

Citation for the 2003 ICMI Freudenthal Medal to Celia Hoyles

The first Hans Freudenthal Award of the International Commission on Mathematical Instruction (ICMI) is awarded to Professor Celia Hoyles. This distinction recognises the outstanding contribution that Celia Hoyles has made to research in the domain of technology and mathematics education, both in terms of theoretical advances and through the development and piloting of national and international projects in this field, aimed at improving through technology the mathematics education of the general population, from young children to adults in the workplace.

Celia Hoyles studied mathematics at the University of Manchester, winning the Dalton prize for the best first-class degree in Mathematics. She began her career as a secondary teacher, and then became a lecturer at the Polytechnic of North London. She entered the field of mathematics education research, earning a Masters and Doctorate, and became Professor of Mathematics Education at the Institute of Education, University of London in 1984.

Her early research in the area of technology and mathematics education, like that of many researchers, began by exploring the potential offered by Logo, and she soon became an international leader in this area. Two books published in 1986 and 1992 (edited) attested to the productivity of her research with Logo. This was followed, in 1996, by the publication of *Windows on Mathematical Meanings: Learning Cultures and Computers*, co-authored with Richard Noss, which inspired major theoretical advances in the field, such as the notions of *webbing* and *situated abstraction*, ideas that are well known to researchers irrespective of the specific technologies they are studying.

From the mid nineties, her research on technology integrated the new possibilities offered by information and communication technologies as well as the new relationships children develop with technology. She has recently co-directed successively two projects funded by the European Union: the Playground project in which children from different countries designed, built and shared their own video games, and the current WebLabs project, which aims at designing and evaluating virtual laboratories where children in different countries build and explore mathematical and scientific ideas collaboratively at a distance. As an international leader in the area of technology and mathematics education, she was recently appointed by the ICMI Executive Committee as co-chair of a new ICMI Study on this theme.

However, Celia Hoyles' contribution to research in mathematics education is considerably broader than this focus on technology. Since the mid nineties, she has been involved in two further major areas of research. The first, a series of studies on children's understanding of proof,

has pioneered some novel methodological strategies linking quantitative and qualitative approaches that include longitudinal analyses of development. The second area has involved researching the mathematics used at work and she now co-directs a new project, *Techno-Mathematical Literacies in the Workplace*, which aims to develop this research by implementing and evaluating some theoretically-designed workplace training using a range of new media.

In recent years Celia Hoyles has become increasingly involved in working alongside mathematicians and teachers in policy-making. She was elected Chair of the *Joint Mathematical Council of the U.K.* in October 1999 and she is a member of the *Advisory Committee on Mathematics Education* (ACME) that speaks for the whole of the mathematics community to the Government on policy matters related to mathematics, from primary to higher education. In 2002, she played a major role in ACME's first report to the Government on the Continuing Professional Development of Teachers of Mathematics, and contributed to the comprehensive review of 14-19 mathematics in the UK. In recognition of her contributions, Celia has recently been awarded the *Order of the British Empire* for "Services to Mathematics Education".

Celia Hoyles belongs to that special breed of mathematics educators who, even while engaging with theoretical questions, do not lose sight of practice; and reciprocally, while engaged in advancing practice, do not forget the lessons they have learned from theory and from empirical research. Celia Hoyles' commitment to the improvement of mathematics education, in her country and beyond, can be felt in every detail of her multi-faceted, diverse professional activity. Her enthusiasm and vision are universally admired by those who have been in direct contact with her. It is thanks to people like Celia Hoyles, with a clear sense of mission and the ability to build bridges between research and practice while contributing to both, that the community of mathematics education has acquired, over the years, a better-defined identity.