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The Process is Just Messy: A Historical Perspective on Adoption of Innovations

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Suppose you were an alien trying to understand how people in the United States feel about the Common Core School Standards for Mathematics (CCSSM). You could look at the Internet, mass media, YouTube and all of the other venues available. Walking away from them, you would be very confused about whether the U.S. loves or hates the CCSSM, whether testing is a part of the standards, whether the standards are a requirement of No Child Left Behind, etc. In this article, I consider the adoption of the CCSSM through a historical lens. The article looks at three previous efforts to change the way students experience learning and how those efforts unfolded. Conclusions discuss those areas most important for ensuring the continued adoption of CCSSM.

Suppose you were an alien who just arrived from a distant planet to study people on Earth. Upon visiting the United States, you learned of this new curriculum called the Common Core[1] (National Governors Association Center for Best Practices [NGA] & Council of Chief State School Officers [CCSSO], 2010). Some media coverage suggests that the Common Core is wonderful. For example, headlines read:

- "Six Reasons Teachers Praise Common Core" (Ridder, 2015),
- "The Common Core is Working in my Classroom" (Baxter, 2014),

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[1] The term "Common Core" is used in the opening of this article because that is how it is known in the media and in society, more generally. Thus, that is the way our alien friend would encounter the standards. The more precise Common Core State Standards for Mathematics is used after the introduction.

- "Six Ways the Common Core is Good for Students" (Long, 2013), and
- "Common Core Drives Improvement Across the Curriculum" (Fincke, 2016).

But, contrasting headlines assert that:

- "The Common Core Makes Simple Math More Complicated" (Nelson, 2014),
- "Florida Lawmaker: Common Core Will Turn 'every one of your children gay'" (Keyes, 2014),
- "The Common Core Costs Billions and Hurts Students" (Ravitch, 2016), and
- "DNC Emails: Common Core a 'Third Rail' to Ignore" (Pullman, 2016).

And, Common Core is apparently also difficult to do:

- "Analysis of Teacher Assessments Indicates Common Core Standards Not Being Implemented" (Gorman, 2015),
- "New Math means Parents Also Head Back to School" (McGonigle, 2016).
- For sure, Common Core is something contentious that people are taking sides on:
- "Jeb Bush Fights Lonely Battle Defending Common Core" (Killough, 2015),
- "Opposition to Common Core Rising" (Hasten, 2014),
- "The Math Wars Wage On: New Study Finds "new math" Unnerving as Ever" (Lloyd, 2016).

As an otherworldly guest, you would likely be confused about how this thing, the Common Core, could be both loved and hated, good and bad, all at the same time. What message do you take back to your planet about education in the U.S.? How do you make sense of the headlines to provide an accurate report of the standards adoption?

I propose that one way to make sense of Common Core adoption is to look backward at other attempts to fundamentally change teaching and learning in the U.S. For the purposes of this discussion, only the Common Core State Standards for School Mathematics (CCSSM; NGA & CCSSO, 2010) will be considered. This paper will explore three well-known attempts to change the way students experienced learning in schools and what those attempts taught us about the adoption of innovations. The paper concludes by identifying the key areas of focus for continued adoption.

Two Curriculum Reforms and a Change in Standards

To help our alien friend make sense of the national discourse on the CCSSM, I will examine the adoption efforts surrounding three curricular innovations in the U.S. These include two curriculum reforms (new math and Man: A Course of Study) and the California math reforms of the 1980s. These efforts were chosen because of parallels between each effort and the current CCSSM. In particular, all of these efforts were significantly political undertakings that aimed to fundamentally change the ways in which students experienced learning in their classrooms. In preparing this paper, I was advised to be careful in comparing textbook changes to standards implementation (W. McCallum, personal communication, November 23, 2014; J. Wilson, personal communication, November 16, 2015). This seems reasonable. After all, standards provide expectations whereas curriculum provides a roadmap for realizing those expectations (W. McCallum, personal communication, November 23, 2014). However, I argue that while there are certainly important differences between curriculum (i.e., textbooks) and standards, the stories of these three large-scale adoption efforts have strong themes in common with each other and with the current debates about the CCSSM that make them interesting as examples. Among other points, they each raise interesting questions about the role of politicians and parents in the adoption effort and they all challenge us to consider what adoption and success mean at different scales.

The New Math

For science and mathematics, the defining event of the 1950s was the launch of Sputnik I and II in 1957, which spurred the United States government to take seriously the need for highly-trained scientists and mathematicians. The perception that the U.S. might be lagging behind the Russians in the space race was unacceptable for security reasons and led American policymakers to create policies that would support and encourage students to pursue science and engineering degrees (Neal, Smith, & McCormick, 2008). In 1961, President Kennedy announced that the U.S. would send a man to the moon by the end of the decade. Suddenly, there was a national pride in pushing forward at least some students' learning of mathematics! These were the early years of the new math.

The two decades following World War II became an era of curriculum reform for the National Science Foundation (Ravitch, 1983) during which over $500 million was invested into science and mathematics curriculum and teacher development (Hoff, 1999). It was also the first time there was a major infusion of federal funding into local schools through the National Defense Education Act (NDEA), which provided widespread funding for a variety of educational initiatives and paved the way for the Elementary and Secondary Education Act (ESEA; Lappan & Wanko, 2003). NDEA funding included college fellowships and K-12 support of mathematics and science learning.

"New math" was the name applied to a set of projects that were similar in intent, though not formally connected to each other. Many were motivated by the Commission on Mathematics' (College Entrance Examination Board, 1959) "nine-point program for college-capable students" (Phillips, 2015), which outlined a vision for school mathematics. The underlying intent of the projects was to introduce students to mathematics as logical structures that students were capable of understanding (Walmsley, 2003). The goal was to base the curriculum on concepts fundamental to mathematics (Bybee, 1997). There was no single new math project and some of the projects actually predated Sputnik and NDEA. Max

Beberman's University of Illinois Committee on School Mathematics in 1951 and Robert Davis' The Madison Project in 1957 were examples of efforts that predated Sputnik while, the School Mathematics Study Group (SMSG) under Edward Begle's guidance began in 1958. Together, there were fifteen main projects across elementary and secondary education comprising new math that began between 1951 and 1961 (Walmsley, 2003). While each project was unique, most relied on discovery-based learning approaches and most were led by mathematicians (Walmsley, 2003). It was an exciting time for the emerging field of mathematics education as mathematicians leading the projects learned about public schools, student learning, and teacher professional development (e.g., Klein, 2003).

However, by 1965, new math was publicly ridiculed in various wide-spread media sources such as Tom Lehrer's (1965/1990) song "New Math," where he repeats the refrain that new math is "so simple that only a child can do it," making fun of the new approaches to mathematics that seemed more convoluted than the traditional approaches. Additionally, the famous book *Why Johnny Can't Add* (Kline, 1974) had been released as a mass-market paperback, further fueling the public dislike of the new approaches to mathematics many adults did not understand because they were different from the way most adults had been taught. Kline's discontent for the new math initiatives was initially limited to communities of mathematicians and curriculum developers until the release of his book, when his opinions were embraced by a more diverse audience (Phillips, 2015). Thus, the book became a major voice in the movement against new math (e.g., Phillips, 2015; Walmsley, 2003; J. Wilson, personal communication, November 16, 2015). In 1965, new math ideas were incorporated in some way into 75% of high schools and 40% of elementary schools in the U.S. (Phillips, 2015). However, new math quickly lost favor. According to Ravitch (1983), the percentage of school districts formally adopting new math textbooks dropped from around 30% in the early 1970s to only 9% by 1976. The reasons for this were many, but key among them were

- parents' ongoing dislike of their children bringing home mathematics that the parents could not understand (Phillips, 2015),
- the difficulty of changing teachers' practices (Kilpatrick, 1997),
- a lack of local and state policies to reinforce the messages of the reforms (Bybee, 1997),
- a lack of professional development and assessments aligned to the new teaching materials (Walmsley, 2003),
- a failure to understand the local nature of education and the need to find ways to adapt intended innovations to fit the systemic realities of each setting (Kilpatrick, 1997), and
- a fundamental disagreement among mathematicians, who were leading several of the efforts, on what mathematics were important and what the nature of that mathematics should be (Kilpatrick, 2004).

Despite their independence from each other, the new math projects' demise was interconnected and largely political (Phillips, 2105). While some claim the new math failed (e.g., Ravitch, 1983; Phillips, 2015); others argue that it paved the way for subsequent mathematics efforts and that we still see remnants of the reform efforts alive today (e.g., Bybee, 1997; Davis, 2003). For example, new math projects influenced in fundamental changes to the textbook industry and to the ways in which we think about the teaching and learning of mathematics (e.g., Walmsley, 2003; J. Wilson, personal communication, November 16, 2015). The new math implementation also informed what we now know about curriculum reform. Many researchers have expressed the same sentiments as Payne (2003):

> From my experience in the 1960s and 1970s, I learned that a major curriculum reform effort requires broad professional and public support, good instructional materials, an enormous amount of teacher education, clear understanding of the goals of the reform on the part of both professionals and the general public, test instruments that

> reflect the curriculum, and continuing dissemination of research results and information on the new curriculum. If a reform effort is missing any one of these conditions, then I think that there will be difficulty with the reform, and if several are missing, the reform is likely to fail. (p. 595)

New Math and the CCSSM

Some notable contrasts and similarities exist between the CCSSM and new math. Most notably, the CCSSM as a set of standards seeks to define expectations for all students while intending for school districts and states to identify the pedagogical implications of those standards (Common Core State Standards Initiative [CCSSI], n.d.). In contrast, new math projects developed classroom materials to support the vision of mathematics learning the developers sought to promote. To help standardize the implementation of the CCSSM, a nationwide effort to create assessments aligned with the standards has been undertaken. These efforts have led to much controversy and many states have opted not to use those assessments (e.g., Evans & Saultz, 2015; Ujifusa, 2015). Conversely, the new math projects provided curriculum materials that were intended to be implemented in classrooms. While the instructional elements of the new math projects were clearly provided within each project, there were no standardized features across new math, which prevented any kind of standardization of assessment to show effectiveness (Kilpatrick, 1997).

Like the new math, the CCSSM implementation has been plagued by uneven preparation of teachers. Different states and districts have provided varying amounts of support to teachers to learn about the CCSSM, which will perpetuate the very inequity the CCSSM was designed to overcome (e.g., CCSSI, n.d.). Supporting CCSSM implementation requires that teachers have access to curricular materials and pedagogical support (e.g., Cohen & Hill, 1998), which are expensive and unfunded as part of the CCSSM roll-out. CCSSM implementation also requires teacher buy-in and ownership that must be fostered as part of the change process (e.g., Geisler, 2009). Richer districts are more likely than poorer ones to be able to support the teachers in ways that help offset the inequity, though all districts will likely be challenged to meet the new standards.

Also, like new math, the implementation of the CCSSM has been hampered by outspoken parents who do not understand their children's mathematics homework (e.g., Goodman, 2015; Nanna, this issue; Smith, 2015). They question why their children are being forced to learn a mathematics that is different than they, themselves, learned. Because we live in times when social media is a dominant form of communication of ideas, the fight has not only been taken to state and local governments and newspapers, as it was in the new math era. This has enabled parents to generate a lot of attention for their struggle with the CCSSM. Social media has also allowed the arguments against federal funding of education to take hold in the CCSSM debate, which harkens back to the political and social activism that arose in the 1950s and 1960s (e.g., Phillips, 2015).

In summary, CCSSM was different in purpose and form from the new math projects. However, both are similar in a few key ways. Highlighted above, we noted that supporting teachers and the differences in their understandings is one key similarity between the two initiatives. Another key similarity is the role of parents in shaping the public discourse about the projects, particularly noting that the same complaint has driven both projects–parents do not understand the mathematics their students are bringing home.

Man: A Course of Study

At the same time new math developers were trying to revolutionize students' experiences in mathematics classrooms, a team led by Jerome Bruner created an innovative, ethnographically-based social studies curriculum called *Man: A Course of Study* (MACOS). MACOS, like new math, took a discipline-based approach to teaching. MACOS relied on driving questions like "what is human about human beings?" to invite student to think about social structures (Dow, 1991;

Ravitch, 1983). The curriculum relied on semi-ethnographic movies, such as a series about the Netsilik Inuit people in the Canadian Arctic (Johnson & Laird, 2004). MACOS was an implementation of a spiral curriculum, designed to allow students to understand progressively more complex materials. Reports on the effectiveness of MACOS indicate that teachers and students viewed it positively (Dow, 1991; Johnson & Laird, 2004). Further, the program materials won several awards (Institute of Education LibGuides, 2015).

Despite its adoption by schools in 47 states (Institute of Education LibGuides, 2015) and the project team's innovative teacher support program (Dow, 1991), MACOS was unable to survive a difficult political climate. Two converging forces worked together to undermine the program and, ultimately, brought the entire curriculum funding efforts of the National Science Foundation under congressional scrutiny (Ravitch, 1983). This scrutiny led to a significant reduction of funding, which caused the final demise not only of MACOS, but also of the remaining new math initiatives. The first force working against MACOS was timing. MACOS was developed during a time when public opinion was turning against federal funding of education (e.g., Dow, 1991; Lappan, 1997). Citizens were distrustful of the federal government's goals and intentions in engaging in such funding. The second force that conspired to undermine widespread adoption of MACOS was a push by parents and religious leaders to stop the implementation of the curriculum they felt was inappropriate for their children (Dow, 1991). There were a number of reasons for their concern, one being the curriculum materials, which they viewed as too sensitive for their children. For example, portions of the video materials portrayed heavy topics such as a practice of leaving elderly Netsilik tribe members out on the ice to die (Johnson & Laird, 2004). In one community after another, parents led the charge against MACOS. Even in cases where they did not have children in MACOS classrooms, parents were able to lobby for their cause to their state and national representatives (e.g., Dow, 1991). Ultimately, this parent-led concern resulted in Senator John Conlan leading the effort to shut down MACOS funding as well as NSF's funding for curriculum and implementation (e.g., Dow, 1991; Johnson & Laird, 2004; National Science Board, n.d.). When funding was lost, the MACOS project could no longer support the 1,700 schools that had implemented the curriculum and MACOS disappeared from the schools quickly.

MACOS and CCSSM

The two parallels that are the most resonant between the CCSSM initiative and the MACOS project are the two elements that led to MACOS' demise: distrust of the federal government and parental outcry. Because CCSSM was not federally-funded,[2] one might surmise that the CCSSM would escape this particular scrutiny. However, some elements of CCSSM implementation were federally-funded. For example, the federal Race to the Top grant program provided points in their scoring rubric to applicants who adopted common standards such as the Common Core (U.S. Department of Education, 2015). Such efforts have raised questions among critics about the role of the government in education (see the headlines above as examples). One specific example of Race to the Top issues is related to assessments. Because CCSSM was initially implemented under the federal No Child Left Behind legislation, which mandated annual assessments for districts receiving particular funds, and because the assessments developed with Race to the Top funds (i.e., Partnership for Assessment for Readiness for College and Careers [PARCC] and Smarter Balanced) were intended to fulfill this requirement, there is an appearance of governmental control over the CCSSM. This raises questions for many who believe that schools should remain under local control. In some states this has led to the Common Core being replaced by locally-developed standards (Banchero, 2014).

Parental outcry is the public face of the CCSSM debate. Blog posts, social media posts, and newspaper articles present

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[2] Discussion of the funding of CCSSM is outside the scope of this article, but it has also raised a number of concerns among critics and proponents alike.

the alleged complexity of the mathematics that is being taught as Common Core (e.g., Beckler, 2015). And, in my opinion, the media seems to be watching and waiting for these opportunities to promote the controversy. In some states, parents seem to be winning. For example, in Indiana, new standards were written and implemented after the legislature voted to remove the old standards. However, that set of standards is largely overlapping with the CCSSM. This is because, at its heart, the CCSSM is the core mathematics that K-12 students need to know. A considerable proportion of the ideas included in the Common Core are commonly agreed upon ideas. In fact, in interviews conducted for a course on the Common Core in fall 2014, my doctoral students spoke to Common Core proponents as well as a member of the mathematics team at the Indiana Department of Education, and all agreed that the bulk of the content in the Common Core is fundamental mathematics for school-aged learners (H. Bass, personal communication, December 5, 2014; J. Confrey, personal communication, December 9, 2014; B. Reed, personal communication, December 5, 2014; W. Schmidt, personal communication, December 8, 2014). Thus, the Common Core has the strength of being recognized as appropriate school-level mathematics, while MACOS was designed as good anthropology without understanding the challenges of implementing it in a school environment (e.g., Dow, 1991). This difference plays out in the complaints of parents, which for the CCSSM, focus on problems with curriculum materials rather than the actual standards.

In summary, the implementations of MACOS and the CCSSM share a general dislike among parents and an undercurrent of governmental distrust. These are mediating factors that could ultimately undermine the CCSSM. However, CCSSM implementation could also learn from MACOS in that the professional development approaches developed by MACOS did allow it to be implemented in a wide array of schools. CCSSM differs from MACOS in one very important way—the materials to be learned in the CCSSM are generally recognized as being fundamental mathematics ideas, whereas in MACOS, the developers were simultaneously challenging peoples' beliefs about the content to be taught as well as the ways in which that content should be taught.

California Math Reforms

The reform that most resembles the CCSSM roll-out for our purposes is the California math reforms of the 1980s and 1990s. These reforms came at the end of a back-to-basics movement that followed the fall of new math (Walmsley, 2005). After a decade of back-to-basic mathematics, *A Nation at Risk* (National Commission on Excellence in Education, 1983) was published. It pointed to weak content being taught, low expectations for students, and problems with teaching (e.g., Ravitch, 2001). The reports sounded alarms about deficiencies in the U.S. education system. The report became a rallying cry for significant changes in education.

California responded to the crisis in education with *The Mathematics Frameworks for California Schools, K-12*, a new set of standards for which all public schools in the state of California would be responsible (Wilson, 2003). Along with the development of the standards, the state limited textbook offerings for schools to those that aligned with the standards (Kilpatrick, 2004) and they developed replacement units aligned with the new frameworks (Cohen & Hill, 1998). The state also implemented an assessment system aligned with the standards, known as the California Learning Assessment System (CLAS; Wilson, 2003). They created an approach to professional development that sought to provide support for all the teachers in the state.

By the time of the California mathematics reforms, the field of mathematics education had matured considerably from the early days of new math. Unlike new math era reforms, the California reforms built from systematic research approaches developed out of those earlier projects. One area of research from which the California reforms benefitted and to which it contributed was the research on professional development that showed engagement in professional development impacted adoption (e.g., Cohen & Hill, 1998; Wilson, 2003). Further, there was an entire issue of *Education Evaluation and Policy*

Analysis dedicated to the case studies of teachers trying to implement the standards. Publications like this issue of *Education Evaluation and Policy Analysis* are notable both because they provide documentation of different stakeholders' perspectives and because this research base provides the field with new understandings of various important aspects of innovative curriculum adoptions, including school reform, teacher learning, and the impacts of assessment on student learning.

Seeming to have learned from the problems that plagued earlier innovations, California put a reform into place that was systemic. It considered all of the pieces and parts of the system in an effort to provide the best opportunities for success. However, the politics of school reform were complicated. The Math Wars (e.g., Jackson, 1997a, 1997b; Schoenfeld, 2004) were starting and the relationship between the state school board and the state superintendent of schools, Bill Honig, conspired to undermine even this robust reform effort (Wilson, 2003). At the heart of the math wars was an argument about the fundamental nature of the mathematics to which students should be exposed. One side favored content-focused mathematics while the other side favored process-oriented mathematics (Schoenfeld, 2004). In shockingly similar ways to the CCSSM implementation, materials were produced for the California math reforms that claimed to be aligned with the standards, but in reality were not. Such materials made it possible for critics to blame the new standards for questionable materials (Schoenfeld, 2004).

Some have argued that while new math was problematic because it focused primarily on mathematical structures and the back-to-basics movement was problematic because it relied only on mastery of calculation (Jackson, 1997b). One might also argue that the standards focused primarily on problem solving (e.g., NCTM, 1989) were also problematic because it takes all three elements—problem solving, structures, and calculation—to understand mathematics.

California Reforms and CCSSM

Modern standards-based reforms stand to learn from the California math reforms. Some of the most salient take-aways related to the CCSSM include the relationship between political players and the perseverance of implementation, the role of assessment, the role of parents and other stakeholders, and the role of teacher development. As with the CCSSM roll-out, the political posturing around the California math reforms overtook all other considerations.

California's experience offers insight into the process of injecting a new assessment system into a reform effort. While it was appropriate to develop and implement assessments aligned with instruction (e.g., Pellegrino, Chudowsky, & Glaser, 2001), leaders of the California math reforms did not consider the those who would feel threatened, confused, or disenfranchised by that implementation (Wilson, 2003). We are seeing similar concerns in the implementation of PARCC and Smarter Balanced for the CCSSM roll-out as evidenced by the rise of opt-out movement (Pizmony-Levy & Saraisky, 2016). Consistent with the California math reforms, CCSSM assessments are complicated and expensive to develop and implement (Scott, 2015). In California, this resulted in the early demise of the assessment system (Wilson, 2003). In the CCSSM implementation, the pattern may be repeating with multiple states moving away from the Race to the Top-funded CCSSM assessments (Wikipedia, n.d.).

The California math reforms demonstrate, again, that the role of stakeholders in any educational intervention is important. Educational efforts in the post-Sputnik era have been characterized by a rise in parental involvement in education. Stakeholder engagement is generally seen as important, but it can also undermine innovations (e.g., Dow, 1991; Wilson, 2003). In California, as with new math, MACOS, and CCSSM, the educational intervention led to students doing schoolwork that looked different from what parents expected. In California, this raised questions about whether the mathematics concepts and skills included in the standards were the correct mathematics. Such questioning allowed experts in a variety of fields to weigh in from various philosophically-grounded positions in regards to the appropriateness of the mathematics mandated by the reform effort. As with the CCSSM roll-out, public opinion shaped the dialogue. Now, more than ever, stakeholders have a considerable voice in what happens because of social media. Perhaps a large-scale public awareness effort could have helped the California reform. Perhaps such an effort could also help the CCSSM roll-out. Even the Gates Foundation, which has spent millions on the CCSSM, now admits that they significantly underestimated the resources needed to support the successful roll-out of the CCSSM (Desmond-Hellmann, 2016).

Finally, while new math and MACOS acknowledged the need for teacher development and took important steps to explore models for large-scale professional development (e.g., Davis, 2003; Dow, 1997), the California reforms took large-scale professional development seriously (Wilson, 2003). They created train-the-trainer opportunities, developed teacher development options, and engaged teachers in a wide array of activities. Despite these efforts, however, there seemed to be little movement in many classroom teachers' practices (e.g., Cohen, 1990; Wilson, 1999). Fast forward to CCSSM where the need for professional development was not central to the roll-out effort. In fact, professional development seems to have been left up to each state, with many teachers receiving almost no development. In my own state, I have been present when our Department of Elementary and Secondary Education has asserted that a good use of teacher professional development funds, in light of the CCSSM, is to buy better assessment preparation systems. This is shocking given the large body of professional development research that has been developed through (e.g., Hill, 2004; Hill & Ball, 2004; Hill, Rowan, & Ball, 2005) and following the California math reforms (e.g., Goldsmith, Doerr, & Lewis, 2014; Heck, Banilower, Weiss, & Rosenberg, 2008; Sleeter, 2014). Instead of looking at models like the statewide effort undertaken in Georgia starting around 2005 to support the implementation of the Georgia Performance Standards (e.g., Geisler, 2009), the policymakers seem to have overlooked this important aspect. Despite all the research community has learned about professional development, that knowledge has not turned into actionable plans for teachers.

Another noteworthy stakeholder concerns common to the California math reforms and the CCSSM is dissatisfaction surrounding curricular materials. Stakeholders seem to judge the standards by the work students bring home. Thus, the materials adopted become the embodiment of the standards for the stakeholders. In California, this led to attempts to severely limited scope of textbooks considered for adoption (e.g., Wilson, 2003), as well as curriculum development by the state. In the CCSSM implementation, videos and blog posts from angry parents blaming the “Common Core” for the mathematics their child’s textbooks are readily available in Internet searches and social media venues. In many cases, the complaints focus on particular representations or algorithms for solving problems other than algorithms traditionally used in U.S. school mathematics (Nanna, this issue). However, it is rare that these approaches have been specified by the CCSSM, which only occasionally requires “standard algorithms” and the use of number lines (NGA & CCSSO, 2010). These materials, however, shape the public opinion of the standards.

To summarize, the California math reforms mirrored the CCSSM roll-out in some important ways and differed in ways that are critical. Similarities included the focus on the development of standards for all students to meet and attention to the mechanisms by which students’ attainment of those standards could be measured. However, the CCSSM roll-out does not appear to have adopted the systemic approach seen in California. This is apparent in the lack of systematic teacher preparation provided in the CCSSM roll-out. Further, the California math wars opened the ongoing dialogue between two camps: one that wants students to develop conceptual understandings and the other that wants students to have fluent skills. The CCSSM itself reflects both of these positions as do the materials that have been developed to support it.

CCSSM

So, now we return to our friend from outer space. What is the alien to make of the CCSSM? Certainly, no one can predict whether the CCSSM will survive in its current form. And, certainly, the debate around it will persist. But, the ideas that are embedded in the CCSSM are the fundamental ideas that students need to know (e.g., J. Confrey, personal communication, December 9, 2014; H. Bass, personal communication, December 5, 2014; B. Schmidt, personal communication, December 8, 2014). Several states that have not adopted or have dropped CCSSM have the standards, featuring the same kinds of mathematics, as the CCSSM (e.g., Achieve, 2014; B. Reed, personal communication, December 5, 2014: Virginia Department of Education, 2011). Furthermore, the Standards for Mathematical Practice are reflected in some way in the standards of several states that do not adhere to the Common Core. This suggests that the CCSSM has, already had a potentially lasting impact. The alien would likely note that this is consistent with the other efforts discussed in this paper—regardless of their "failure" both new math and the California math reforms have continued to impact U.S. approaches the teaching and learning of mathematics in schools.

Perhaps the most important take-away for our intergalactic visitor is the realization that change is messy and that many conflicting headlines can all convey a different aspect of truth simultaneously.[3] We do not know what influence the CCSSM will have on school mathematics, but we can bet that the conversation will continue for years to come. Public education, including the teaching and learning of mathematics, is simultaneously driven by the politicians and owned by the stakeholders. We also know that mistakes have been made in the implementation of the CCSSM that could have been avoided if we had looked backward while moving ahead. The

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[3] All of the headlines are plausible with the exception of the one proclaiming that the Common Core will make children gay. That headline is not factually accurate, though it apparently expresses a strongly-held opinion of a state legislator.

story will continue to unfold and the headlines will continue to appear until "CCSSM" becomes just "math" or until the CCSSM detractors gain more traction. Either way, we can learn from the past projects to anticipate those issues to which mathematics educators need to attend if the CCSSM adoption is to persist. Specifically, mathematics educators will need to consider: (a) ongoing dialogue with stakeholders to help them understand the purpose and content of the CCSSM; (b) ongoing work with textbook developers to ensure that textbooks move closer and closer to the intended CCSSM mathematics; (c) better support of teachers; and (d) ongoing work to make assessment affordable, equitable, and informative.

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