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Understanding Public Sentiment About Educational Reforms: The Next Generation Science Standards on Twitter

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System-wide educational reforms are difficult to implement in the United States, but despite the difficulties, reforms can be successful, particularly when they are associated with broad public support. This study reports on the nature of the public sentiment expressed about a nationwide science education reform effort, the Next Generation Science Standards (NGSS). Through the use of data science techniques to measure the sentiment of posts on Twitter about the NGSS (N = 565,283), we found that public sentiment about the NGSS is positive, with only 11 negative posts for every 100 positive posts. In contrast to findings from past research and public opinion polling on the Common Core State Standards, sentiment about the NGSS has become more positive over time—and was especially positive for teachers. We discuss what this positive sentiment may indicate about the success of the NGSS in light of opposition to the Common Core State Standards.

Keywords: *public sentiment, Next Generation Science Standards, sentiment analysis, educational data science*

SUSTAINABLE, system-wide educational reforms are challenging and uncommon in the United States (Cohen & Mehta, 2017), especially given how educational systems have added—but rarely subtracted—initiatives and responsibilities (Cohen & Hill, 2008). This systemic structure highlights the importance of considering educational reform as a complex process involving multiple stakeholders and levels, including the public (Jacobson et al., 2019). Despite the challenges associated with system-wide and national reforms, they have been and can be successful (Berkeley et al., 2009; Cohen & Mehta, 2017), especially when key conditions are met. Namely, reforms are more likely to succeed if they are more iterative than transformational in nature and recognize or align with the problems teachers face during the development of the necessary infrastructure for the reform (Cohen & Mehta, 2017). In addition, a key factor undergirding successful educational reforms is broad public support (Cohen & Mehta, 2017). Underscoring this point, Cohen and Mehta claim that even if the other key conditions were not present if reform efforts "had broad and deep popular external support, it could succeed" (p. 676). Thus, public support—already having it or deliberately working to bolster it—is a core component of system-wide educational reforms.

In addition to the question of how to develop public support for reforms, another foundational question concerns how to measure it. Public support—as a form of public opinion—can be considered in terms of the valence, or sentiment, of the beliefs people express toward the policy or topic. Hereafter, we use the terms public sentiment and sentiment synonymously to refer to the valence of beliefs about a particular topic—educational reforms. People's beliefs about educational reforms have been studied using self-report (e.g., EducationNext, 2020; Polikoff et al., 2016), as well as observational methods (e.g., Wang & Fikis, 2019) that leverage large collections of *digital trace data*, "detailed records of social interaction" (Welser et al., 2008, p. 116) that result from our behaviors within digital platforms. Such data are often not only *large* in size but are also not only historically available (e.g., it is possible to explore what users posted about in particular historical months and years) but are also generated on an ongoing basis in a way that