Efraim Fischbein, 1920-1998, Founder President of PME
A Tribute

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The 23rd meeting of the International Group for the Psychology of Learning Mathematics in Israel is touchingly the first in which we cannot be joined by our Founder President, Professor Efraim Fischbein, who left us on July 22nd 1998. It is a time of sadness, yes, but it is also a time for celebrating the achievements of this gentle man who is responsible for the existence of our organisation. In particular, it is to him that we owe our focus on the *psychology* of learning mathematics.

Efraim Fischbein was born in Bucharest on January 20th, 1920. He was a precocious child who learned to read Hebrew from the old testament at the age of three. He spent his formative years in Romania where he had to cope with the hardship of living in a rising fascist state. When World War II broke out he was forced into hard labour with other Jewish youths. His sight was seriously damaged and at the end of the war he prepared for his university examinations by listening to the reading of friends and conversation with his fellow students. He graduated at the Bucharest University in 1947 with an MA in Psychology and the qualification to teach mathematics in high school.

His first activity was to travel to Transylvania to care for a hundred orphans who were survivors of death camps. In 1948 he returned to Bucharest as a high school teacher and then, in parallel, as a lecturer in developmental psychology at the university. His long association with the University of Bucharest culminated as head of the Department of Educational Psychology from 1959 to 1975.

He was a prolific author of articles and books during this time, including the first original Romanian text-book on Psychology (*How do we know the world*, 1958). His monograph *The Figural Concepts: the nature of geometric entities and their development in children* was published in 1963 and accepted for his PhD. Other titles published in Romanian include: *The Man, Master of His Habits* (1955), *Concept and Image in Mathematics Thinking* (1965), *The Art of Thinking* (1968), *Hazard and Probability in Children's Thinking* (1974).

He caught the eye of the international mathematics community and was invited to address the first International Congress in Mathematics Education in 1969. His outstanding presentation on "Enseignement mathématique et dévelopement intellectuel" and his rising eminence led to his invitation to chair the Working Group on the Psychology of Mathematics Education at the second ICME conference in 1972. This highly successful working group continued under his chairmanship at the third Congress in Karlsruhe in 1976 where the participants voted to continue with conferences every

year as “The International Group for the Psychology of Mathematics Education”. Efraim Fischbein was elected its founder president and served in this role from 1976 to 1980. Meanwhile he was appointed Professor of Psychology and founder chairman of the School of Education in Tel-Aviv University in 1975. He remained here for the rest of his life, with many visiting positions abroad, at Nottingham, UK, Montréal, Canada, Pisa, Italy, Georgia, USA, Heidelberg, Germany, and Granada & Valencia in Spain.

He continued to publish prolifically throughout his working life, including books in English on *The Intuitive Source of Probabilistic Thinking* (1975) and *Intuition in Science and Mathematics* (1987). His articles are a model of carefully designed research methodology and generative theory. Although well-versed in the methods of psychology, he was critical of its limited application to mathematics and saw that the psychology of mathematics education must develop its own theoretical perspectives.

His greatest creation is surely the organisation to which we belong. Following the decision to meet annually at Karlsruhe in 1976, the first meeting occurred the following year at Utrecht, organised by Hans Freudenthal. At Osnabrüch in 1978 the organisation was formally constituted under the title “International Group for the Psychology of Mathematics Education”, subsequently shortened from IGPME to PME.

I remember vividly the talk he gave at PME in 1978, for it was to change my whole professional life. He presented his empirical and theoretical ideas on individual conceptions of infinity. His slim, wiry frame resonated with vigour and emotion as he passionately advocated the theoretical implications of his empirical findings. His enthusiasm had a profound effect on me personally. My own, previously solitary studies in undergraduate thinking suddenly began to take their place in the wider picture that he painted. It inspired me to make the study of limits and infinity—and broader research in undergraduate mathematics—as the focal point of my studies at that time. By 1985 a growing interest in this area led to the formation of the Advanced Mathematical Thinking group. Thus it was that Efraim’s interest in the psychology of school mathematics permeated through to mathematics education at all levels.

He had a salutary wisdom that challenged those who professed to wear Emperor’s clothes. I remember explaining to him that I could “see” an infinitesimal as a graph that tended to zero. He challenged me forcefully, saying: “*Show* me an infinitesimal”. I was taken aback. I could not do it. Though I could formulate the formal mathematical framework, I had never analysed what it was that made the ideas work cognitively. It took a perceptive genius to ask the right question that cause a new theory to blossom. In my own case, this question from Fischbein spurred the journey of a life-time as I struggled to understand the relationship between conceptions to *think* about mathematics and processes that allow us to *do* it.

It is a salutary thought that he continued in vigour in his sixties and seventies, producing books and research articles of great quality at a time when many others have taken a well-earned retirement. At almost every conference of PME it has been my privilege and delight to take my turn amongst his many friends and colleagues who sought his wisdom and advice.

His research has a subtle balance between theory and empirical evidence that has always been the hallmark of his scholarship. It is these qualities which should continue to mark our present and future work in PME.

His work on primary and secondary intuitions, on children's probabilistic thinking, on the complex meaning of infinite concepts and on intuition in both mathematics and science have been seminal. They provide us with fundamental notions on which we can continue to build into the future. While we lament his passing, we therefore rightly celebrate his achievement and his legacy:—the gift of "PME" which draws us together every year to pursue our continuing quest to understand the subtleties of psychological studies in mathematics education.

Farewell dear friend, our journeys continue in your footsteps.

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A selection of publications by Efraim Fischbein in the last decade:

E. Fischbein (1989). Tacit Models of Mathematical Reasoning. *For the Learning of Mathematics.*

E. Fischbein, R. Stavy and H. Ha-Naim (1989). The Psychological Structure in Naive Impetus Conceptions. *The International Journal of Science Education, 11* (1).

E. Fischbein & J. Engel (1989). Difficolta psicologiche nella compresione del principio di induzione matematica. *La Matematica ed la suo didactica, 3* (1).

E. Fischbein (1990). Intuition and information processing in mathematical activity. *International Journal of Educational Research, 14* (1).

E. Fischbein, D. Tirosh, R. Stavy and A. Oster (1990). The autonomy of mental models. *For the Learning of Mathematics, 10* (1).

E. Fischbein, M.S. Nello and G.S. Merino (1991). Factors affecting probabilistic judgments in children and adolescents. *Educational Studies in Mathematics, 11*.

E. Fischbein (1993). The theory of figural concepts. *Educational Studies in Mathematics*.

E. Fischbein (1994). Didactics of mathematics as a scientific discipline. In R. Biehler, R. Scholtz, R. W. Sträßer, B. Winkelmann (Eds) *Didactics of Mathematics as a Scientific Discipline – The State of the Art*. Dordrecht: Kluwer

E. Fischbein and D. Schnarch (1997). The evolution with age of probabilistic, intuitively-based misconceptions. *Journal for Research in Mathematics Education, 28* (1).

E. Fischbein and A. Grossman (1997). Schemata and intuitions in combinatorial reasoning. *Educational Studies in Mathematics*.

E. Fischbein and A. Grossman (1997). Tacit mechanism of combinatorial intuitions. In E. Pehkonen (Ed.), *Proceedings of the 21st Conference of the International Group of the Psychology of Mathematics Education*. Lahti, Finland.

E. Fischbein and T. Nachlieli. (1998). Concepts and figures in geometrical reasoning. *International Journal of Science Education, 20* (10).

E. Fischbein (1998). Conoscenza intuitiva e conoscenza logico in attività matematica. *La Matematica e la sua didattica, 4*.

E. Fischbein (1999). Psychology and mathematics education. *Mathematical Thinking and Learning, an International Journal, 1* (1).

Plus other articles in the process of publication.