

Communications

The past and future of *For the Learning of Mathematics*: a personal view

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The decade of the 1960s was a critical period in the history of civilization. These were the years when the scientific bases for bio-, nano- and cyber-technologies and artificial intelligence were developed. World politics was in a period of turmoil. It was the decade when the Vietnam War escalated and spread to practically all of South East Asia. It was the decade of the construction of the Berlin Wall by the German Democratic Republic (GDR, East Germany) in 1961, of the Cuban Missile Crisis in 1962, of the killings of John F. Kennedy in 1963, and of Martin Luther King Jr. in 1968. Never was the Cold War so close to becoming the most destructive war ever. In Latin America, military dictatorships flourished in many countries and guerrilla movements were common. A similar situation existed in Africa and other regions of the World. In June 1967, the Third Arab-Israeli War, between Israel, Egypt, Jordan and Syria took place. Although short in duration, the consequences were enormous. In May 1968, civil unrest in France, followed by strikes, occupation of factories and schools, carried a message of disapproval of the capitalist system and the perception that new generations were being prepared to serve the armed forces in the name of national interests and rivalries and to bear the same disgrace, suffering and destruction of the generation of their parents. Youth was very sensitive to this political movement. The unrest and protests, sometimes violent, spread through the entire world and repression followed, with different mechanisms and strategies. The consequences of 1968 were particularly felt in the various levels of schooling.

In 1969, while Hans Freudenthal was the President, ICMI decided to organize the International Congress of Mathematical Education (ICME). The first congress, ICME 1, took place in Lyon, France, in 1969, and the second, ICME 2, in Exeter, UK, in 1972. Issues discussed at these congresses were mainly around movements of change in mathematics education, particularly the modern mathematics proposals. There were no echoes of the events of 1968. But, at ICME 3, in Karlsruhe, West Germany, issues of a socio-political nature were raised. Since then, we can see a socio-political tenor in mathematics education.

In 1980, there appeared the first issue of a new journal, *For the Learning of Mathematics*, the result of the ideal, the intellectual effort and the financial support of David Wheeler, who conceived and edited it. In the tradition of journals known by

their editors, we might call FLM the “David Wheeler journal”. He decided what to publish and a main characteristic of the new publication was to give space for new and innovative ideas. The exercise of going through past issues of FLM shows the trends being delineated in the post-1968 period.

Great changes affected the world in the final decade of the 20th century. The fall of the Berlin Wall, in 1990, marked the beginning of a new geography of Europe, with geopolitical, cultural and socio-economic characteristics, with repercussions for the entire world. We entered the 21st century with the lasting effects of September 11, 2001, particularly the invasions and civil wars in Afghanistan, Iraq, Eastern Europe, North Africa and elsewhere in the world.

How much has the 1968 movement influenced mathematics education? This question is, as yet, not well studied. Nor have similar questions about the subsequent movements at the end of the 20th century and in the first decade of the 21st century been examined. It is naïve to say there is little influence. As an example: school attendance is disrupted in many, many cities under conflict. Billions of children and teenagers are affected. They study mathematics. Children and teenagers outside conflict zones are also affected, mainly because of security measures, controls in general societal behavior, all subjected to the permanent impact of television and internet news. There is a generalized fear and mistrust. All this affects the emotional and the imaginary, and, hence, the cognitive capabilities, of students of all ages. Particularly of children and teenagers. They all study mathematics.

We all recognized the enormous dynamics of mathematics education as a discipline in the 1960s and 1970s. Although there are minor hints of the influence of the student unrest in some aspects of the efforts of mathematics educators, I believe a deeper reflection on these matters is necessary, as a lesson for our current behavior as mathematics educators.

How does all this affect mathematics education? Profound changes in the daily life and perturbing threats to the survival of civilization ask for a new look at education, particularly mathematics education. I quote the 1998 interview of Mikhail Gromov in the *Notices of the AMS*:

We must do a better job of educating and communicating ideas. The volume, depth, and structural complexity of the present body of mathematics make it imperative to find new approaches for communicating mathematical discoveries from one domain to another and drastically improving the accessibility of mathematical ideas to nonmathematicians.

We can paraphrase these remarks and say that we drastically open our communication about the big facts affecting our world today, and hence our school practices. I don't know how this affects mathematics education, but I feel it will affect it. The evolution of mathematics and the world scenario are intimately related. Clearly, there are implications of the evolution of mathematics for mathematics education. All the technological advances must be taken into account. Mathematics educators should be concerned with these implications. A good opportunity is to bring developments from the project Mathematics of Planet Earth, into mathematics education.

Maybe the recognition of some form of vagueness in doing mathematics may revitalize the reach of research. It

may be necessary to have another look at formalism and rigor. The same is true for mathematics education. Perhaps something similar to the courageous approach of Louis P. Benezet, later endorsed by Hassler Whitney and Andrew M. Gleason. By the way, I remember the great respect of Hassler Whitney (President of ICMI, 1979-1982) for FLM and the way David Wheeler conceived and edited it.

These issues pose a different challenge to editors of specialized journals. It may be necessary to have a different look at strict peer-review evaluation and to conclusive finalization of papers and to allow for a new style of writing mathematics education. FLM, in the spirit of its founder, David Wheeler, may set the example for this openness, needed and urgent, to make mathematics education a powerful instrument in our fight for the survival of our threatened civilization on Earth.

A subtle journal of sudden enlightenment

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Any journal worth its salt provides and maintains a protected and constrained space, with particular characteristics and values. While the space may not be strictly guarded, it will have guardians: those who keep an eye out for what is taking place, who know about and who care about what has happened there before and what is happening there now, and what may happen there in the future.

Mathematics education suffers acutely from its own version of the forgetful functor, the loss or even deliberate shedding of its past, the important sense that things were not always like this, nor consequently need they be this way in the future. (Textbooks provide one interesting example of this: see Fauvel in FLM 9(1).) This journal comprises an important record of that growing, collective, on-going history, one that remains provocative and protected. To know the past can help to free one from the tyranny of the present. In order to see the future more successfully, a strong sense of the past, as well as a feeling for how things change, can be extremely helpful.

Mathematics education is still a young field, sometimes viewed as too young to have much of a history or to have developed its own internal historians, as opposed simply to those ever-aging elders who have merely lived through it (*pace* the *International Journal for the History of Mathematics Education*). Almost all of those who have ever worked in it are still alive in the memories of the current older generation (including David Wheeler, this journal's founder and long-time first editor). But this will not always be the case and, before too long, many key figures will only be known and knowable through their writing.

One of FLM's characteristics has to do with a profound focus on theme and narrative arc, rather than on method and tradition (and an underlying "study") [1]. This, in conjunction with the moderate length of FLM writing, brought to mind the recent Nobel laureate Alice Munro's short stories.

Here are two comments about her work, comments that reverberate through more than a few of the articles in this journal:

all is based on the epiphanic moment, the sudden enlightenment, the concise, subtle, revelatory detail. (Holcombe, 2008)

Munro's writing creates what amounts almost to an empathetic union among readers, critics most apparent among them. We are drawn to her writing by its verisimilitude—not of mimesis, so-called and much maligned by Heble as "realism"—but rather the feeling of being itself or [...] of just being a human being. (Thacker, 1998, p. 197)

Short stories are not for everyone. In mathematics education, some want more detail, some want more claims, more evidence, more argument. No one really wants more citations, surely. Yet the reference list is sadly the biggest growth area (like an academic hypoxic dead zone). A large list often intimates a defensive nervousness in an author (or a journal) on the one hand and a complete lack of confidence in a taken-as-shared canon of sorts (aware though we both are of the difficulties with this notion) on the other. If there are no books-and-articles-one-can-presume-the-reader-has-read-or-is-at-least-acquainted-with (in the cataloguing vernacular of the opening chapter of Italo Calvino's *If on a Winter's Night a Traveller*), it can result in an unwillingness to *allude*, to gesture, to take-as-read—in case, perhaps, one is taken for a plagiarist or an incompetent.

It does not take too much imagination to conceive of a near future in which all that is published as an article is an alphabetised set of references. But the relentless thud of (name, date) references (to use the telling phrase of past editor, Laurinda Brown) can prove so disruptive to any other sort of rhythm in the writing. It is as if nothing can be permitted to be seen out of the corner of one's eye; everything must be bathed in the often destructive (and blinding) light of full disclosure.

All this citation, of course, relates to indicating what I (as author) purport to know, as well as where and how I position myself in a piece, both in relation to others and to various claims to insight and revelation. But surely there are other, more helpful, ways of doing this besides reference-peppering. In substantial part, FLM articles exhibit a tentativeness that acknowledges this delicate state of affairs. Its authors appreciate, as Munro puts it, "the complexity of things, the things within things" (quoted in Holcombe, 2008). But many articles also exude, at times, a suggestiveness that gestures toward new possibilities. Even if only temporarily, such a tenor can upset current forms of consensus, by refusing to offer certainties and by always remaining open to the way *any* political, didactical or technological decision can create its own blinkers, its own way of promoting one form of awareness over another. With regard to this post-modern predicament, Deleuze's response asserts that all one can do is invent through art. The future of FLM may well lie in its continued commitment to a poetic sensibility, as well as its avowedly "literary" aspirations.

And what of the reader? We believe FLM exhibits a close connection between author and reader, playing a direct role in both educating and incubating new readers *and* writers. For example, we both make extensive use of FLM articles in our