Paths to the Present

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Abstract

Reform may be too strong a word to characterize any developments in mathematics education in the United States from the turn of the twentieth century to the beginning of the third millennium. School mathematics has continually changed (especially in terms of decisions that have been made in response to perceived changes in the school population), but change should not be confused with reform. The basic form of school mathematics remains much like what is was at the end of the nineteenth century. Even substantial attempts to unify the mathematics curriculum in the early 1900s and to modernize it in the 1950s and 1960s yielded only surface, temporary, or localized changes. The rhetoric of reform tends to paper over important differences among reformers, and attempts to implement reform have largely ignored the wider social, political, and economic context. As of 1995, when this article was first published, it was not clear that reformers in the standards movement of the late twentieth century would be any more successful than their forebears.

Key-words: *reform; curriculum; unified mathematics; mathematics education community; new math.; societal pressures; unintended effects.*

Resumo

Reforma pode ser uma palavra muito forte para caracterizar algum desenvolvimento em Educação Matemática nos Estados Unidos, por volta do século XX até o início do terceiro milênio. A matemática escolar tem mudado continuamente (especialmente em termos de decisões que têm sido tomadas em resposta às mudanças observadas na população escolar), mas mudança não pode ser confundida com reforma. A forma básica da matemática escolar persiste como era no final do século XIX. Mesmo tentativas substanciais para unificar o currículo de matemática no início dos anos 1900 e para modernizá-lo nas décadas de 50 e 60 produziram somente mudanças superficiais, temporárias ou localizadas. A retórica de reforma tende a mostrar diferenças importantes entre os reformadores, e tentativas de implementação da reforma ignoraram largamente o contexto social amplo,

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político e econômico. Como em 1995, quando este artigo foi publicado pela primeira vez, não estava claro que os reformadores do movimento padrão do final do século XX teriam mais sucesso que seus antecessores.
Palavras-chave: reforma; currículo; matemática unificada; comunidade de educação matemática; nova matemática; pressões sociais; efeitos inesperados.

> *The number of times the teaching of mathematics has been reformed and the general similarity of view of the reformers are always interesting to student of the history of the subject.*
>
> (Smith 1922, p.297)

As the first two decades of this century drew to a close, mathematics was increasing threatened as a school subject. In the elementary school, arithmetic had already come under pressure to reduce the time spent on it, drop unnecessary topics, and shift the emphasis to problems having social utility (Kilpatrick 1992, pp.13-20). Now the high school mathematics curriculum was in jeopardy. States were steadily decreasing their requirements in algebra and geometry, and enrollments were dropping (Stanic 1986, pp.195-6).

At the winter meeting of the national Education Association (NEA) in Chicago in February 1919, speaker after stepped to podium to deliver sharp criticism of mathematics (Austin 1928). The mathematics teachers at the meeting had no good way to respond. They had no place on the NEA program and no comparable association to serve their interests. Teachers of English had established a national council in 1911, but mathematics teachers had organized only local associations such as the Association of Teachers of Mathematics of the Middle States and Maryland, the New England Association of Mathematics Teachers, and the Central Association of Science and Mathematics Teachers.

When the Chicago Mathematics Club met the following month, the members appointed a committee to correspond with teachers around the country to learn their view on forming a national organization. About 100 secondary mathematics teachers were contacted, and a large majority of the replies favored the idea. At the next meeting of the NEA, in Cleveland in 1920, 127 mathematics teachers from twenty states met to organize the National Council of Teachers of Mathematics (NCTM) (Austin 1928; Osborne Crosswhite 1970, pp.195-6).

A chanching role in reform

The NCTM was born out of adversity. Its first president, C.M. Austin (1921, pp.1-2), acknowledge as much in his report on the establishment of the Council:

> Mathematics courses have been assailed on every hand. So-called educational reformers have tinkered with the courses, and they, not knowing the subject and its values, in many cases have thrown out mathematics altogether or made it entirely elective…To help remedy the existing situation the National Council of teachers of Mathematics was organized.

Although the NCTM steadily grew in membership, acquired a journal (*Mathematics Teacher*), and began to issue recommendations for improving the teaching of mathematics, its influence at national level remained marginal. High school course enrollments continued to decline during the 1930s, and general education reforms associated with social efficiency, behaviorist theories of learning, and progressive education continued to take toll on school mathematics into the 1950s (Osborne and Crosswhite 1970, pp. 213-18; Stanic 1986).

The advent of the so-called new math. reforms of the 1950s and 1960s put school mathematics on the national agenda and encouraged those who wanted better mathematics instruction and more prominent place for mathematics in the curriculum. The reforms, however, were not begun by an organization of the teachers. University mathematicians played the dominant role. The NCTM followed the movement, trying to keep its members informed about developments by inviting the reformers to speak at its meetings and to publish in its journals, pamphlets, and yearbooks.

The immediate stimulus for the new math reforms was the concern among mathematicians, scientists, and policymakers that the national faced a serous shortage of mathematically trained personnel. After some reform efforts were already under way, the Soviet Union launched the first sputnik in 1957. The U.S. government responded by dramatically increasing its support for curriculum development projects and teacher education projects to improve school mathematics (Stanic and Kilpatrick 1992, p. 413):

> At first, the focus of curriculum development was the "college capable" student-the student who would be likely to enter college and who might be persuaded to pursue a scientific career if the school mathematics curriculum were more stimulating, intelligible, and mathematically elegant. During the early 1960s, several projects that had started by revising the secondary school curriculum began to tackle the elementary curriculum as well. Shortly there-after, the federal government launched its War on Poverty, and so-called disadvantaged student became a new focus of curriculum development work…
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> The elementary school proved a much tougher arena for the reformers, and ideas that appeared to work well with enthusiastic teachers and eager students in the high schools near universities often floundered when they were exported to less advantage schools. Critics…began to find a more receptive audience for their complaints that the new math was too abstract, impractical, and confusing. With the public, as well as educators themselves, increasingly convinced that the new math had failed, the wave of reform receded, and "Back to Basis" became the hallmark of textbooks and instructional programs.

In response to the back-basis movement of the 1970s, the National council of supervisors of Mathematics (NCSM 1978) issued a position paper on basis mathematical skills, and NCTM (1980) followed with its *Agenda for Action*. These documents also set the stage for a more elaborate attempt by the NCTM to change curriculum, instruction, and assessment, the three key areas of school mathematics seen as needing reform. In 1989, the NCTM published its *Curriculum and Evaluation Standards for School Mathematics*. That was followed in 1991 by its *Professional Standards for Teaching Mathematics*. Its *Assessment Standards for School Mathematics* is being prepared for publication.

With these standard documents, the NCTM has entered "anew dimension in professional leadership" (Crosswhite 1990). Each document has been widely circulated in draft form and has received reviews and endorsements from a wide range of groups, including groups outside mathematics education. The final publications have been launched with considerable fanfare, accompanied by national press coverage and executive summaries for policymakers (for more

on the process, see Crosswhite 1990, Massell 1993). The few criticisms of the documents have been muted (e.g., Effros 1990; Finn 1993; Palais 1989). Moreover, the NCTM has followed the documents with other activities and publications designed to help teachers understand and implement the Standards. From its early days of being buffeted by others reformers and later trying to keep up with the pack, the NCTM has moved to the forefront of education reform.

The story of recent efforts to reform mathematics education, however, is neither as simple nor as straight forwards as the foregoing sketch might suggest. It is not just a story of the NCTM's changed role. The efforts of the 1980s and 1990s are set within a context of other development in education and in society. Clearly, there are many exciting ideas around. What is not so clear is how school mathematics is changing as a consequence. The remainder of this essay is a personal view of recent efforts as refracted through the lenses of yesterday's lessons and today's contexts of reform.

Lessons of reform

Reform efforts in school mathematics have been marked by splits within and between the groups supporting or opposing the reform. These splits can be seen even in the rationale for establishing the NCTM. In the first issue of the NCTM's newly acquired *Mathematics Teacher*, the following "reasons for the National Council" were listed:

> First, it will at all times keep the interests of mathematics before the educational world. Instead of continual criticism at educational meeting, we intend to present constructive programs, by friends of mathematics. We prefer that curriculum studies and reforms and adjustments come from the teachers of mathematics rather than the educational reformers.
> Second, it will furnishing a medium through which teachers in one part of the country may know what is going on in every other part the country. Significant reports and studies and experiments will be given wide circulation through the official journal. Otherwise they would be known only locally.
> Third, the Council through its journal will furnish medium of expression for all of teachers of country. Thus, a felling of solidarity

> will be aroused. All teachers of mathematics will know that they are members of one family, working together under a common leadership.
> Fourth, the Council will help the progressive teacher to be more progressive. It will also aroused the conservative teacher from his satisfaction and cause him to take a few steps ahead.
> Fifth, the splendid work of the National Committee on National Requirements will be conserved and extended as time and new may show the need.
> Sixth, the Council should receive the support of every teacher of secondary mathematics because it intends to maintain a journal whose editors and writers are real class room teachers. In fact, the teachers themselves are the owners of the journal, if they will but join the Council. (Austin 1921, p.3)

The first and fourth reasons for establishing NCTM are particularly revealing. The organizers were, at one and the same time, leery of "educational reformers" and supportive of "progressive teachers." Given the diversity of suggested reforms inside and outside of mathematics education, these reasons, although not entirely clear, are not necessarily contradictory. It appears as though the NCTM defined progressives as supporters of mathematics and labeled their foes so-called educational reformers.

By the 1920s, after more than two decades of criticisms of the role of mathematics in the school curriculum, it was certainly not easy to define *friend* and *foe*, and it was even more difficult to label particular individuals (apart, perhaps, from unpopular critics such as David Snedden or Franklin Bobbitt) as one or the other. When the report of National Committee on Mathematical Requirements (NCMR) appeared in 1923, it showed the effects on the committee's recommendations of the persistent attacks on mathematics that NCTM President Austin had noted in 1921. The NCMR, formed in 1916 and composed of some of the most vigorous defenders of mathematics, described its main goal as follows (p.23):

> To the end that all pupils in the period of secondary education shall gain early a broad view of the whole field elementary mathematics, and particular in order to insure contact with this important element in secondary education on the part of the very

> large number of pupils who, for one reason or another, drop put of school by the end of the ninth years contain the fundamental notions of arithmetic, of algebra, of intuitive geometry, of numerical trigonometry, and at least an introduction to demonstrative geometry, and that this body of material be required of all secondary pupils.

The proposed curriculum was indeed rigorous, but the concession to the critics was, in the context of the era, clear. The NCMR recognized that the battleground was shifting to the developing junior high school, and it was there that the committee members defended their stand for a reasonably rigorous mathematics program to be required of all students. Those students remaining in school after junior high were dealt with in the committee's discussion of "Elective Courses in Mathematics for Secondary Schools."

Advocates for less required mathematics even came from the community of teachers beings asked to join the NCTM. Data from a survey of 416 secondary school teachers (forty-eight of whom taught mathematics) led Counts (1926) to conclude: "With the exception of the teachers of mathematics, practically all the teachers in these schools feel that their own subjects should be more largely patronized that at present" (p.156). Of the forty-eight mathematics teachers, seventeen thought that more pupils should take mathematics, and eighteen thought that fewer pupils should take mathematics. The evidence, although certainly not overwhelming, suggests that not all the teachers called to join the NCTM wholeheartedly endorsed the cause. The other writings to the NCMR members reveal that their willingness to support less required mathematics (or to require mathematics only in the junior high school) was a grudging concession to more than twenty years to criticism. The teachers in the survey, on the other hand, had little reason to be anything other than completely honest about their beliefs.

The early twentieth century was, therefore, characterized by a complex school reform milieu. A variety of educators (including the forebears of present-day mathematics educators) sociologists, and others outside education were attempting to respond, in general, to changes in society and, in particular, to actual changes in the quantity and perceived changes in the quality of the school population. Ideas

with very different origins and intention began to come together under the general banner of reform. One of those ideas, unified mathematics, is a notable example of how bringing together diverse audiences through a common reform rhetoric can have problematic consequences.

Calls for a unified secondary mathematics curriculum had begun as early as 1890. Almost immediately, the proposals began to take different forms as they encountered opposition both inside and outside the mathematics education community (Sigurdson 1962, pp. 529-40). "The unified mathematics movement was not itself unified; significant differences of opinion existed among those people who calling for mathematics to be organized into correlated, fused, unified, or parallel courses" (Stanic and Kilpatrick 1992, p. 410). Eventually, the unification movement began to focus on the junior high school subject. The student population of high school, in particular, was expanding and changing in response to urbanization, industrialization, and immigration. "A rigorous unified mathematics curriculum for all students became, by the 1930s, the general mathematics taken by those students deemed incapable of doing higher level mathematics" (Stanic and Kilpatrick, p.414).

At least one reason for that change was the approach taken by William David Reeve, a strong advocate of unified mathematics who was disappointed with its limited implication in classrooms. While critics such as H.C, Morrison, David Sneed, and Abraham Flexner were arguing that too much mathematics was required of students given its role in most people's daily lives, Reeve was trying to link his calls for unified mathematics to these broader criticisms.

Where other mathematics educators saw the work of reformers outside mathematics education as "severe criticisms against present practices in mathematics" (Minnick 1916, p.81), Reeve saw an opportunity. Citing a critique by Morrison, he observed:

> No one who reads [it] will feel that he is attempting to discredit the place of mathematics as part of the child's educational equipment. On the other hand, his attitude is friendly and constructive-this, it seems, is one good reason why all mathematics teachers should read what he has say. (Reeve 1916, p.204).

Responding to Flexener's belief that "the course in mathematics should include "nothing for which an affirmative case can not now be made out", Reeve replied, "this is exactly what teachers of mathematics who are really interested in the future are trying to do". (p. 207). Reeve recognized that he was linking a reform movement with its own history in mathematics education with the reform rhetoric of the "outsiders":

> Let it be remembered that theses suggestions…are not given merely in the hope that something may be done to satisfy the cry for reform in the teaching of mathematics (which is in many respects legitimate) but to try to remedy some of the weaknesses of the system of which we were aware long ago, and also to increase the mathematical power of the pupils who go out from our classes so that their knowledge can function most efficiently. (pp. 211-212)

Reeve continued his attempts to use the banner of general school reform to advocate unified mathematics with a keen awareness of his audiences. For example, in 1920 he addressed members of the NCTM on the topic of a "general" mathematics program by saying, "I am not interested in a destructive type of criticism of past methods" (Reeve 1922, p. 381). Speaking to principals and superintends of the Minnesota Educational Association that same year, he gave essentially the same address, but with a different spin. He began with a greater willingness to recognize past criticisms:

> For a long time, mathematicians and others have occasionally denounced our methods of teaching mathematics and usually from their own point of view…A careful study of the recent tirades against mathematics reveals criticisms really aimed a faulty organization and improper methods of teaching the subject matter, rather than a desire to discredit the subject itself. (Reeve, 1920, p. 258)

He went on to associate himself with the reformers'view that the study of mathematics cannot be justified on the basis of tradition alone but must be shown to have an appropriate role in students'live.

Clearly, Reeve was adjusting his message. On the hand, the strategy is not unreasonable. Anyone who wants a message to be accepted must consider the audience. On the other hand, given Reeve's (1920) desire for a program that would lead all students into "much higher and more powerful mathematics without any ultimate loss" (p. 260), his intention does not seem to have meshed well with the reform rhetoric he was willing to use.

Others attempted to adapt their calls for unified mathematics in a similar fashion (see, e.g., Breslich 1916, 1920), but Reeve's role was especially significant given his position as editor of the *Mathematics Teacher* during the 1930s. His editorials announcing the crisis in school mathematics and defending the role of mathematics in the curriculum must have been written with some regret that he had been too quick to accept the language and rhetoric of the critics.

Reeve was far from the last mathematics educator to pick up the banner of school reform as a means of legitimizing proposed changes in school mathematics. The principal recommendation in the agenda for Action (NCTM, 1980) was that "problem solving be the focus of school mathematics" (p. 1). By characterizing problem solving as a basic skill, the authors of the *Agenda* appropriated, reinterpreted, and hoped to turn to their own advantage the language of the back-to-basis reformers. Essentially, the argument was that the *Agenda* authors, too, supported "going back to the basis," as long as everything the NCTM wanted in a mathematics curriculum was defined as a basic skill.

The strategy, however, had its drawbacks. Placing the problem-solving recommendation within the context of the back-to-basics rhetoric both distorted the nature of problem solving as an approach to teaching mathematics and implicitly supported those with a more limited view of school mathematics. In any school subject, but perhaps especially in mathematics, *how* skills are taught is a critical as *which* ones are taught. Students need to see skills not as ends in themselves but as means to other ends. As John Dewey (1910) said, there is "danger in those studies where the main emphasis is upon the acquisition of skill…Practical skill, modes of effective technique, can be intelligently, non-mechanically *used* only when intelligence has played a part in their *acquisition*" (pp. 51-52).

Although the authors of *An agenda for Action* would be likely to agree with Dewey, their call for problem solving to be the focus of school mathematics was undetermined by their willingness to take what might be seen as a general approach to teaching mathematics and reduce it to one of many skills to be learned. There is a price to be paid when slogans are stretched to cover multiple agendas.

A nation at risk

The publication *A Nation at Risk* (National Commission on Excellence in Education 1983), which is usually seen as launching today's reform movement in education, actually appeared after a number of others activities associated with reform inside and outside mathematics education were under way. Inside mathematics education, efforts were being made to update the curriculum, incorporating more application and giving technology a grater role in mathematics instruction (see, e.g., College Board 1983; Conference Board of the Mathematics Sciences 1982; NCSM, 1978; NCTM, 1980; National Science Board Commission on Precollege Education in Mathematics Sciences, Science, and Technology 1982; and National Science Foundation and U.S. Department of Education 1980). Meanwhile, a larger movement to reform education nationwide had begun as well (Finn and Rebarber, 1992, pp. 175-176),

> perhaps with the 1975 revelation by the College Board that average Scholastic Aptitude Test scores had been declining for a decade, with media attention to "illiterate" high school graduates and with the "back to basis" movement that began in the late 1970s.

The test-score decline issue grabbed the public's attention and reinforced the use of test scores as measures of the quality of schools and schooling. The back-to-basis movement, which for many parents and other citizens has never abated, was accompanied by calls that schools (and teachers) be held accountable for the product they were supposed to be turning out – educated students.

The *National at Risk* document, however, was to set many of the terms of the discourse, including the economic competitiveness

arguments to reform and justification of reform in the low performance of students on the international assessments. The tone of *A National at Risk* (p. 5) was strident and certain:

> Our National is at risk. Our once unchallenged preeminence in commerce, industry, science, and technological innovation is being overtaken by competitors throughout the world ...The educational foundations of our society are presently being eroded by a rising tide of mediocrity that threatens our very future as a National and a people.

Today, the report's bleak view of the United States as a potentially second rate world power has given way to more optimistic appraisals. Germany, south Korea, and Japan-Countries cited in the report as threats to U.S. prowess-have been mired in their own economic problems. The Soviet Union, along with the military threat it posed, has disappeared. Though America's "position in the world" is not without its problems, the country's position is secure in ways not anticipated by the report.

Despite these changes, it is much to soon for any effects of the current wave of education reform to have been felt in the economy. Any improvements we see cannot be attributed to changes in education. A *National at Risk* assumed that the educational and the economic systems in a country are so linked that improvement in the former inexorably improves the latter. That assumption has always been questionable. Nonetheless, it was embraced at the time by reformers in various camps, who recognized that more subtle arguments for improving education might no capture public attention. Today's reform rhetoric is still set within a discourse of failure in which American schools are portrayed as having failed in their mission, American teachers as having failed to teach, and American schoolchildren as having failed to learn. The perception that U.S. students are failing to keep ahead in the international race has turned out to be a powerful metaphor for justifying educational reform.

Setting the argument for reform in terms of test scores, however, simply fueled efforts to seek accountability in schools by testing students. State governments, having increased their expenditures on education, were expanding their testing programs

as a means of controlling what schools were doing with those expenditures. With many more testing programs in place, the stage was set for policymakers arguing for reform to present charts comparing average scores of countries, state, and districts, as well as graphs showing fluctuations in scores. The charts and graphs could be used not only to show that the system was failing but to detect any indications of improvement.

The focus on accountability was complicated by various movements within education to restructure schools and to give more autonomy to teachers (Carnegie Task Force on Teaching as Profession 1986; Darling-Hammond 1990; Finn and Rebarber 1992). Teachers were then caught between those reformers calling for more accountability (e.g., greater mandated tests) and those reformers calling for more autonomy (e.g., greater reliance on teacher judgments of student progress). Because many testing programs work at odds with other reform ideas, assessment reform has become a critical battleground.

Within mathematics education, reform was helped along by societal concerns about inequitable access to professions involving mathematics, science, and technology. The theme of "access to knowledge" (Goodlad and Keating 1990) was sounded, and questions were raised anew about the effects of practices such as tracking and ability grouping in mathematics. The content of the mathematics curriculum itself came into question as researchers demonstrated the disparity between school mathematics and the mathematics used in society (e.g., Rogoff and Lave 1984). Some reformers of mathematics education proposed that the subject could be made more relevant to groups traditionally underrepresented in mathematics, and thereby presumably more comprehensible to all, if it were culture-inclusive (Wilson and Mosquera Padron 1994). Other reformers worked on bringing more technology into the mathematics curriculum and into instruction. All the reformers apparently saw a need to turn away from the abstract mathematics that was prominent during the new math era toward a more applied mathematics that emphasized data analysis and mathematical modeling. Finding a balance between abstraction and application, however, is a dilemma the mathematics education community must still resolve.

Rasing standards

Undoubtedly the most adroit move-one that was perhaps also the most problematic-by those who sought reform in school mathematics a decade or so ago was the appropriation of the tern *standards* to describe the proposed changes. The term is irresistible to politicians and the public, who see it as restoring lost qualities to schooling, raising expectations as to what students will learn.

A key recommendation in *A National at Risk* referred to "Standards and Expectations":

> **We recommend** that schools, colleges, and universities adopt more rigorous and measurable standards, and higher expectations, for academic performance and student conduct, and that 4-year colleges and universities raise their requirements for admission. This will help students do their best educationally with challenging materials in environment that learning and authentic accomplishment. (p. 27)

Little in the subsequent prose about implementing the recommendation referred to curriculum or to the process of instruction. The emphasis, instead, was on changes in such indicators as grading practices, admissions requirements, and standardized test scores to show that higher standards and expectations had been met. Textbooks and instructional materials were to be upgraded and updated, but that hardly constitutes reform.

The reformers of school mathematics no doubt wanted to raise expectations, but more than that they wanted to change to content of school mathematics, how it would be taught, and how it would be assessed. The NCTM *Curriculum and Evaluation Standards* (1989) proposed three reasons for groups to adopt a formal set of standards: "(1) to ensure quality, (2) to indicate goals, and (3) to promote change" (p. 2). By using the language of standards, the NCTM could lay out its goals and its hopes for change in a form that would speak to profession about a vision for school mathematics and to the politicians and public about improved learning. Even a cursory reading of the reaction to the NCTM Standards by educators and public, however, suggests that improved performance, shown primarily by higher test scores, is what a standards documents is expected to address.

For those inside the reform community-NCTM members and certain other professionals-the Standards are vision of what could be, a flag to rally around, but clearly not a road map with detailed indicators of progress. For the more diverse community outside comprising the great mass of people teaching creating, or using mathematics, as well as policymakers and public at large, the Standards by their very name must provide benchmarks of quality and means of determining improvement. Once again, this time by appropriating the rhetoric of standards, the leaders of reform in mathematics education have found themselves caught in web of languages.

The Rhetoric of reform

Our contention is that *reform* is too strong a word to characterize developments in mathematics education at any point over the past century. Professional and public discussion of issues in mathematics education ebbs and flows. School mathematics continually changes, but it has yet to achieve a form substantially different from established in the closing year of the last century. Change not be confused with reform. Only two historical moments-the decades at the turn of century, when a more unified, applied curriculum was proposed, and the 1950s and 1960s, when the curriculum was to be modernized-come close to qualifying as times of reform. Yet both yielded only surface changes in school mathematics, having effects quite different from the reformer's intentions (Stanic and Kilpatrick 1992).

What has happened during the past century is that the rhetoric of reform, always inflated to gab attention, has been simplified, made even more dramatic, and brought onto the national stage. Meanwhile, the views and actions of teachers and students of mathematics have remained richly diverse. Reform movements have a kind of enforced unity at the top, but disunity always breaks out below. The accompanying rhetoric tends to paper over that disunity.

In 1920, when the NCTM was founded, the subject of mathematics was endangered in the curriculum. Three-quarters of a century latter, the public school is endangered in the sense of being rejected by the public in favor of various alternatives. Also endangered, sometimes literally, are the people within public schools. The reform

movement in mathematics education underestimates this wider social context while talking advantage of the public's and the policymaker's desires for reform. The rhetoric plays on anxieties about changes in the workforce but ignores student's declining interest in education as a form of advancement and their legitimate concerns about limited employment opportunity. It also assumes a role for teachers that in many cases conflicts with their daily experience. In short, the wider context is recognized superficially as a source of justification for reform but is neglected, often ignored, for its impact on the implementation of reform ideas.

Today's reformers of mathematics education may have learned the lesson to be draw from pervious reform efforts. They almost certainly recognize that true reform has not occurred up to now, and they know that it cannot be brought about simply by preaching-either to the already converted or to those unfamiliar with the substance of the reform. One can argue that today's reformers are better at doing what our forebears consistently, may require doing not something better but something different. Given our own limited perception of a different path to take, we can only applaud the persistence of those pursuing a vision of mathematics education that, although popular, is neither new nor easily implemented.

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