Questions for Practice: Reflecting on Developmental Mathematics Using 19th-Century Voices

By Marcus E. Jorgensen

ABSTRACT: ***In this article the author has used 19th-century arithmetic and algebra textbooks as a way to reflect on current practices in developmental mathematics education. Five areas of special interest were found: motivation, relevance, depth, pedagogy, and textbooks. Philosophic and practical statements from vintage textbook authors remind educators of a number of questions and issues within each of those areas of interest. In some respects, little has changed over the years and many issues remain unresolved or little progress has been made. One hundred years from now will things be the same, or is it time for a change, a rethinking?***

"An event or situation beyond the individual's typical experience must occur if the reflective process is to be triggered."

Many authors of 19th-century arithmetic and algebra textbooks have made profound statements that have remarkable relevance for mathematics instruction today. Listening to their voices has made me question much of what is currently done in the teaching of developmental mathematics. In this article I review the writings of some historic authors, as found in their book introductions, as a way to reflect on current philosophies and methodologies.

Just as a mirror helps one to see their own physical reflection, educational statements from the distant past can be used to help instructors better see their own educational practice. Concerning the concept of reflection in education, Rogers (2001) analyzed a number of theoretical approaches and determined, with regard to antecedents to reflection, that "most authors agreed that an event or situation beyond the individual's typical experience must occur if the reflective process is to be triggered" (p. 42). I propose that the voices of 19th-century textbook authors can provide that reflective trigger by speaking from a different time and a different context, but with an air of familiarity.

In this article I provide a number of quotes from the introductions of textbooks from the 1800s pertaining to various issues that are relevant today. In one respect, relevance is understandable because, after all, math is math and certainly the basics of algebra have not changed much over the years. In fact, at least once a semester I have students work problems directly from these antiquarian books. I want them to make a connection with history and realize that a basic understanding of mathematics is something that, for years, has been considered to be important to what an educated person should know. The contexts of the word problems are sometimes humorous to modern readers, but the problems are remarkably similar to those that students do today. For example, instead of solving for how many hours it will take for two planes to meet, students in the 1800s calculated the number of days it would take for two people walking to meet or the number of hours for a pirate ship to overtake a schooner. But, essentially, the problems are the same.

Areas of Special Interest

In reviewing the philosophical statements from the introductions of several textbooks, I have found five areas of special interest for today's developmental mathematics educators: motivation, relevance, depth, pedagogy, and textbooks. These are important educational concepts in any academic discipline but they have special significance to developmental math instruction. Motivation and relevance are closely related and must be strongly addressed by the developmental instructor, especially in teaching students who are potentially at risk. Pedagogical approaches and selection of textbooks are typically more complicated in developmental math. Classrooms often have a mix of traditional and nontraditional students who all have had some level of math instruction earlier in their educational experience. Many students have developed attitudes and emotions towards math that can inhibit self-confidence and learning. Also important to developmental math instruction is the depth of the students' learning. Going beyond rote memorization of math concepts and skills is important especially because developmental math is preparation for at least one more college-level math course. In addition, the importance of effective instruction is critical, especially given that developmental math courses are must-pass courses for students who may have had previous negative experiences in learning math and are seeking a higher education degree. This is contrasted with the fact that

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developmental math courses often top the list of "graveyard" courses at many institutions. So, can these voices from the dust trigger reflection on important aspects of practice? I explore each area of interest and discuss questions and implications for practice today.

Motivation

Questions. Almost 200 years ago Thomas Dilworth published several editions of an arithmetic textbook entitled, *The Schoolmaster's Assistant*. He included "An essay on the education of youth, humbly offered to the consideration of parents" as a preface. In the 1816 edition of the text, he listed a number of suggestions to assist parents in the education of their children. His very first point is: "A constant attendance at school is one main axis whereon the great wheel of education turns" (p. iv). His next point is:

> But whatever task he [the teacher] imposes on his pupils, *to be done at home* [emphasis added], they should be careful to have it performed in the best manner, in order to keep them out of idleness: "For vacant hours move more heavily, and drag rust and filth along with them; and it is full employment, and a close application to business, that is the only barrier to keep out the Enemy, and save the future man." [He notes that the quote is from Watt's essay but gives no further information on the reference.] (p. iv)

Translation: Go to class and do your homework. I find it interesting that 200 years later I give that same advice to my students, although not as eloquently as Dilworth. I tell my students that the two most important things they can do to be successful in the course are to come to class and to do their homework in a meaningful way. In one sense it is somewhat comforting to know that today's instructors are not alone in dealing with basic motivational issues of keeping students engaged. However, it is a little sobering to realize that in over 200 years the same motivational challenges still exist. The following quote is from over 100 years ago yet it still applies today to far too many students: "Algebra has not always proved to be an interesting subject to the younger classes in our secondary or lower schools; indeed, in very many instances it has been greatly disliked by the students in such institutions" (Milne, 1894, p. 3). Is this human nature, or could it be that a solution that makes learning math meaningful and motivating still evades mathematics educators?

Implications. For most of my students who are not successful in a developmental math class, the reasons may be varied, but I cannot help but think that motivation and other affective factors play a major role. Much of Nolting's book, *Winning at Math* (Nolting, 2008), is devoted to motivation and math-related emotions. The American Mathematical Association of Two-Year Colleges' (AMATYC) *Beyond Crossroads* has noted that "the beliefs and attitudes that students bring with them to the classroom play a major role in how they learn mathematics" (Blair, 2006, p. 23). Many of my unsuccessful students seem to lack the motivation necessary to attend class or to take their homework seriously. Some students even acknowledge their lack of effort. One student, on the last page of her final exam, apologized for her lack of effort in recognition that she would not pass the course. To her credit, she took responsibility, but I think her story is one shared by many.

Some students, on the other hand, have shown strong motivation, particularly nontraditional students for whom education is now of more importance. In talking with a student recently about math test anxiety she commented,

Some students even acknowledge their lack of effort.

"This is why I dropped out of college 20 years ago." The difference was that, years later, she was now motivated to do something about it and, by the way, successfully completed the course. Howard (2008) conducted an interesting qualitative study of developmental mathematics students who eventually became very successful but who previously had not been. Her study supports the idea of the importance of affective factors in learning math.

Why is it that there is continued trouble over the years in motivating students to study math? How much control do educators really have over motivation and other affective factors? Additional research in this area is needed, particularly for developmental math students. Levine-Brown, Bonham, Saxon, and Boylan (2008) review several instruments that can be used to assess affective factors.

Nearly 200 years ago, John Bonneycastle made this statement relating motivation to relevance of the content:

> To raise the curiosity, and to awaken the listless and dormant powers of younger minds, we have only to point out to them a valuable acquisition, and the means of obtaining it; the active principles are immediately put into motion, and the certainty of the conquest is ensured from a determination to conquer. (1825, p. iv)

How is curiosity raised, especially when some students are in survival mode, meaning that they just want to know what to memorize so they can get a passing grade in the course? Do instructors enable that attitude by telling students what to memorize, because there is so much content to cover (Yopp & Rehberger, 2009)? A common test-taking technique that some textbooks and teachers preach is the brain dump. Students are told that as soon as they get their exam, they should write down the memorized formulas at the top or on the back of the exam. What then is the expectation of what they learn for the long term? Is rigor the amount of temporarily memorized algebraic algorithms or should it be something different? Do instructors take the time to raise curiosity or just lecture to the students as the most efficient way to cover the material?

More progress is needed in this area with research specifically targeting developmental math students (e.g., Howard, 2008). Given these students' prior history with math, research with K-12 students or even college-level students may not be generalizable to the developmental math population.

Will future educators be able to cite improvement, or will the same issues related to motivation exist 100 years from now? Bonneycastle, as noted in the previous quote, has said that instructors should "point out to them a valuable acquisition, and the means of obtaining it" (p. iv). How well is the purpose for math requirements in higher education articulated, especially when it is a general education requirement? Apparently, previous generations have also asked the perennial question, "Why do we have to take math?"

Relevance

Questions.

> A parent often inquires, "Why should my son study mathematics? I do not expect him to be a surveyor, an engineer, or an astronomer." Yet, the parent is very desirous that his son should be able to reason correctly, and to exercise, in all his relations in life, the energies of a cultivated and disciplined mind. That is, indeed, of more value that the mere attainment of any branch of knowledge. (Ray, 1848, p. v)

For those students not majoring in mathematics, science, or engineering, why do they take math? What is the relevance? All math teachers have to answer that question, and I suspect that the answer usually has to do with using math every day and that, for those concepts that do not have direct application to someone's everyday life, learning math helps develop general problem-solving and critical-thinking skills. Dudley

(2010), a retired university mathematician, makes a strong point that the vast majority of Americans will never use higher math skills, like algebra, in their lives. He states that the more important reason for learning subjects like algebra is to increase reasoning skills. Here are two other quotes from the first half of the 19th century that concur thru with Dudley's sentiment:

> But, of all the sciences which serve to call forth this spirit of enterprise and inquiry, there are none more eminently useful than Mathematics. By an early attachment to these elegant and sublime studies, we acquire a habit of reasoning, and an elevation of thought, which fixes the mind, and prepares it for every other pursuit…. it is, likewise, equally estimable for its practical utility. (Bonneycastle, 1825, pp. iv-v)

> If the design of studying the mathematics were merely to obtain such a knowledge of the practical parts, as is required for business; it might be sufficient to commit to memory some of the principle rules, and to make the operations familiar, by attending to the examples.… But a higher object is proposed, in the case of those who are acquiring a liberal education. The main design should be to call into exercise, to discipline, and to invigorate the powers of the mind. It is the logic of the mathematics which constitutes their principal value, as a part of a course of collegiate instruction. The time and attention devoted to them, is for the purpose of forming sound reasoners, rather than expert mathematicians. (Day, 1841, pp. iii-iv)

Implications. Are students better problem-solvers as a result of taking math courses? Are they better critical thinkers? Some would disagree (Lemire, 2002) and past research on transfer of skills to other domains has been inconclusive (Atherton, 2007). A search for experimental studies conducted during the last 10 years on the transfer of reasoning skills with a focus on algebra and higher level math at the secondary and postsecondary levels has produced few reports; this is surprising because this topic is so critical to why math is required of so many students. But, if it is assumed that taking a mathematics course increases students' reasoning abilities in general, and it is further assumed that critical thinking is a desired outcome of developmental and general education mathematics courses, then how should that inform pedagogy? I believe that I am a good critical thinker; however, I have never been educated in what constitutes critical thinking, and I suspect that this is the case for most mathematics instructors.

In many cases math is taught with the hope that somehow students pick up some critical thinking skills. Textbooks contain some problem-solving guidelines but little else to develop critical thinking. Several instruments for measuring critical-thinking and reasoning skills are reviewed by Levine-Brown, Bonham, Saxon, and Boylan (2008). There is also some recent evidence that students can be taught critical thinking skills through a math course (Amit, 2010; Sanz de Acedo Lizarraga, Sanz de Acedo Baquedano, Goicoa Mangado, & Cardelle-Elawar, 2009; Benander & Lightner, 2005). Should there be more emphasis on teaching critical thinking? Do faculty need training in the teaching of critical thinking? What is the connection between learning math and becoming as Day (1841) would call "sound reasoners?"

Depth

Questions.

> An attempt has been made to render the science [mathematics] as easily attainable as possible, without prejudice to the main result; not to save the learner the trouble of thinking and reasoning, but to teach him [sic] to think and reason; not merely to supply a series of simple exercises, but to insure a good knowledge of the subject. (Sherwin, 1846, p. vi)

Some students even acknowledge their lack of effort.

What should be the "main result" of teaching mathematics? What constitutes "a good knowledge of the subject?" Sherwin suggests a happy medium between making the material "as easily attainable as possible" but still allowing the students to think and reason while learning math. The extent to which students think and reason is what I refer to as depth. Bloom's taxonomy of cognitive domain objectives is a way to think about depth of learning with deepness increasing as one progresses in order: knowledge, comprehension, application, analysis, synthesis, and evaluation (Bloom, 1977).

Joseph Ray, M.D. (1848) believed that students should be able to do more than just memorize steps to doing problems. He stated, over 150 years ago, "the pupil should not be taught merely to perform a certain routine of exercises mechanically, but to understand the why and the wherefore of every step" (p. v). Bailey (1892) referenced depth of learning with a different perspective. He said that "he who relies upon thousands of special rules" is nothing compared with those "who can apply a score of general principles to millions of particulars" (p. 4).

Implications. What is the underlying philosophy of math education today in terms of depth of learning? Specific math skills deteriorate with time if not used. This is reflected in the time limits that many institutions place on course prerequisites. For example, at some institutions, if a student took beginning algebra, but it was over 2 years ago, it will not count as fulfilling the prerequisite for the intermediate algebra course. The student must retake the placement test or retake the course. This type of rule is an acknowledgement of the fact that if students do not use it, they will lose it. This begs the question then about what expected learning outcomes will endure for students, especially for students in majors where math is primarily a general education requirement. Is content the master over depth? Is the content a mile long and an inch deep? Are students memorizing procedures just to get by? Is more focus needed on outcomes related to mathematical understanding and critical thinking, or even attitudinal outcomes?

The quandary is content versus depth. With more content to cover, teachers often resort to lecture and the students resort to memorization. It has been suggested that content be reduced so that selected concepts could be covered in more depth (Jorgensen, 2005). A common response was that this approach would just "water down the curriculum." However, the suggestion that content be reduced was to actually increase the rigor with depth rather than providing surface coverage of broad content. I suggest that rigor can be thought of as a function of both depth and content. Imagine a graph with the vertical y axis as depth and the horizontal x axis as content. Now picture a plot of a developmental course's content matched up with the depth at which each content element is taught. From my perspective, the area under the curve would represent the rigor. Given this view of rigor, less content does not mean diminished rigor if the learning is deeper.

Maybe there is some room for discussion about appropriate amounts of content. Johnson's (2007) case study of a developmental mathematics program has found that "the vast majority of students in the Intermediate Algebra course will use almost none of what they actually learn in that course in their college level work in mathematics" (p. 287). Alignment of curricula is worth looking at, and maybe there should be different pathways to the different college-level math courses; one size may not fit all. Johnson further states, "It is not sufficient to take the content of developmental mathematics courses 'for grant-

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ed'; it is essential to consider the actual needs of college mathematics students" (p. 288). Depth of learning is as important a need as the content.

AMATYC's *Crossroads* document supports efforts to improve depth of learning: "One of the most widely accepted ideas within the mathematics community is that students should understand mathematics as opposed to thoughtlessly grinding out answers." But, that statement is followed by: "But achieving this goal has been like searching for the Holy Grail" (Cohen, 1995, Chapter 2).

Pedagogy

Questions.

> The best mode, therefore, seems to be, to give examples so simple as to require little or no explanation, and the learner reason for himself [sic], taking care to make them more difficult as he proceeds. This method, besides giving the learner confidence, by making him rely on his own powers, is much more interesting to him, because he seems to himself to be constantly making new discoveries. Indeed, an apt scholar will frequently make original explanations much more simple than would have been given by the author. This mode has also the advantage of exercising the learner in reasoning, instead of making him a listener, while the author reasons before him. (Colburn, 1834, p. 3)

Colburn advocates for an inductive approach that allows students to discover general principles. I often find it tempting to be the sage on the stage and make the students listeners instead of exercising the learner in reasoning. But when I do that am I depriving them of the joy of discovery? Teachers are naturally interested in their discipline of study and may want to tell it all. Maybe students need to be given the chance to have some of the same discovery experiences that the teachers have had when they learned math as students.

Implications. The current primary pedagogy, judged by developmental mathematics textbooks, seems to be as follows: (a) present the principles, rules, and/or steps used in solving some type of problem; (b) show some examples; (c) have the students do some problems on their own in class; and (d) assign practice problems for homework. This more deductive approach has some value, but some of the voices from the past are reminders to think about other options.

One of the issues with an inductive or discovery approach to learning is the degree to which students are allowed to struggle. To a certain degree, mental struggling can be useful to learning, especially for deeper understanding of concepts. However, there may be a fine line between useful struggling and frustration. And, since some developmental math students already have a history of frustration with math, then finding where that line is located becomes critical for an inductive approach.

As an administrator at a community college, I started receiving numerous complaints about a math instructor. This was unusual for this instructor so I asked him what was going on. He explained that he was taking a different approach and letting the students work in groups to figure out problems on their own so that their learning could be deeper than a traditional approach, in his opinion. The students, however, complained that "he is not teaching us." They expected lectures on his part and memorization on their part. Changes to how teaching is approached may require that students are informed about and prepared to change their approach to learning.

> *There may be a fine line between useful struggling and frustration.*

I question the extent to which students are required to memorize for traditional, closed-book exams. Some memorization is critical, such as the multiplication tables, laws of exponents, order of operations, or any mathematical fact or concept that students should be able to do by rote. These are typically frequently applied concepts or operations that are essential to having a fundamental number sense. However, what is the point of memorization beyond these types of skills and concepts? Although this may be heretical to some, consider why students memorize the quadratic formula. If they ever actually had to use it outside of math class they would look it up or use a calculator. Isn't it more important that they know what it is and how it is used? As noted, instructors promote temporary memorization by teaching test-taking skills such as the brain dump. I propose that deeper learning on appropriate concepts could be assessed if students were allowed to use their books or notes during testing; the tests could have more difficult questions. Instead of memorizing a lot of information, students could spend their time learning deeper concepts and use their book, notes, and other information sources as references for solving problems requiring higher level critical thinking.

Schwartz and Jenkins (2007) summarize key findings from the literature on effective developmental education practice. They found that "the most effective developmental teaching strategies in the literature are characterized by dynamic student-and-student and teacher-and-student interactions as well as by efforts that aim to awaken students' innate desire to acquire knowledge" and that "most of these approaches fall within the category of active or student-centered learning, which has been demonstrated to be effective with adult, nontraditional, and developmental students" (p. 7). They note, however, that "most strategies have not been empirically tested to determine their efficacy with large numbers of students over long periods of time" but "informal studies and substantial anecdotal evidence suggest that they can help academically unprepared students achieve" (p. 7). Highlighting the need for more pedagogical research, an extensive search of the developmental education literature by the U.S. Department of Education's Office of Vocational and Adult Education (2005) found only a limited number of studies on adult developmental mathematics, none of which were randomized controlled trial experiments (p. 3). The field needs additional research to evaluate such active approaches with developmental math students.

Textbooks

Questions. When I tell my students that I collect algebra textbooks, sometimes a student will joke by saying, "Do you want mine?" Then I explain that my collection is from the 19th century. When I show them some of the books their first impression is always the convenient size. Most of these books are 5 inches by 8 inches and weigh just ounces. One student recently said that he might actually bring his book to class if it was that size. Today's books are enormous by comparison. I looked at the size of four recent editions of developmental mathematics intermediate algebra textbooks and found that they averaged a staggering 882 pages with shipping weights on Amazon.com that averaged 4.2 pounds. Are these large, expensive textbooks really necessary? Does the additional bulk add much in effectiveness?

I reviewed the introductions from five new intermediate algebra textbooks from three different publishers to identify any information on pedagogical philosophy or any special features that they mention. They were all relatively similar and noted their content sequence, clarity, page design, study helps, and supplemental information (including accompanying software and web site programs). Most touted their use of example exercises. One book stated that "exercises are often the determining factor in how

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valuable a textbook is to a student" (Sullivan & Struve, 2010, p. xii).

Exercises are mentioned as key in the 19th century textbooks as well. E. Bailey (1835) stated that one of the leading principles which he observed in writing his book was "to show the reason of every step, without perplexing the learner with abstruse demonstrations" (pp. 4-5). Later in the century, Milne (1894), lamenting about textbooks, said,

> Two causes, chiefly, have conspired to produce this unfortunate condition of affairs [student dislike of algebra]—one, the unattractive and uninteresting method of presenting the subject; the other, the difficulty of the examples and the complexity of the problems presented to the pupils for solution. (p. 3)

Clear examples at appropriate levels of difficulty have been goals for years. However, are the students being spoon fed by providing too much in the way of examples? Looking at Colburn (1834) again, he states, "The learner is expected to derive most of his knowledge by solving examples himself; therefore care has been taken to make the explanations as few and as brief as is consistent with giving an idea of what is required" (p. 3). His inductive approach calls for the learner to do a little more work at increasingly appropriate levels of difficulty. He even says that giving the student too much may be harmful: "In fact, explanations rather embarrass than aid the learner, because he [sic] is apt to trust too much to them, and neglect to employ his own powers" (p. 3). Day (1841) concurs:

> In the colleges in this country, there is generally put into the hands of a class, a book from which they are expected of themselves to acquire the principles of the science to which they are attending: receiving, however, from their instructor, any additional assistance which may be found necessary. (p. iii)

Are students just searching for example exercises that are exactly like the homework so they can get it done and out of the way without striving for deeper learning? The issue of how much help is truly helpful to a student demands further research.

Modern books advertise the motivating and relevant features of their books. These concerns are echoed in older books as well: "One of the designs of this book is to create in the minds of the pupils a love for the study, which in some way must be secured before success can be attained" (Robinson, 1856, p. iv). I am disappointed, however, in today's attempts to relate math to life. One of the newest textbooks describes its applications as including "a wide variety of real-life applications" (Larson, 2010, p. xii). My experience is that most application problems are not, in fact, "real-life." In this particular textbook, the following problem is given as an example of a real-life application:

> The first generation of the iPhone™ has an approximate volume of 4,968 cubic inches. Its width is 0.46 inch and its face has the dimensions x inches by $x + 2.1$ inches. Find the dimensions of the face in inches. (p.xii)

This example is not real life. No one would ever have to solve that type of problem. The use of iPhone gives the appearance of being a modern application to which students can relate. However, the underlying math is not connected to real life. Here is another example, from a different developmental textbook, of a supposedly real-life application, again featured in the introduction of the textbook as an example of their "new and improved applications" that "include real data and topics which are more relevant and interesting to today's student" (Miller, O'Neill, & Hyde, 2010, p. xi):

> *"Explanations rather embarrass than aid the learner, because he [sic] is apt to trust too much to them."*

> An athlete's average speed on her bike is 14 mph faster than her average speed running. She can bike 31.5 mi in the same time that it takes her to run 10.5 mi. Find her speed running and her speed biking.

Real data I suppose, but not real life in terms of the math involved.

> We insist on the application of every principle, for it is the application that gives life and importance to theory. Who would study the steam engine if it were a mere philosophical toy – if it were not for its utility and mechanical power? We hear much of studying mathematics for the improvement of the mind, and we would not detract in the least from that object; but it is attained in its highest sense only when we combine theory and practice. (Robinson, 1856, p. vi)

Implications. Textbooks are key and they drive curricula and pedagogy. Publishers obviously want to develop effective texts, but I wonder if the profit-motive drives them to produce books that are more attractive and easier for the students and easier for the instructors. There seems to be an unstated understanding that what students need is lots of examples, lots of explanations, lots of help, and plenty of homework problems for drill and practice. However, no research is cited to support this assertion. Easiest may not always be best. Added features can become unnecessary and distracting clutter. I think students would welcome a straightforward, simple presentation with real-life relevance. They might actually bring their books to class.

> Within a few years many new text books on algebra have appeared in different parts of the country, which is a sure index that something is desired–something expected–not yet found. The happy medium between the theoretical and practical mathematics, or, rather the happy blending of the two, which all seem to desire, is most difficult to attain; hence many have failed in their efforts to meet the wants of the public. (Robinson, 1856, p. iv)

One hundred and fifty years later and "not yet found."

Conclusion

What I appreciate most about the vintage textbooks is that the authors typically express their teaching philosophies. This provides a good mirror in which to reflect on current practices. I have noted five areas of interest in reviewing a number of introductions of 19th-century textbooks: motivation, relevance, depth, pedagogy, and textbooks. I have identified a number of issues and questions in each area but few answers. Although there is a need for continued research in each of these areas, it may be more important to look at the overarching system because these topics are all interrelated. In this approach the unit of analysis would be the system, a system built on a strong philosophical foundation. I am encouraged by the recent efforts of the AMATYC Developmental Mathematics Committee to address the system in their New Life Project. Starting with a new mission statement for developmental mathematics, the project's purpose is to develop a "new life vision of developmental mathematics" (AMATYC Developmental Mathematics Committee, n.d.).

The historical perspective given by these voices from the past gives mathematics educators pause to wonder whether or not the curriculum and pedagogy are tied to tradition in which little has changed over the years. Reviewing these vintage books allows instructors to step back and look at the big picture. One hundred years from now will things be the same,

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or is it now time for a change, a rethinking, a resolve to make math relevant and meaningful to students?

> No mathematician thinks of using the clumsy and antiquated processes by which we have been accustomed to teach our pupils in algebra…Why not, then, dismiss forever these processes, and let the pupil enter at once upon those elegant and productive methods of thinking which he [sic] will ever after use? (Olney, 1873, p. iv)

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For Your Information

February

22-24, 2011–Association for the Advancement of Computing in Education's (AACE) online conference, "Global Time, Global Conference on Technology, Innovation, Media & Education." For more information visit www.aace.org/conf/gtime

23-26, 2011–National Association for Developmental Education's (NADE) 35th Annual Conference, "Capitalizing on Developmental Education," at the Marriott Wardman Park Hotel in Washington, DC. For more information see ad, back cover, or visit the website http://nade2011conferencede.com/

March

7, 2011–Society for Information Technology & Teacher Education's 22nd International Conference at the Sheraton Muxic City Hotel in Nashville, TN. For more information visit www.site.aace.org

8, 2011–Call for papers, submission deadline for the Developmental Education Summit at Lake Land College, Mattoon, IL, October 25, 2011. For more information see ad, page 18, or contact jbennett9516@lakeland.cc.il.us or tblaser@lakeland.cc.il.us

20-23, 2011–Teaching Academic Survival Skills' (TASS) 22nd Annual Conference at Embassy Suites Hotel, Fort Lauderdale, FL. For more information visit the website http://www.tassconference.org

31 to April 2, 2011–On Course 6th Annual National Conference, "Festival for Learner-Centered Educators," at the Hilton Long Beach & Executive Meeting Center, Long Beach, California. For more information visit the website http://www.oncourseworkshop.com/conference.htm

April

3-5, 2011–New York College Learning Skills Association's (NYCLSA) 34th Annual Symposium on Developmental Education, "Brain Based Learning: Taking it to the Top," at the Kaatskill Mountain Club in Hunter Mountain, Hunter, NY. For more information visit the website http://www.nyclsa.ort/annual_conf_current.htm

7-8, 2011–Pennsylvania Association of Developmental Educators' (PADE) 2011 conference, "The Many Faces of Developmental Education: Working Together for Success," at the Willow Valley Resort, Lancaster, PA. For more information visit the website http://www.pade-pa.org/conference-info.html

14-15, 2011–Michigan Developmental Education Consortium's (MDEC) 25th Annual Conference, "What Works?" at Macomb Community College, Warren, MI. For more information see ad, page 34, or visit the website http://www.mdec.net/MDEC%20Conference/Index.htm

15, 2011–Call for Proposals Deadline; College Reading & Learning Association's (CRLA) 44th Annual Conference "Hands across the curriculum" in San Diego, California. For more information see ad, page 29, or visit www.crla.net

May

29 to June 1, 2011–NISOD's 32nd Annual International Conference on Teaching & Leadership Excellence, "Putting Teaching and Leading on the Map," at the Hilton Austin in Austin, TX. For more information visit the website http://www.nisod.org/conference/

June

25 to July 22, 2011–Kellogg Institute for the Training & Certification of Developmental Educators at Appalachian State University in Boone, North Carolina. For more information visit www.ncde.appstate.edu/kellogg

October

25, 2011–Developmental Education Summit at Lake Land College, Mattoon, Illinois. For more information visit ad on page 18 or contact jbennett9516@lakeland.cc.il.us or tblaser@lakeland.cc.il.us

November

9-12, 2011–College Reading & Learning Association (CRLA) "Hands across the curriculum" 44th Annual Conference in San Diego, California. For more information visit www.crla.net