

---

## Historical Evolution of Equity and Quality in Education and in Math Education

This chapter will present a comparative historical account of the evolution of issues of quality and equity in mathematics education and education in general. The historical account will be limited to the second half of the twentieth century when issues had started to be debated at the scholarly and policy levels. It will also be at the macro level focusing on international reports and literature.

The issues of educational equity and quality will be traced historically with reference to the United Nations treaties and declarations pertaining to the right to education. The issues of equity and quality in mathematics education will be traced with reference to three types of publications of historical value in mathematics education: Landmark scholarly publications, reports written by authorities in the field, and the activities of the International Commission on Mathematics Instruction (ICMI), including the International Conferences on Mathematics Education (ICME conferences) and ICMI studies.

### 2.1 The Evolution of Educational Equity and Quality

#### 2.1.1 The Fifties and Sixties

In 1948, the United Nations made a declaration about the nature and extent of human rights amongst which was the right to education for all people. It was declared that elementary education would be free and compulsory and that the higher levels of education would be accessible to all on the basis of merit (United Nations, 1948, Article 26). The UN declaration of human rights was transformed into action at the international level through the use of treaties as instruments to secure human rights observance. Between 1976 and 1990 a series of international covenants and conventions were developed to provide a comprehensive legal basis for the measures required to protect and deliver human rights.

The earliest two of those treaties which affected education were the International Covenant on Civil and Political Rights (ICCPR) (United Nations, 1966a) and the International Covenant on Economic, Social and Cultural Rights (ICESCR) (United Nations, 1966b), which together with the Universal Declaration of Human Rights (United Nations, 1948), have been proclaimed by the United Nations to constitute the International Bill of Human Rights. All of these treaties reaffirmed the right to compulsory and free primary education, and nondiscrimination in educational provisions first set out in the 1948 Declaration.

According to the UN regulations, treaties are expected to be ratified by the member states, and when this happens, the treaty becomes legally binding for the state. Each treaty requires the government's periodic self assessment of its compliance and a binding reporting procedure to the UN.

### **2.1.2 The Seventies**

The Universal Primary Education (UPE) was a moving target. The educational commitments made in the Universal Declaration of Human Rights have also been reaffirmed on many occasions by UNESCO actions. UNESCO established 1980 as a target date for the achievement of universal primary education (UPE) in most of the developing regions of the world. However, this target was not achieved.

One of the earliest of UNESCO's visions of the quality of education appeared in the report of the International Commission on the Development of Education which was chaired by Edgar Faure (Faure et al., 1972). The vision of this landmark report introduced the concept of lifelong education as a right for every individual and reaffirmed that universal basic education, in a variety of forms, depending on possibilities and needs, should be the top priority for educational policies in the 1970s.

### **2.1.3 The Eighties**

The eighties did not witness significant progress either in achieving the target of universal primary education or in bringing forward new conceptualizations of educational quality. It was a decade for reaffirming the original recommendations of the Bill of Human Rights regarding the right of the child to free and compulsory primary education without discrimination and the right of accessibility to higher levels of education for all on the basis of merit.

### **2.1.4 The Nineties**

By 1990, however, there was still a long way to go, and the World Conference on Education for All, was held that year in Jomtien (Thailand). In addition to restating the UPE goal for achievement by the year 2000, the Jomtien Conference (UNESCO, 1990) set out an 'expanded vision for education' which

stipulated that beside expanding access to education, education should contribute fully to individual and societal development through focus on learning, relevance, and quality of education as prerequisites for achieving the fundamental goal of equity. Although great progress had been made in most regions, the target, again, was not fully realized by all countries. Accordingly, in 2000, the Millennium Declaration (United Nations, 2000) reaffirmed that children everywhere, boys and girls alike, should be able to complete a full course of primary schooling, but did not go beyond that.

In the mid nineties another landmark report by the International Commission of Education for the twenty-first century, chaired by Jacques Delors came with a report titled 'Learning: The Treasure Within' (Delors et al., 1996). The report identified the goal of education as based on its ability to provide learning to know, learning to do, learning to live together, and learning to be.

Up till the Millennium Declaration, the UN treaties and declarations focused on providing Universal Primary Education (UPE) without discrimination but they were almost silent on the quality of education. The Jomtien World Declaration on Education for All (UNESCO, 1990) was more of a vision than a plan of action. In 2000, The Dakar Framework for Action (UNESCO, 2000) set out an ambitious and comprehensive agenda to be achieved by 2015.

### 2.1.5 The First Decade of the Twenty-First Century

In 2000, The Dakar Framework for Action (UNESCO, 2000) specified the following goals:

1. Expanding and improving comprehensive early childhood care and education, especially for the most vulnerable and disadvantaged children.
2. Ensuring that by 2015, all children, particularly girls, children in difficult circumstances and those belonging to ethnic minorities, have access to complete free and compulsory primary education of good quality.
3. Ensuring that the learning needs of all young people and adults are met through equitable access to appropriate learning and life skills programmes.
4. Achieving a 50% improvement in the level of adult literacy by 2015, especially for women, and equitable access to basic and continuing education for all adults.
5. Eliminating gender disparities in primary and secondary education by 2005, and achieving gender equality in education by 2015, ensuring girls' full and equal access to and achievement in basic education of good quality.
6. Improving all aspects of the quality of education and ensuring excellence of all so that recognized and measurable learning outcomes are achieved by all, especially in literacy, numeracy and essential life skills.

The Dakar Framework was a significant landmark in the international declarations regarding educational equity and quality. First, it was the first time in the declarations of the UN bodies that equity and quality of education were

put together as goals of education within a framework of action and within a specific time line. It brought forward the argument that the achievement of the moving target of universal participation in education may be dependent on the quality of education provided. It underscored that the quality of teaching and student learning may have an impact on how long students stay in school and how punctual they are in their attendance and participation in learning. Parents, on the other hand, are more likely to send their children to school if they perceive that the quality and relevance of their children's education justify the investment they are making. Also the quality goal specifies that the quality of all aspects of education should be ensured, and that measurable learning outcomes be achieved by all, especially in literacy, numeracy, and essential life skills (goal 6). Moreover, the Dakar Framework is the most comprehensive in all UN declarations regarding education in that it extends the agenda beyond achieving universal participation in education in two directions; improving early childhood education (goal 1), and providing for adult continuing education through ensuring that the needs of all young people and adults are met through equitable access to appropriate learning and life skills programmes (goal 3 and 4).

In summary, the pattern of evolution of the concepts of equity and quality seem to have been dominated by equity in the decades that followed the founding of the United Nations. The concept of quality in education was put forward as an international concern only towards the turn of the last century. New daring visions of educational quality were formulated in the seventies and nineties but were not translated into action then. The Dakar Framework marks the birth of the concept of equity in quality in education, a concept advocated for mathematics education in this book. The Dakar Framework underlined the interdependence between equity and quality and set out an agenda based on the assumption that educational processes and outcomes are qualitative in nature and that the number of children who participate in education is not a substitute for the quality of their education.

## **2.2 The Evolution of Equity and Quality in Mathematics Education Literature**

### **2.2.1 The Fifties and Sixties**

Unlike the evolution of educational equity and quality, the evolution of equity and quality in mathematics education was dominated by quality issues between 1950 and 1980. The evolution of the concepts of equity and quality in mathematics education in the second half of the last century will be traced by referring to three categories of publications of historical value in this regard: Landmark scholarly publications, reports written by authorities in the field, and the activities of the International Commission on Mathematics Instruction (ICMI).

The 1950s witnessed the ‘new mathematics’ movement in the United States of America and later in other developed countries. The motivation and the characteristics of this movement have been documented in many studies (Begle, 1970; ICMI, 1979; Morris, 1980). The issues debated in this period were almost exclusively related to the improvement of the quality of mathematics education. In the area of the goals, the debate focused on rationalizing new reasons for more expanded mathematical education by broadening its goals to encompass all aspects of mathematical literacy (Niss, 1996). The rationalizations for improving the quality of these goals were varied and included economic competitiveness, the development of mathematical knowledge, the role of mathematics in the sciences, the needs of the modern workplace, and the needs of the information age.

The improvement of mathematical content and its organization in the curriculum were the paramount concern of that era. One of the publications which captured the ethos of the new mathematics movement was the sixty-ninth yearbook on ‘Mathematics Education’ published by the National Society for the Study of Education (NSSE) (1970). The significance of this yearbook is that the NSSE publishes a yearbook on an educational subject, if its board of directors senses that there is a turning point in the development of that subject. Before the NSSE 1970 yearbook, the last yearbook that the NSSE published on mathematics was in 1951 on *The Teaching of Arithmetic* (NSSE, 1951). In the preface of the NSSE (1970) yearbook, the editor of the series wrote:

“In 1966, the Board of Directors of the National Society sensing that the shock wave of the radical changes in pre-college mathematics of the past decade or so was subsiding, concluded that it would be appropriate to prepare a clear account of the changes that had occurred and to examine the implications of those changes for mathematics teaching in the near future” (p. vii)

In the introduction of the yearbook, Edward Begle (1966), the editor of the yearbook wrote:

“Not quite two decades have elapsed since the appearance of the last NSSE yearbook on mathematics education. During that period a revolution in school mathematics has taken place... This revolution in school mathematics was, in a sense, a byproduct of a revolution in mathematics itself.” (p. 1)

In support of the innovation in mathematics curricula, Wilder (1970) presented arguments which were typical of the many arguments given in that era. One argument was that mathematical knowledge was growing rapidly both in its basic and applied aspects. Consequently, it was expected that more topics considered to be university subjects would be provided at the high school level and some topics at the high school level would be moved to the primary level. A second argument was that this transfer of topics could not be done

by adding new topics to the existing ones in the curriculum, so to accomplish this transfer, a new organization of the curriculum had to be introduced. This organization was based on mathematics as a study of structures - known as the 'economy principle' - since studying a mathematical structure would save instructional time because many mathematical topics could be regarded as examples of that structure. The third argument was that such a curriculum would not only bring up-to-date mathematical knowledge but will also enable students to exercise mathematical ways of thought.

The new mathematics movement was reinforced by a psychology of learning that was aligned with the nature of the new mathematics education. It was Bruner who was able to capture the spirit of the movement and provide a framework for a cognitive theory. In his book, *The Process of Education*, Bruner (1960) presents four themes, two of which capture and reinforce the spirit of the new mathematics movement: The importance of structure and readiness for learning. In the theme of structure, Bruner states that:

“grasping the structure of a subject is understanding it in a way that permits many other things to be related to it meaningfully. To learn structure, in short is to learn how things are related” (p. 7)

He further argues that understanding fundamentals makes a subject more comprehensible, ensures more effective retention, promotes the transfer of learning, and narrows the gap between 'elementary' knowledge and 'advanced' knowledge. Bruner's ideas regarding the structure of a subject, reinforced the basic assumptions made by the new mathematics movement about the importance of organizing mathematics curricula around mathematical structures.

On the theme of readiness for learning, Bruner makes the startling statement that:

“we begin with the hypothesis that any subject can be taught effectively in some intellectually honest form to any child at any stage of development.” (p. 33)

This view of readiness for learning rationalized (or motivated) the proposals of the new mathematics movement to push down advanced topics in mathematics from the university level to secondary and even primary levels. Seemingly, Bruner's statement on readiness for learning implied a strong position on equality, by affirming the equality of humans in their potential to learn; however, it was not a statement about equity from a social justice perspective.

The pre-occupation with the quality of mathematics education rather than the equity in access to it was also evident in the developing countries. One example in the developing countries was the UNESCO Mathematics Project for the Arab States (UMPAS) (UNESCO, 1969) which was typical of the effort of the international community to 'transfer' the experience of the developed countries to developing countries. As the 'revolution' of the new mathematics movement was about to fade away in western countries, UNESCO decided to

sponsor a mathematics project in the Arab countries to improve the quality of mathematics education, in harmony with similar projects undertaken in the developed countries. UNESCO brought together many of the prominent leaders of the new mathematics movement to put together a vision and a mathematics curriculum at the secondary level. The rationalization given for such a vision echoed the one given in the United States in the 1950s as evidenced by the following statement that appeared in an early project document (UNESCO, 1966):

“Modernization means that the teaching of mathematics is based on a general attitude quite different from the one in traditional teaching. It proceeds, using the notion of set theory as a basis, to build up a more unified construction, structured by homogeneous ideas. Mathematics must be taught by stressing, at the appropriate time, the fundamental structures that occur in several branches of mathematics, both as means and ends” (Appendix II)

UMPAS was meant to be a starting point for a sustainable development of mathematics education in the Arab countries. However, because of its excesses and its over-emphasis on abstract concepts and mathematical structure, the long term impact of UMPAS withered away in a few years.

## 2.2.2 The Seventies

The seventies were years of questioning of and doubt in the promises of the new mathematics era. One extreme reaction to that was to return to the basics, that is, to emphasize skills through drill work without consideration for building understanding and to do away with the abstraction and the excessive emphasis on mathematical processes and mathematical topics that do not have direct application in school or in life.

## 2.2.3 The Eighties

The early eighties witnessed a shift towards connecting mathematics education to academic and adult life needs, societal needs, and technological needs. Thus, the link with society became one important attribute in the quality of mathematics education. Although individual differences were recognized in this respect, they were not seen as equity issues that should be addressed from a social responsibility perspective. We present two examples to illustrate the shift in the goals of math towards being more inclusive of individual and societal needs.

The first example comes from a UNESCO publication (Morris, 1981) based on papers presented in a meeting which brought together 14 math educators representing different parts of the world and relevant international organizations to debate and review the question of goals of mathematics education. Perhaps the best way to convey the spirit of the meeting and the publication that followed is to list some of the titles of the papers presented and debated:

1. Goals as a reflection of the needs of society
2. Goals as a reflection of the needs of the learner
3. Goals as a reflection of the needs of the requirements of production
4. Goals of mathematics for rural development
5. Links with commerce and industry
6. Educational objectives for mathematics compatible with its development as a discipline
7. New goals for old: An analysis of reactions to recent reforms in several countries
8. The NCTM PRISM project: An attempt to make curriculum change more rational and systematic
9. The evolution of mathematics curricula in the Arab countries
10. Goals of the mathematics curriculum in British Columbia: Intended, implemented and realized.

The meeting, with its participants and topics and its emphasis on the role of mathematics in serving the different needs of the individual in school and adult life, the society, and the discipline, represented a shift from the new mathematics fundamental goals of understanding the nature of mathematics.

Another significant example that illustrates the shift in the goals of mathematics education towards more responsiveness to the needs of the individual and society was the Cockcroft Report entitled 'Mathematics Counts' (Committee of Inquiry into the Teaching of Mathematics in Schools, 1982). This committee was set by the government to consider and make recommendations regarding teaching math in primary schools in England and Wales, with particular regard to the mathematics required for further and higher education, employment and adult life. Committee membership included research mathematicians, mathematics educators, higher education professors and administrators, school teachers and administrators, representatives of industry and business, and representatives of the educational authorities. The committee worked for four years on its mission and submitted in 1982 a comprehensive report which came to be known as the Cockcroft Report after its chair W.H. Cockcroft.

The Cockcroft Report was a landmark in the history of mathematics education in the second half of the last century because of its impact on mathematics education, not only in England and Wales but in the rest of world. This is because it legitimized and transformed earlier ideas and visions into action plans as to how to render mathematics to count by re-orienting it to serve the needs of individuals (as learners and adults) in school, in employment, and in further and higher education.

### 2.2.4 The Nineties

The nineties of the last century witnessed the emergence of the concept of equal access to quality mathematics. This was heralded by an important re-



port prepared by two boards, namely the Board on Mathematical Sciences and Mathematical Sciences Education Board (1989). The report was entitled ‘Everybody Counts’, which in comparison to the Cockcroft Report (Mathematics Counts), reflected, intentionally or unintentionally, the change towards more inclusive goals of mathematics education. Though *Everybody Counts* makes similar arguments regarding the importance of the role of mathematics in serving the needs of students’ adult life in terms of employment and further education, it does however bring into focus three issues. First, it broadens mathematical literacy to be in line with the requirements of the information age. Second, it underlines the importance of mathematics for the economy and recommends doing away with the historically dominant idea of having a two-tier mathematical literacy, one for the masses and one for college bound students. Third, and most importantly, it declares explicitly that the quality of mathematics education is not achieved if equal participation in mathematics education is not provided: ‘It is vitally important for society that *all* citizens benefit equally from high-quality mathematics education’ p. 7.

Two curriculum projects which have had a far-reaching impact worldwide demonstrate the growing concern in the nineties regarding increasing the weight given to equal access to quality mathematics education: The National Curriculum in the United Kingdom and the National Council of Teachers of Mathematics (NCTM) in the USA. The National Curriculum included equal access to quality mathematics education among its aims. One of the aims in Stages 1 and 2 is ‘The school curriculum should aim to provide opportunities for all pupils to learn and to achieve’ (Qualifications and Curriculum Authority (QCA), 1999). Also the National Curriculum included the following aim in Stages 3 and 4: ‘The curriculum should enable all young people to become: Successful learners, who enjoy learning, make progress and achieve; confident individuals who are able to live safe, healthy and fulfilling lives; responsible citizens who make a positive contribution to society’ (Qualifications and Curriculum Authority (QCA), 2007). In its project Standards 2000, the NCTM dedicated one out of its six principles to equity: ‘Excellence in mathematics education requires equity-high expectations and strong support for all students’ (NCTM, 2000). It is worth observing that the issue of equity did not come up in the NCTM Standards of 1989.

## 2.3 The Evolution of Equity and Quality in Mathematics Education in ICMI and PME Activities

We shall survey two types of ICMI (International Commission on Mathematics Instruction) activities: ICMI Studies and the International Congresses of Mathematics Education (ICME).

### 2.3.1 ICMI Studies

In the the past 17 years, ICMI studies mainly addressed issues related to the quality of mathematics education, with the exception of the following two studies which have relevance to equity issues in mathematics education:

- Gender and mathematics education, published under the title ‘Towards Gender Equity in Mathematics Education’ (Hanna, 1996)
- Mathematics education in different cultural traditions: a comparative study of east asia and the west (Leung et al., 2006)

### 2.3.2 The ICME Congresses

The main activities of ICME congresses from 1968 to 2008 were surveyed for their coverage of and relevance to equity issues in mathematics education. The activities surveyed were: Plenary sessions, non-plenary lectures, and conference groups (according to the different terminologies used: working groups, topic groups, discussion groups). The sources of information were: (1) The official programs of ICME congresses which I attended and and whose programs I have in my personal files (ICME 4 and ICME 6–11); (2) an ICMI web site (Furinghetti and Giacardi, 2008) for the remaining ICME congresses. The activities that pertain to equity in the remaining ICME congresses are listed in Figure 2.1 (1968–1988), Figure 2.2 (1992–2000), and Figure 2.3 (2004–2008). The results may be summarized as follows:

- The majority of ICME congresses focused on aspects of quality of mathematics education
- Each of the ICME congresses had at least one plenary lecture that pertained to equity issues except ICME congresses 1, 7, 8, and 9
- ICME 6 was a turning point as far as emphasis on social issues. In the ICME congresses that followed ICME 6, the number of lectures that pertained to equity increased steadily from four in ICME 7 to 8 in ICME 11
- Similarly, the number of groups (working groups, topic groups, discussion groups) pertaining to equity have been increasing steadily since ICME 6 (1988) in Budapest
- In general the results indicate that up to 1988, the focus of the activities of ICME congresses was on quality issues, and since then, the focus on equity increased gradually and steadily

### 2.3.3 The PME Annual Conferences

The International Group for the Psychology of Mathematics Education (PME) started as a professional organization in 1977 to promote international contacts, exchange, and interdisciplinary research in the psychology of mathematics education. PME has since organized the annual conferences which covered

Lectures		Groups
Plenary	Non-plenary	
ICME1		
None	None	None
ICME 2		
-Mathematical education in developing countries – some problems of teaching and learning (Hugh Philip)	None	-Mathematics in Developing Countries
ICME 3		
-The Interaction between Mathematics and Society (J. Lighthill) - Education in Mathematics and Science Today: The Spread of False Dichotomies (P. Hilton)	None	Not available
ICME 4		
-Experiences in popularizing mathematical methods (Hua Loo-Keng)	None	-Working Group on increasing the participation of women in mathematics
ICME 5		
-Socio-Cultural Bases for Mathematical Education (Ubiratan D'Ambrosio)	None	<i>Topic Groups</i> - Women and Mathematics
ICME 6		
-School mathematics in the 1990's: The challenge of change especially for developing countries (Bienvenido Nebres)	None	<i>Topic Areas</i> 4: Problems of the handicapped students 13 Women and mathematics  <i>Fifth Day Special: Mathematics, Education, and Society:</i> -Mathematics education and culture -Society and institutionalized mathematics education -Educational institutions and the individual learner -Mathematics education in the global village

**Fig. 2.1.** Activities pertaining to equity in ICME congresses 1968–1988

Lectures		Groups
Plenary	Non-plenary	
ICME 7		
None	-A social ethics for math education (Chevallard) - Mathematics education in the global village: the wedge and the filter(Jurdak) - Children and their inherited mathematical culture (Paez) - Mathematics beyond good and evil (Shelley) - New approaches to the mathematical education of minorities in the United States (Treisman)	<i>Working Groups:</i> 10: Multicultural and multilingual classrooms 19:Mathematics for pre-mature school leavers 22: Mathematics education with reduced resources <i>Topic Groups</i> - Ethnomathematics and math education - Mathematics for work: vocational education - Indigenous peoples and math Education -The social context of math education
ICME 8		
None	- Where does it come from and where does it go? (D'Ambrosio) - Mathematics education and gender issues (Leder)	<i>Working Groups</i> 6: Gender and mathematics 7: Mathematics for gifted students 8: Mathematics for special students 21: The teaching of mathematics in different cultures 22: Mathematics, education, society, and culture <i>Topic Groups</i> -Education for mathematics in the working place
ICME 9		
None	- Overcoming obstacles to the democratization of math education (Bishop) -The socio-cultural turn in the studying, the teaching, and learning of mathematics (Lerman) - Designing instruction of values in school mathematics (Soedjadi) - Widening the lens- changing the focus: Researching and describing language practices in the multilingual classrooms in South Africa (Adler) - Cultural cross-purposes and expectations as barriers to success in mathematics (Clark) - On the role of politics in the development of mathematics in Africa (El Tom) - In search of an East Asian identity in math education (Leung) - The impact of California? back-to- basics policies (Jacob) - Math education for and in the dominant and the other cultures (Sakonidis)	<i>Working Groups</i> -The social and political dimensions of math education -History and culture in math education  <i>Topic Groups</i> 15: Math education for students with special needs 17: Mathematics education and equity 21:Ethnomathematics

**Fig. 2.2.** Activities pertaining to equity in ICME congresses 1992–2000

Lectures		Groups
Plenary	Non-plenary	
ICME 10		
-Mathematics education for whom and why? The balance between mathematics education for all and for high level mathematics performance (Lerman, Askey, Carreira, Namikawa, Vithal)	-On the relationships between informal out-of-school mathematics and formal in-school mathematics in the development of abstract mathematical knowledge (Bonnotto) -Promoting equity in math education (Baoler) - Globalization, ghettoizing, and uncertainty: Challenges for critical math education (Skovsmose) - Math education and language: policy, research and practice in multilingual contexts (Setati)	<i>Topic Study Groups</i> 4: Activities and programmes for gifted students 5: Activities and programmes for students with special needs 6: Adult and life-long mathematics education 7: Math education in and for work  <i>Discussion Groups</i> 3: Mathematics for whom and why? The balance between 'mathematics education for all' and 'for high level mathematical activity' 5: International cooperation in math education 7: Public understanding of mathematics and math education 15 Ethnomathematics Current problems and challenges concerning students with special needs
ICME 11		
- Equal access to quality math education (Panel: Bill Atweh (moderator); Olympia Figueras; Murad Jurdak; Catherine Vistr-Yu)	-Challenges to mathematics education research faced by developing countries. Report of Survey Team 2(Borba) -Equity: The Case for and against gender(Leder) -Socio-cultural perspectives on the learning and development of mathematics teachers and teacher-educator-researchers(Goos) -Ethnomathematics at the margin of Europe. A pagan calendar in modern times(Bjarnadóttir) -Mathematics education in multicultural and multilingual environments. Report of Survey Team 5(Bishop) -Mathematical literacy in South Africa – an opportunity for shifting learner identities in relation to mathematics(Graven) -How mathematics education can help in shaping a better world?(D'Ambrosio) -Societal challenges to mathematics education in different countries. Report on Survey Team 6(Ferrini-Mundy)	<i>Topic Study Group</i> 6: Activities and programs for gifted students 7: Activities and programs for students with special needs 8: Adult mathematics education 9: Math education in and for work 32: Gender and math education 33: Math education in a multi-linguistic multicultural environments  <i>Discussion Groups</i> 10: Public perceptions and understanding of mathematics and mathematics education 11: Quality and relevance in mathematics education research 18: The role of ethnomathematics in mathematics education

**Fig. 2.3.** Activities pertaining to equity in ICME congresses 2004–2008

different aspects of interdisciplinary research in the psychology of mathematics education and other related fields.

In his comprehensive survey and analysis of the evolution of equity and social justice in the PME, Gates (2006) traced these concepts as they appeared in PME proceedings. Based on his survey and analysis, Gates gave the following conclusions:

- In the early years of PME (1977–1986), ‘there was a slight attention to issues that relate to the social context in which learners and teachers live and work’ (p. 375)
- At the end of the second decade (1987–1996) of PME, more attention was given to equity and social justice as evidenced by the emergence of equity, gender, and ethnomathematics issues in PME research. ‘This however has not yet reached the sophistication that theories have reached outside PME research literature-the social systematic level’ (p. 84)
- By the third phase of PME (1997–2005), PME research showed a broadened interest in the cultural and social contexts of mathematics learning and teaching such as compatibility between home and school cultures. learning in multilingual context and in indigenous communities.

All in all, PME research seems to have followed the same pattern as ICME’s as far as equity in mathematics education is concerned. The 1980s was the decade when interest in social and cultural issues in mathematics education started to emerge. The 1990s was the decade when social and cultural issues became a significant and growing component of research in mathematics education.

## 2.4 Conclusion

Figure 2.4 presents a summary of the evolution of equity and quality in education and mathematics education in the period 1950–2008. The pattern of evolution of the concepts of equity and quality in mathematics education that emerges from the survey of the literature and ICMI activities differs from the pattern of the evolution of these two concepts that emerges from the survey of the relevant international literature. As to the evolution of the concepts of educational equity and quality, the concept of educational equity in terms of provision for universal primary education was paramount between 1950 and 2000 but educational quality received low priority during that period. In the first decade of the twenty-first century, quality education for all has emerged as a top priority.

On the other hand, the evolution of the concepts of equity and quality in mathematics education was dominated by quality concerns in scholarly discourse between 1950 and 1980. The social and cultural aspects of mathematics education started to emerge as legitimate research in the 1980s. Towards the end of 1980s, equity issues became a major concern in mathematics education.

Period	Education		Math Education	
	Equity	Quality	Equity	Quality
1950's	Universal Primary Education (UPE)	Little emphasis	Little emphasis	Understanding math concepts and processes
1960's	Universal Primary Education (UPE)	Little emphasis	Little emphasis	Understanding math concepts and processes
1970's	Universal Primary Education (UPE)	-Faure's vision of educational quality -Little emphasis in practice	Little emphasis	Questioning the goals of new math
1980's	Universal Primary Education (UPE)	Little emphasis	Little emphasis	Serving adult life, societal, and technological needs
1990's	Universal Primary Education (UPE)	-Delores vision of educational quality -Little emphasis in practice	Math education for all	Quality math education for all
2001–2010	Education for all	Quality education for all	Math education for all	Quality math education for all

**Fig. 2.4.** Summary of the evolution of equity and quality in education and mathematics education 1950–2008

The first decade of the twenty-first Century witnessed the shift towards an increased emphasis on achieving equal access to quality math education.







<http://www.springer.com/978-1-4419-0557-4>

Toward Equity in Quality in Mathematics Education

Jurdak, M.

2009, XIV, 177 p., Hardcover

ISBN: 978-1-4419-0557-4