

HOW DO TEACHERS AND DISTRICTS IMPLEMENT STATEWIDE CO-DESIGNED INSTRUCTIONAL FRAMEWORKS?

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We report the findings from our efforts to co-design statewide instructional frameworks to support elementary and middle school mathematics teachers' and leaders' implementation of state standards in ways that align with visions of high quality mathematics instruction. In this paper, we explore whether districts as well as individual teachers took up the instructional frameworks, their reasons for doing so, and the ways they used them to support instruction. Our findings indicate that the instructional frameworks were widely adopted across the state, supported teachers' pacing and sequencing efforts, and provided opportunities for professional learning. However, school/district leaders and classroom teachers had different views on why their district decided to take the frameworks up, indicating a communications divide that needs to be addressed in future co-design efforts.

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The notion of vision has long been researched as an important part of a teacher's ability to enact thoughtfully adaptive teaching (Duffy, 1998). Additionally, a shared vision of high-quality instruction among administrators, teachers, and other stakeholders, is essential for professional development and collaborations to be effective in schools (Birkeland & Feiman-Nemser, 2012; Fulton, et al., 2010) and for the implementation of new programs or policies (Gamoran, et al., 2003). The importance of common vision of mathematics instruction is reflected in Cobb and Jackson's (2011) theory of action for large scale instructional improvement in mathematics, which includes vision of high quality mathematics instruction (VHQMI) underlying a coherent instructional system as one of five key elements. What counts as "high quality" in mathematics education is debatable, but a large body of research suggests that HQMI involves listening to students and building on their representations and strategies to encourage sense making. Teachers who aspire to this vision are often constrained by district policies (e.g., scripted curricula, strict pacing and sequencing) and state mandates (e.g., assessments, standards). Although these conditions have constrained mathematics teachers across the country, we describe a research-practice partnership (RPP; Coburn, et al., 2013) that aims to co-design infrastructures and resources that support North Carolina mathematics teachers to develop and enact common visions of high-quality mathematics instruction (VHQMI). In this paper, we report the findings from our efforts to co-design statewide instructional frameworks to support elementary and middle school mathematics teachers' and leaders' implementation of state standards in ways that align with VHQMI. Specifically, we explore whether districts as well as individual teachers took up the frameworks and why.

Co-designing for Shared VHQMI Through Instructional Frameworks

Research suggests that pacing guides are often viewed as a constraint to enacting visions of practice (Duggan, et al., 2018). They undermine teachers' flexibility to meet individual student needs as district expectations of strict adherence to weekly or daily schedules contribute to the need to "cover everything," often by dropping conceptual-based, student-led activities in favor of

teacher-directed activities (Bauml, 2015). In North Carolina [NC], school districts had each created their own pacing guides to sequence instruction based on statewide standards. Differing levels of capital and expertise among districts resulted in widely varied pacing guides, some co-created by district-wide teams of elementary math specialists and, in other districts, created by K-12 district curriculum leaders with no particular expertise in mathematics education. North Carolina teachers and leaders identified this as a problem of practice that could be leveraged to build towards a more coherent vision across the state. Thus, we convened teams including teachers, instructional coaches, administrators, and curriculum leaders from 19 diverse and representative school districts, higher education faculty from eight universities and state leaders from the NC Department of Public Instruction [NC DPI] to co-design an elementary and a middle school pacing guide that would be grounded in research on learning progressions (Common Core Standards Writing Team, 2013) and could be adapted *statewide*. The co-design teams decided to address their concerns about common VHQMI, and the productive vs. non-productive uses of pacing guides by envisioning a pacing document that goes beyond “what to teach when.” Focused on the idea that curriculum materials can themselves be educational (Drake, et al., 2014; Davis & Krajcik, 2005) the co-design teams set a goal of promoting a shared instructional vision by developing suggested state-wide, grade-level pacing guides, re-named **instructional frameworks** (IFs) to denote their role beyond traditional pacing documents that:

- 1) Emphasize curriculum guidance, not prescriptive pacing,
- 2) Focus on central ideas with links to exemplary curriculum materials, lessons, and instructional strategies,
- 3) Allow for flexibility and unpredictability based on differences in teachers, students, and contexts,
- 4) Address development of student reasoning and how to build upon it (i.e., learning progressions), and
- 5) Are adjusted frequently based on feedback from teachers.

The co-design teams completed first drafts of the IFs in fall 2017, sought feedback through a statewide survey from stakeholders, made revisions and rolled the IFs out in spring 2018. Importantly, the NC DPI adjusted the content of their free, optional interim assessments [Check-Ins] to align with the IFs sequencing and pacing. Like the Check-Ins, districts had the option to use the IFs to guide implementation of the mathematics standards for the 2018-2019 school year. At this time, the elementary and middle school IFs have been available and adapted statewide for three years. In this paper, we share findings related to three research questions:

- RQ1: For districts that adapted the IFs, what did participants think was the reason for uptake?
- RQ2: What aspects of the frameworks did individual teachers report were their favorite?
- RQ3: How did teachers report using the frameworks?

Research Methods

This work is part of an ongoing Design-based Implementation Research (DBIR) state-wide project that is in its seventh year, having partnered with hundreds of NC mathematics educators. In 2019, a survey was distributed through the state agency’s listservs to approximately 20,000 mathematics teachers, school administrators, and district mathematics leaders. Of the 813 educators that responded to the survey, we analyzed only the responses of participants who worked with grades that would potentially use the IFs. These 538 responses represented 74% of the NC school districts. Of the respondents, 60 were School-based Coaches/Curriculum Facilitators, 38 District Curriculum Personnel, 4 Principals/Asst. Principals, and 436 Classroom Teachers. The respondents worked in elementary (320), middle (181), elem/middle (11), middle/high (16), and elem/middle/high school (10) settings. In this report, we analyzed the answers to a block of questions/prompts related to implementation of the IFs:

1. **Question 1:** Did your district use the instructional frameworks?
2. **Prompt 1:** If you know what influenced your district's decision to use the IFs, rank and order the reasons below: match/align to the state quarterly assessments, match the textbook or math program used in my district, align to State resources, match our current sequencing and pacing of instruction, address the development of student reasoning and how to build upon it based upon research, were co-designed by a large number of people, were created with feedback from teachers and leaders, and I do not know.
3. **Question 2:** What are your favorite aspects of the instructional frameworks? (Pick up to 3 choices): [same choices as Prompt 1].
4. **Question 3:** How did you use the IFs (Select all that apply): as a resource among a variety of resources, a resource to supplement a textbook or math program, to determine pacing and/or to sequence instruction, to gain a better understanding of what the standards mean, to gain a better understanding of the mathematics, to understand vertical alignment.

Findings

Of the 75 district leaders, school coaches, and principals/asst. principals who answered question 1, 85% (n=64) reported that their district was using the IFs, 13% (n=10) said they were not using the IFs, and 2% (n=1) said that they did not know. These 75 mathematics leaders represented 53 of 115 districts or roughly 46%. We used responses from district and school leaders only because we believe they have the most accurate knowledge of the district's decisions, whereas a teacher does not always have direct knowledge of their district's intentions. Interestingly, of the 227 classroom teachers who answered this question, 78% of respondents say that their district uses the IFs, 8% say that they do not, and 14% do not know. This suggests some coherency between teachers' and leaders' knowledge of whether the IFs are being used within their districts. The fact that 14% report that they do not know whether their district adapted the IFs or not suggests there may be a communication challenge between districts and teachers. Overall, we are encouraged by the high number of districts that report using the IFs.

Why Did Districts Take Up the Instructional Frameworks?

We separated responses to survey prompt 1, if you know why your district decided to use the IFs, by education role. According to district leaders, school coaches and principals/asst. principals, the top three ranked reasons that districts chose to use the IFs were that they matched the state quarterly assessments, matched the district's textbook/curriculum and incorporated feedback from teachers and leaders. In contrast, classroom teachers reported that their district chose to use the IFs because they matched the textbook/curriculum, matched their district's current pacing guide, and aligned to the State's resources. In this case, teachers and teacher leaders only agree that the district used the IFs because they match the textbook/curriculum of their district. Otherwise, there is little agreement. It is significant to notice that educators who are closer to their district's decision making process, report that assessments were an important part of their decision while classroom teachers ranked assessments in the bottom three reasons they thought their district used the IFs. This finding indicates that there is miscommunication between districts and teachers and suggests infrastructuring as a potential problem to address in working towards shared VHQM.

What Were Individuals' Favorite Aspects of the IFs?

Of the 302 respondents to Question 2, approximately 50% chose *matched the state quarterly assessments* as one of their top three favorite aspects of the IFs. Not far behind was the fact that the IFs *address the development of student reasoning and how to build upon it based on research*

(40%) and that they *match their district's current pacing guide* (36%). Disaggregating the responses by role group (teachers and leaders), there is no difference which suggests regardless of role responsibilities, participants valued the same aspects of the IFs. In particular, the IFs seem to be valued for their intended purpose: suggested pacing of standards. Second, the IFs are valued for aligning standards with the assessments. Surprisingly, the second most valued characteristics of the IFs involved the fact that they are based upon the development of student reasoning and research. Taken together, these findings suggest that educators value the resources for addressing their practical challenges, *assessments and pacing*, and must be attended to in resource design. Further, grounding resources in research was a characteristic that was valued by those who took it up.

How did individuals use the IFs?

Question 3 asked participants to select among a variety of ways that they used the IFs in their classroom instruction or professional work (if leaders). From the 226 responses, the three most prevalent uses of the frameworks were to gain a better understanding of what the standards mean (51%), as a resource among a variety of resources (51%), and to determine pacing and/or to sequence instruction (47%). Less common responses included using the frameworks to gain a better understanding of the mathematics (36%), to understand vertical alignment (31%), and as a resource to supplement a textbook or math program (14%).

Discussion

The goal of this DBIR project was to work towards statewide shared VHQMI by co-designing instructional frameworks to address the shared problem of practice of non-productive uses of pacing guides and the many disparate, district-created pacing guides across the state. The IFs were taken up widely and served their purpose as a guide for sequencing and pacing and also as a tool to promote professional learning. Findings about why and how districts used the IFs and what was most valued about the tool have implications for future co-design. First, perceptions about why districts took up the IFs differed between leaders and teachers, indicating a lack of communication. Continued co-design to promote shared VHQMI needs to support communication across role groups. Second, respondents valued that the IFs addressed the development of student reasoning and how to build upon it based on research, and yet this component was not among the top reasons respondents perceived as a reason districts chose to use the frameworks. In other words, respondents valued that the tool was research-based and focused on student reasoning, but it was not a determiner of uptake in the way that alignment to state assessments was. Thus, the co-design process needs to include negotiating the existing structures within the communities for which tools are being created. Finally, intentionally seeking feedback from all role groups in the system is essential in co-design. In the case of the IFs, getting feedback at multiple levels allowed for attention to the differing needs that were expressed, resulting in high uptake and buy-in, opportunities for learning, and movement toward shared VHQMI. As one respondent noted:

The instructional frameworks could be the beginning of a powerful movement in North Carolina towards Student Centered Mathematics Instruction. The frameworks are so detailed regarding rationale for clusters that it serves to support teacher professional learning. I think that we need so many more professional learning opportunities where teachers from all over the state can come and collaborate and learn from each other.

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