a year. *SERJ* is one of the ISI-sponsored journals and is freely accessible at the "publications" page of the IASE website, http://www.stat.auckland.ac.nz/~iase/publications.php.

The forerunner of *SERJ* was the Newsletter published by the International Study Group for Research on Learning Probability and Statistics. The idea of forming a study group arose at the first ICOTS in 1982. Ephraim Fischbein and David Green drew up a first statement of aims for the group and David Green was the first secretary. In 1988 Joan Garfield took over from David and held office until 1996. Joan Garfield was the driving force in gathering statistics educators together and promoting the activities of The International Study Group for Research on Learning Probability and Statistics. From 1996 until 2002, former IASE presidents M. Gabriella Ottaviani and Carmen Batanero transformed the Newsletter to the IASE Statistical Education Research Newsletter and two issues a year were published in electronic form since 2000 (Ottaviani, 2000). In 2002 IASE decided to have its own research journal as a vehicle to encourage research in statistics education and advancing our knowledge, and improving the teaching of statistics at all educational levels. *SERJ* (http://www.stat.auckland.ac.nz/~iase/serj/), continues to build on the foundations built by the "Newsletter of the International Study Group for Research on Learning Probability and Statistics" and the "Statistical Education Research Newsletter."

SERJ aims to advance research-based knowledge that can help to improve the teaching, learning, and understanding of statistics, probability, or related quantitative research methods, at all educational levels and in both formal (classroom-based) and informal (out-of-classroom) contexts. Such research may examine, for example, cognitive, motivational, attitudinal, curricular, teaching-related, technology-based, organizational, or societal factors and processes that are

related to the development and understanding of stochastic knowledge, or on the development of assessment instruments and research methodologies in such or related areas. In addition, research may focus on how people use or apply information and ideas related to statistics and probability (Gal, 2005). All papers are reviewed internally by an Associate Editor or Editor, and are blind-reviewed by at least two external referees. Contributions in English are common. Contributions in French and Spanish have also been published.

International Statistical Literacy Project (ISLP)

Since 2000, the World Numeracy Project, a committee established by ISI in 1994, came under the umbrella of the IASE. Carol Joyce Blumberg, former Vice President of IASE, was and still is the leading force of this project.

The mission of the International Statistical Literacy Project (ISLP, http://course1.winona.edu/cblumberg/islplist.htm) is to provide those interested in statistical literacy with information and resources and to aid them in the development of statistical literacy around the world

The main focus on the project is on the development of a series of web pages that will provide users with resources that are useful for the development of statistical literacy at all levels from Primary/Elementary School through Adult Learners. There are also web pages for official statisticians and for journalists and the mass media. Further, there are web pages devoted statistical literacy projects, websites, etc. that have been developed by national statistical offices, national statistical societies, and other non-profit organizations. A concentrated effort has been made to include more items in languages other than English. Web pages providing listings of (and links to) items in different languages have been added to the website. Also, at the suggestion of the ISLP Advisory Committee a webpage has been created with links to curriculum guidelines from a variety of countries.

In the latest *IASE REVIEW* Carol Joyce Blumberg (2005) launched an appeal to fill out a survey to encourage the users to give suggestions for the improvement of the web pages and to send recent articles/reports that they see in their own countries.

Website

The IASE aims to be an effective international voice for strengthening statistical education and stimulating statistics research. With the IASE web site we hope to offer members innovative ways to reach each other electronically and otherwise. In 1999 former president Brian Phillips, started with developing our website which provided much information useful for anyone involved with statistics education (Phillips, 1999). Under the presidency of Chris Wild (2003-2005), the web site has grown to a comprehensive site of statistics education which gives not only information about IASE activities and IASE members but has impressive publication page and links to sites of interest to anyone involved in statistics education.

The web site consists of seven main pages: (1) the *About* page gives information about IASE, the Executive Committees, information about National Correspondents, history of IASE and the Statutes, (2) the *Members* page is only accessible with a login for members; there members can contact other members, can edit their profile, add conferences, news items or photos, (3) the *Publication* page enables the visitor to quickly locate and download IASE publications and proceedings of IASE conferences, (4) the *Conferences* page gives an overview of IASE and IASE related conferences, (5) the *News* page can be consulted by country and gives the visitor the opportunity to add items; once the added item has been approved by the webmaster it will appear on the news page, (6) the *Links* page gives interesting links to research, curriculum guidelines, discussion lists, datasets, Java applets …Since the beginning of 2005 IASE search capabilities have been enhanced to the searchable sites *JSE* (http://www.amstat.org/publications/jse), *MSOR* (http://mathstore.gla.ac.uk/), ISLP (http://course1.winona.edu/cblumberg/islplist.htm), ASA Stat Ed section (http://www.amstat.org/sections/educ), and CAUSEWeb (http://www.causeweb.org/) and (7) the *Contact* page.

The site is regularly updated and members are encouraged to explore it. The IASE Executive appreciates any suggestions to help improve this site so that it becomes the first place statistics educators look for information.

WHAT IS COMING UP?

Satellite in 2007

Plans are underway for a next Satellite in Portugal in 2007.

IASE RoundTable in Monterrey (Mexico) in 2008

The theme of the fourth IASE Round Table is "*Statistics Education in School Mathematics: Challenges for Teaching and Teacher Education*." This RoundTable is an important step in the activities of the Joint ICMI/IASE Study. The Joint ICMI/IASE Study is a cooperation between IASE and ICMI and brings the mathematics and statistics education communities to work in collaboration with the aim of analysing the situation of teaching statistics at school level and making recommendations about how to train mathematics teachers to better succeed in educating statistical literate students. It was recognized that, in spite of recommendations to increase the presence of statistics teaching at school level, students enter University with a poor level in statistics. This impedes their progress in learning very basic inferential statistics at University and is causing a general misuse and misunderstanding of statistics by researchers and professionals. Carmen Batanero (former IASE president 2001-2003) will act as chair of the International Programme Committee of the Joint Study, http://www.stat.auckland.ac.nz/~iase/index.php.

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