

Authentic Values and Coping with some Paradigm Shifts as Determinants of Mathematics Education in a Global Community

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Abstract

The role of mathematics education in achieving a global community was identified, basically as contributing to disseminate particular values, and to design and implement mathematics curricula as to cope with paradigm shifts in science, mathematics and mathematics education. Values were described as “authentic” ones when included in the French Revolution Slogans; Liberty, Equality and Fraternity, which can be seen as the origin of the Human Rights Charter and the modern Western civilization. Some implications of the considered paradigm shifts are: Integrated curricula – or at least paying great attention in these curricula to applications in life, self continuous concurrent learning, employing technology, unity of inductive and deductive methods of inquiry, dealing with questions with multiple right answers, employing uncertainty and introducing major changes on the classical theories of “mathematical truth”. The paper concluded by some remarks emphasizing that the above suggestions were written apart from current political events, they are rather futuristic as well as applicable in almost all countries with consideration to some cultural features.

Introduction; The Role of Mathematics Education

Mathematics curriculum is one of school curricula. So, it works together – or actually supposed to – disseminate particular values and to cope with paradigm shifts in science, mathematics, and education in general.

Values needed in a global community can be seen – and deduced from - those “authentic” values of the slogans of the French Revolution; Liberty. Equality and Fraternity, which could be considered as the origin of the Human Right Charter and the modern Western Civilization. Paradigm shifts in relevant areas can be seen as complexity⁽¹⁾ in the areas of science, from seeing mathematics as the study of formal systems to seeing mathematics as a living body⁽²⁾, from seeing mathematics programmes as a large collection of concepts and skills or / and a medium for “formal” teaching” to something people do as a part of their preparation to citizenship in this era⁽³⁾ and from rote school learning to self-continuous and concurrent learning⁽⁴⁾.

Although the suggested “authentic” values and the paradigm shifts in different areas seems to be some kind of unity of some contradiction, particularly romance and reality, the product is badly needed in education whether expressed explicitly or symbolically.

Basic Requirements to Achieve Authentic Values and to Cope with Paradigm shifts

Based on a systemic view, mathematics curricula can be seen as a sub-system of school curriculum, which in its turn can be seen as a sub-system of the systems of education, society, regional and human cultures. So, basic requirements in question in this section can be seen, from the general to the more specific, as follows:

First: In relation to the human culture:

Implementing the United Nations charters⁽⁵⁾.

Disseminating of peace culture.

Second : In relation to regional cultures:

Respecting the cultural variety within the framework of “Unity and Diversity”.

Third : In relation to society:

Achieving a democratic society.

Fulfilling human basic needs⁽⁶⁾ including appropriate income, housing, education, health, insurance and sustainable development.

Relieving the society from some drawbacks of the process of “globalization”, eg “polarization”.⁽⁷⁾

Involvement of society in educational issues.

Fourth: In relation to the system of education:

Creativity must be an essential core to the whole education.

Formal education ought to be seen as a stage of self continuous concurrent education.

Educational research should cope with the methodology of complexity.

Major changes should be introduced to systems of teacher education⁽⁸⁾.

Fifth : In relation to curricula:

The major aims of curricula are to empower students creativity and self continuous concurrent education.

Integration of curricula to make school education relevant to real life, as well as to the present view of “unity of knowledge”.

Introducing basic changes to methods of teaching and systems of evaluation.

Giving students the chance to be familiar with computers and their use.

Practicing team work.

Sixth: In relation to mathematics education:

Changing the dominating theories of mathematical truth as to cope with paradigm shifts in science and mathematics⁽⁹⁾.

Paying more attention to educational activities.

Studying estimation, statistics, networks ... and so on, in an applicable and integrated senses.

Alternative Scenarios

The above mentioned requirements may not be existed in any single country. They may be achieved in different degrees with a variety of distances from those mentioned. So, it is wise to suggest alternative scenarios with regard to authentic values and the degree of coping with some paradigm shifts.

As for authentic vales, the suggested scenarios are ⁽¹⁰⁾: Almost applied both interior and exterior, almost applied interior not exterior, dialogues on applications, and not applied. For coping with the referred to above paradigm shifts, the suggested scenarios are: Almost applied, applied to great extent, applicable to some extend and almost not applied.

A final word

It educationists and teachers are convinced that authentic values and coping with those referred to paradigm shifts are determinants of mathematics education in a global community, they must disseminate their content and struggle to achieve them, regardless the existing situation in their societies. They must go the through the “gaps” in the whole system, with particular emphasis on “educational gaps”.

Notes

(1) Complexity refers to the paradigm shift in science, which can be described in terms of the following developments:

- a) There is no more simple and absolute laws controlling motion and globe.
- b) Unity of human knowledge.
- c) Research is no more neutral.
- d) Thought is no more controlled by logic, and knowledge is no more certain.
- e) It is suggested that the main goal of science is to understand reality with the intention to influence and change it.
- f) Cohesion of knowledge and it technological applications.
- g) The development in technologies of communication, measurement and its units and scientific calculations.

See:

Mina, Faye M. (2003). **Issues in Curricula of Education**. Cairo: The Anglo-Egyptian Bookshop. PP. 23-26 (In Arabic).

- (2) See:
 Mina, Fayez M. (2006). **Issues in Teaching and Learning Mathematics**, Third edition. Cairo: The Anglo-Egyptian Bookshop. (In Arabic).
 Ormell, C (Ed.) (1992). **New Thinking about the Nature of Mathematics**. Norwich: Mag –EDU, University of East Anglia.
 Rogerson, A. (1986). “The Mathematics in Society Project: A New Conception of Mathematics”, **INT. J. EDUC. SCI. TECHNOL.**, 17(5), pp. 611-616.
- (3) See:
 Romberg, T. A. (1994). “Mathematics; Primary School Programs”. In: Torsten Husén and T. Neville Postlethwaite (Eds.), **The International Encyclopedia of Education**, Second edition (pp. 3655-3661). Oxford; Pergamon Press.
 Travers, K. (1994). “Mathematics: Secondary School Programs”. In: Husén & Postlethwaite, *ibid* (pp. 3661-3668).
- (4) Mina, Fayez M. (2004). “Some Remarks on the Future of Mathematics Education”. In: Alan Rogerson (Ed.), **The Proceedings of the International Conference of the Mathematics Education into the 21st Century Project on “The Future of Mathematics Education”**, Ciechocinek, Poland, June 26-July 1, 2004. PP. 93-97.
- (5) This includes rejection of occupation (and the right of combating it), rejection of harming innocents, and respecting basic human rights in all respects.
- (6) Whatever the way to fulfill these needs, whether capitalists or socialism ... etc.
- (7) See Mina (2004), *Op cit*.
- (8) This must be based on professionalization”. For explaining this term, see; *ibid*.
- (9) An attempt has been made by the writer in this concern in 2000 by assuming that:
- a) Reality is to be extended to include “virtual reality” as well as the content of “conditional propositions”, and not to be confirmed to “physical reality”.
 - b) Human behaviour can be more easily explained assuming that the mind constructs mental models of reality, rather than by assuming the existence of “mental logic”.
 - c) Mathematical systems are open systems, which have been influenced by supra systems, introducing changes on all of their components.
- See:
 Mina, Fayez M. (2000). “Theorizing for Non-theoretical Approaches to Mathematics Education”. In: Alan Rogerson (Ed.), **Proceeding of the International Conference of the Mathematics Education into the 21st Project on “Mathematics for living”**, Amman, Jordan, November 18-23, 2000. PP. 6-10.
- (10) Note that we deal with authentic values and coping with some paradigm shifts separately, though there might be some kind of relationship among them. Also note that we dealt with the suggested scenarios in brief.

References

- Mina, Fayez M. (2000). “Theorizing for Non-theoretical Approaches to Mathematics Education”. In: Alan Rogerson (Ed.), **Proceeding of the International Conference of the Mathematics Education into the 21st Project on “Mathematics for Living”** Amman Jordan, November 18-23, 2000. PP. 6-10.
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