

The Conceptual Problems In The Understanding Of The Historical Evolution Of The Notion Of Negative Number

Date: 12 Dec 2024 (Thu)

Time: 10:00-11:30

Venue: Lecture Hall, Cultural Building (E34-G011)

Language: English

Registration: Online Registration (<https://go.um.edu.mo/wpf5ncav> or



Enquiries: Mr. Alex CHEN (Email: fed_event@um.edu.mo / Tel: 8822-4575)

Speaker:

Prof. Gert Schubring, a recipient of the 2019 Hans Freudenthal Medal from ICMI, has made remarkable contributions to the field of mathematics education history over four decades. As a long-time member of the Institut für Didaktik der Mathematik at Bielefeld University, Germany, and visiting professor at the Universidade Federal do Rio de Janeiro, Prof. Schubring pioneered research that emphasized the importance of social context in studying mathematics education history. His work spans multiple areas, including groundbreaking research in mathematics textbook analysis, particularly in Latin America, and building bridges between mathematics history and education communities.

Prof. Schubring played pivotal roles in establishing the field's academic foundation by founding the International Conference on History of Mathematics Education (ICHME) and serving as the founding editor of the International Journal for the History of Mathematics Education. His influential publications, including "The Legacy of Felix Klein" (2019) and "Generalization, Rigor and Intuition" (2005), have helped shape our understanding of how mathematical knowledge is viewed across different cultures and time periods. Prof. Schubring's work not only established the social history of mathematics education as a scholarly field, but also continues to provide valuable insights for current teaching practices and future educational directions.

Abstract:

The negative numbers have at the same time a long and a short history. On the one hand, their concept has been established with rigour only by the nineteenth century, but there are, on the other hand, affirmations of them being elaborated already at rather early periods in the history of mathematics.

For instance, one has affirmed that the Chinese were the first to having used negative numbers and to have had the concept of negative numbers. Others have affirmed that the conceptual problem was resolved by the sixteenth century in Europe. Actually, that was a use of subtractive quantities, and, respectively, of having postulated to have applied the rule of signs, which had not been established conceptually. Over centuries, one had practiced various manners of applying a rule of signs, without being able to establish how one might multiply a negative quantity with a negative quantity.

The basic conceptual problem had been to distinguish between quantities and numbers. It became resolved early in the nineteenth century when a theory of numbers became elaborated, constructing number domains by systematically extending from the domain of natural numbers, by the principle of permanence – here now, the negative numbers were the first extension to integer numbers. Various practices in dealing with the conceptual problems will be analysed, beginning with chapter 8 of the Nine Chapters. And manners alleging to have derived mathematical properties from dealing with practical problems, in various European countries, like vesting them as dealing with gains and losses, etc. The seminar will discuss relations between mathematical practices and epistemological stances in differing mathematical cultures.