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# Extending the Research on 1:1 Technology Integration in Middle Schools: A Call for Using Institutional Theory in Educational Technology Research

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# Extending the Research on 1:1 Technology Integration in Middle Schools: A Call for Using Institutional Theory in Educational Technology Research

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**Abstract**

In this essay, we argue institutional lenses are a vital but largely missing part of understanding how 1:1 technology programs can effect change in teaching and learning in middle schools. Indeed, while current research highlights the positive effects of technology integration efforts, and 1:1 programs in particular have on student learning and engagement, much has focused on the knowledge, skills, and beliefs of individuals or groups of actors. There is less research considering how the institutional context may impact teacher and administrator behavior regarding these and other technology-focused efforts thus limiting our ability to fully support schools and teachers in these efforts. We conclude by calling on researchers to use institutional theory to further understand and support implementation efforts and enhance outcomes for schools, teachers, and students alike.

## INTRODUCTION

In the United States, like so many developed nations, technology is deeply embedded in middle school students' lives outside of school. They connect to their social world through phones, make movies on tablets, and use computers to play video games with others across the world (Downes & Bishop, 2012). And yet, despite these and other myriad experiences with technology out of school, the effective transfer of these experiences to schools, or creation of new ones in schools, continues to be somewhat elusive. Schools and teachers often struggle to build effective, consistent, and meaningful applications of technology to enhance teaching and learning (Herold, 2015; Weston & Bain, 2010). In this way, it seems teachers today may have more difficulty effectively using technology for educational purposes than middle grades students do for personal ones (Lee & Spires, 2009).

While technology programs in schools can take on many forms, 1:1 programs, which provide one device per student, are growing in popularity and prevalence in schools generally (Dexter, Richardson, & Nash, 2016; Sauers & McLeod, 2017) and in the middle grades in particular (e.g., Dunleavy & Heinecke, 2007; Downes & Bishop, 2012). Our interest in 1:1 programs and supporting middle schools to implement them effectively stems in part from one of the author's experiences as a teacher working with the Maine Learning Technology Initiative, the nation's oldest and largest 1:1 program, then in its infancy and later as a middle school technology integrator with the responsibility of launching an iPad 1:1 program. Doing so, the author witnessed the promise and perils of technology integration and the role of organizational and institutional context on implementation effectiveness.

For instance, the way the digital homework policy at the author's middle school was decided and implemented was influenced by the larger institutional norms that emphasized individualism and impacted teachers' implementation in their classrooms. While some teachers were empowered by the policy and found it aligned with their classroom routines and larger accountability policies to which they were held, others felt the homework policy was in direct conflict with their experience of institutional norms. This ambiguity led teachers to question whether and to what degree they should proceed with the digital homework initiative as outlined by the administration. It also revealed to the author that institutional realities (e.g., beliefs, norms, and power structures) matter as much as teachers' and administrators' individual proclivities, knowledge, and skills when engaging in technology integration efforts despite what seemed the inattention paid by the administration to these issues.

Inspired by these experiences, we were drawn to engage in research regarding these and other institutional factors and their impact on technology integration in middle schools. We see such work as critically important to better help schools address the institutional environment and make the most of their often limited resources and ensure implementation fidelity and success (Russell, 2011). Middle schools were also of particular interest in considering questions of how institutional environments impact change efforts as middle schools are both unique and have traditionally been understudied (Hoy & Hannum, 1997). For example, in comparison to other school types, middle schools are more likely to employ teachers who lack age appropriate training due to a gap in teacher preparation and certification (Mertens, Caskey, & Flowers, 2016). Middle schools are also frequently structured differently from one another and other schools within their districts. As such, studies that do not consider these different structures, the beliefs that create and permeate them (i.e., the institutional environment), and their impact on technology efforts, may not fully capture why a given approach succeeded or failed in supporting middle grade students' learning. Indeed, within this very journal, researchers have called for more work employing theoretical frameworks to ground and explain phenomenon in this unique context (Reyes & Netcoh, 2015). We take up this issue directly and argue that using institutional theory to examine middle schools can help us understand the belief structures, rules, and norms that may dictate, constrain, or support actors' behaviors regarding technology integration and its impact on students and their learning.

To make our case, we first briefly review current literature on 1:1 programs at the teacher and leader levels. Next, we discuss how institutional theory can fill important gaps in the research as well as some of its limitations. We conclude by providing a positive path forward for building on existing research on technology in the middle grades.

## What Do We Know About 1:1 Programs in Middle Schools?

### Teachers and Student Achievement

Much of the research on 1:1 programs assesses and explains the ways teachers engage in the work of technology integration within their classrooms. Such studies tend also to focus primarily on student achievement and engagement as outcome measures of interest. Findings from this work are promising and indicate 1:1 programs can enhance achievement across the curriculum (see Harper & Milman, 2016 for a review). Others find 1:1 programs can decrease achievement gaps between socio-economic groups and learning abilities (McClanahan, Williams, Kennedy, & Tate, 2012), and shift the ways students learn by increasing student engagement with the content and demonstrations of their learning (Chou, Block, & Jesness, 2012; Ditzler, Hong, & Strudler, 2016). In middle schools specifically, the findings are similar (Bebell, 2005) and show increases to student achievement (Dunleavy & Heinecke, 2007; Moran, Ferdig, Pearson, Wardrop, & Blomeyer Jr., 2008) as well as promising positive correlations between consistent technology access and use and student test scores (Shapley, Sheehan, Maloney, & Carnikas-Walker, 2010). Researchers have also found that within the middle school environment, using digital technologies in a 1:1 setting can foster more student-centered pedagogies that can minimize the impact of distractions on student learning (Donovan, Green, & Hartley, 2010). Within middle school math classrooms using technology, iPads specifically, can also support students' transition from concrete to abstract thinking (Juhan & Halkias, 2017). Downes and Bishop (2015) find technology integration is a strong fit with the core practices of the middle grades including group activities that build team culture, individualization, choice, and creativity. Within this same study, students also reported that using technology helped them to build stronger organization and efficiency with their work habits (Downes & Bishop, 2012).

In considering the mechanisms that produce these outcomes, the research tends to focus on teacher-level knowledge and behaviors and the specific curricular and pedagogical choices they make when engaging in technology integration efforts. For example, in their work developing their framework and illustrating the need for complex understandings of teacher technological, pedagogical, and content knowledge (TPACK), Mishra and Koehler (2006) highlight how teacher engagement in technology integration can produce new knowledge and uses of that knowledge. Building on this work, others like Hutchison and Reinking (2011) emphasize ideas of curricular integration in which teachers and leaders reexamine pedagogy

to meaningfully embed technology. Studies show teachers, when using technology in a 1:1 setting, innovate (Gulek & Demirtas, 2005; Sauers & McLeod, 2017) and shift from more logistical work and whole class teaching to more individualized instruction (McKnight, O'Malley, Ruzic, Horsley, Franey, & Bassett, 2016) and student-centered learning (Chou et al., 2012). In the middle school setting specifically, teachers reported that the 1:1 programs fostered changes in how they fundamentally understood teaching and learning (Bebell, 2005). Technology may offer teachers ways to engage middle school students' social networks and skills employed outside of school in the classroom (Taranto, Dalbon, & Gaetano, 2011). However, research within the middle school context also emphasizes that pedagogical transitions are only possible with concerted effort and well-designed supports (Ertmer & Ottenbreit-Leftwich, 2013: Peled, Blau, & Grinberg, 2015).

Together then, the research on successful technology integration and effects of 1:1 programs offers useful descriptions and prescriptions of how individual teachers can effectively use technology in their classrooms to enhance student learning and achievement. Such work is critical to design high quality and feasible 1:1 programs in the middle grades. At the same time, however, these studies do not yet seem to explore the institutional environment including the beliefs, norms, and rules that constrain or support implementation efforts in schools. For example, it would be useful to know how and in what ways institutional beliefs (i.e., those which exist within the field of education and teaching as a profession) about technology, teaching, and learning that individual teachers carry impact implementation of 1:1 technology programs. What rules, norms, and routines create and continue to shape the environment in which technology policy is made and enacted? How are those policies then interpreted and enacted by district and school-level workers? Adding institutional theory which examines how structures including norms, rules, and routines come to be in a given field (e.g., education) and then impact behavior, including, in this case, teachers' adoption of new organizational policies and technologies can serve to begin to answer such questions. For example, the institutional norm of autonomy that exists in the teaching profession (see Weiner, 2014 for a review) may have real impacts into not only how teachers come to understand a 1:1 program (e.g., intrusive) but also their willingness to implement it (outside their scope of responsibility). In this way, we might imagine institutional theory adding to our current understandings of how individuals including teachers and administrators interact with their environment to either promote or resist change.

**Leadership and Organizational Culture**

Beyond focusing on teachers and their role in making 1:1 programs successful, researchers have also pointed to the role of school and district leadership in this process. This work gives useful insights about the habits and practices of individual leaders who have successfully implemented large scale technology programs (e.g., Richardson, Sauers, & McLeod, 2015; Schrum & Levin, 2013). For example, work looking at district superintendents' role in technology integration highlights a need for them to be collaborative, set clear expectations, and model and support risk-taking (Hughes, Boklage, & Ok, 2016; Richardson et al., 2015; Schrum & Levin, 2013; Sterrett & Richardson, 2017). Others (e.g., Ertmer & Ottenbreit-Leftwich, 2010) include how leaders can shape organizational norms and study technology integration through the intersection of leadership and school culture. Cho (2017), for example, argues the mission-driven organizational environment of Catholic schools provides unique supports to teachers and students when implementing a 1:1 program, further showing that context matters when planning and implementing technology programs. In the middle school context, Downes and Bishop (2015) argue leaders need to build schedules and organize professional development to allow for collaborative work that integrates curriculum and technology conversations.

Within the study of educational leadership and technology specifically, there has been an emphasis on school leaders promoting distributed or more shared forms of leadership (Dexter, 2011; Hughes et al., 2016) to better position teachers and coaches to create change (McLeod & Richardson, 2011). Additionally, many researchers argue a positive culture for change and achieving successful technology integration is contingent on a strong vision for the purpose and use of technology in schools (Anderson & Dexter, 2005; Dexter, 2011; Levin & Schrum, 2013; Richardson et al., 2015; Sauers, Richardson, & McLeod, 2014). In building and communicating that vision, the inclusion of

diverse stakeholders in making district policies, clear communication of those policies, as well as school level support for those policies are important to the successful implementation of 1:1 technology initiatives (Lamb & Weiner, 2018). Downes and Bishop (2015) also emphasize the need to embrace diverse skill sets both within a school and within a district, especially at the middle school level. They found that embracing the differences in effectiveness of team technology integration may better meet the needs of every student and teacher. The field of technology leadership is growing, and there are calls from the community for more work understanding how leaders can usher in these important and perhaps radical changes in schools (McLeod & Richardson, 2011).

In these ways, this emergent research on technology leadership suggests an appetite for, and interest in, not only what leaders can do to support integration efforts but also to consider how the specific organizational context may play a role in defining these leadership behaviors and supports. This is apparent in the recent MLER SIG Research Agenda (Mertens et al., 2016) which includes questions regarding how teachers' perceptions of technology integration impacts and is impacted by these efforts as well as how technology integration may, over time, shift beliefs regarding pedagogy overall. Though such questions move us towards a more expansive view of local technology implementation, what is still missing, perhaps, is direct investigation into how the larger institutional environment (e.g., education vs. a given school) impacts these individual and organizational attitudes and features. As is true with the work on teachers and technology, much of the current insights in the field are constructed around the individual (e.g., what school leaders do and know) or a specific school or group of schools (e.g., how a given organization should structure itself). This is in contrast to using the institution as the unit of analysis and considering the institutional environment and realities administrators and teachers must negotiate to facilitate change (e.g., how the institutions of education, teaching, technology, etc. and their structures impact organizations and individuals). Therefore, if we want to understand how and why technology is used in middle school classrooms, and whether it is worth our continued collective investment, we need to understand not just the technology, classrooms, and schools in which they sit, but also the unique and long-standing norms and structures in middle schools' institutional environment.

## Institutional Theory as a Tool for Further Understanding

From this short review of the literature, we can conclude that we know quite a bit about (1) the potential positive impact of 1:1 technology initiatives in middle schools, and (2) the knowledge and skills those on the ground need to effectively implement these initiatives. We can also conclude that while strong emergent knowledge exists about some of the organizational features supporting these efforts and how to build them, we do not necessarily know how the institutional environment impacts and intersects with these behaviors and organizational features during implementation. As we have highlighted in this piece, we see institutional theory as a way to address this gap and link the macro-environment of the institutional field in which schools and districts sit and the micro-environments of the classroom (Coburn, 2004) thus extending our collective knowledge base and enhancing implementation efforts.

Institutional theory explores the logics, governance structures, and actors in an institutional field (Scott, 2001). Logics are the beliefs impacting structures and behaviors of individuals and organizations, and they help to set the norms and rules of an institutional environment. Governance structures are the rules and norms that dictate how the institutional environment functions. Actors are the individuals and organizations who carry logics and live the governance structures (Woulfin, 2016). These features stretch across individuals and organizations to explain larger systems at work, and educational policies reflect the logics, governance structures, and actors at work in an institutional field. A more recent development of institutional theory, often called neoinstitutional theory, emphasizes that institutional environments are not static, and actors have the ability to create change to and within those environments (Coburn, 2004; Woulfin, 2016).

Institutional theory is especially useful in studying educational change because it illuminates the shifting beliefs and norms within the institutional field that impact the way actors engage in their work (Russell, 2011). For example, as the field of middle years education

embraces or rejects ideas about how technology impacts teaching and learning, classroom practices may change in response because institutional environments impact classroom practices (Coburn, 2004). An understanding of who carries which beliefs and how they use those beliefs to create policy, routines, and organizational norms will help us to understand how to shift or engage these ideas to foster success. Disrupting events in an institutional field, such as new technology programs, push actors to make decisions and can help researchers to identify the belief systems at play within the field (Meyer & Rowan, 2006) to help practitioners better address them.

Politics and power dynamics also have a strong influence on how actors sculpt their worlds (Meyer & Rowan, 2006) and institutional theory helps us understand these influences. A sense of the impact of politics and power may be particularly useful when considering educational technology as it is often heavily influenced by outside actors such as technology companies, entrepreneurs, and philanthropists (Cuban, 2018: Waters, 2017). Institutional theory helps us understand why certain structures within schools exist and who those structures might benefit (Meyer & Rowan, 2006).

Here it is worth noting that there are some limitations to using institutional theory and our call to do so should in no way be construed as a message diminishing the importance of other approaches. For example, though helpful in uncovering and examining social structures and how they impact organizational behavior and even the behavior of those within organizations; traditionally, institutional theory does not provide insights into the individual motivations that lead people to behave outside prescribed norms, innovate, or change. Moreover, some have argued that institutional theory often lacks (Lok, 2015) or is incapable of having (Willmott, 2015) a critical orientation and often serves solely to illuminate or describe institutional structures rather than to critique how power may operate within them and/or how their structures may be steeped in racism, patriarchy, or other forms of bias. Given the current political context and calls throughout the research community and those studying education (see the 2018 AERA call for proposals as an example) and technology use in schools in particular (see Warschauer, 2014 for a review) to more actively consider and attend to issues of social justice and equity, those wishing to use institutional theory should also consider how they can bring a critical lens to the work.

That said, even with such limitations, when thoughtfully applied, institutional theory can offer researchers interested in issues pertaining to technology integration in the middle grades new and perhaps more expansive ways to think about why and how these efforts succeed or struggle to take hold. Researchers have called for further examination of how the middle school environment impacts technological integration (Downes & Bishop, 2015) and institutional theory may offer a path forward in answering that call. Indeed, there exists strong precedent for the application of institutional theory to understand change phenomenon in schools and some in the middle years in particular. For example, Russell (2011) used institutional theory to examine the logics, or beliefs impacting behavior, of kindergarten education and revealed two competing societal understandings regarding the purpose of teaching our youngest students. This allowed the researchers to identify the media's influence on state policy which in turn influenced individual beliefs and pedagogy. This path of influence provided a model of how educational change at institutional levels impacts behavior. Rigby (2014) too used institutional theory to surface three logics of instructional leadership, offering clarity of language and meaning when studying the work of principals. Woulfin and Weiner (2017) expanded on this research to offer an additional logic of instructional leadership in the context of turnaround schools. Together, these researchers invite us to grapple with the complexities of these logics in the school environment and can serve as a model for how we might consider technology integration within middle schools facing equally complex, if different, institutional environments.

Using another institutional theory, institutional isomorphism (Dimaggio & Powell, 1983) which focuses on why organizations behave similarly over time despite losses to efficiency, the authors looked at the rollout of iPads in the Los Angeles Unified School District in 2013 (Lamb & Weiner, 2018). Doing so, we were able to see how local and national policies, organizational decision-making, communication, and support mechanisms impacted this large-scale technology rollout. This research also clarified how the uncertain institutional environment led to policies and decisions misaligned with, and

ultimately detrimental to, LAUSD's 1:1 technology efforts.

Finally, though still emerging as a commonly adopted framework, institutional theories have occasionally been applied to the middle grades in non-technology contexts, illuminating the ways the middle grades institutional environment is unique and in need of study with these lenses. For example, Cuban (1992) applied institutional isomorphism to the concept and structure of middle schools. He traced junior high schools from their progressive and revolutionary beginnings to their ultimate mirroring of high school structures and purposes. He argued this transition was largely driven by a desire to gain legitimacy and acknowledgement from the public, but ultimately resulted in junior high schools losing their unique purpose. Similarly, Cobb, McClain, Lamberg, and Dean (2003) used institutional lenses of boundary encounters, objects, and brokers to construct and examine the institutional environment impacting middle school mathematics teachers' practices. Using an institutional lens allowed them to see the environment as "dynamic and evolving" (p. 20), and present in both the structures and interactions between individuals. The authors argue these insights then helped them to understand the changes that individuals made to their practice with more complexity and address disconnects more fully and call for others to similarly engage in such work. Similarly, Hoy and Hannum (1997) propose a framework for the organizational health of schools using data entirely from middle schools. This framework includes an examination of how schools interact with their environment, highlighting the importance of understanding the individual students and teachers within a school, its organizational structures, and the institutional field in which it sits.

Taken together, this research shows the value and importance of using institutional lenses to examine the middle school environment as it reveals the way larger beliefs, norms, and routines impact the work of teachers and administrators in profound ways. These examples from both the larger field of educational research and the specific field of middle grades research demonstrate there is both precedence and benefit to using institutional theory to examine educational technologies. Yet, the field is still at the beginning of understanding what institutional theory can reveal about educational change through technology, especially in the middle grades. There is space for much more work to be done to include new and more expansive explanations of the policies and supports one needs to consider and address to enhance the impact of 1:1 technology efforts.

## Where Do We Go from Here?

Shifting now back to the middle years and technology, as research suggests that for technology integration to succeed it often requires teachers and leaders to learn and change (Ertmer & Ottenbreit-Leftwich, 2010), it seems critical that we pay attention to middle schools' institutional contexts if we want to see technology efforts flourish. Moreover, and as discussed earlier, middle schools sit in a unique context of accountability pressures, developmental expectations, policy gaps, and infrastructure, and this context matters in how successfully schools implement large-scale change (Buchanan, 2015; Datnow, Park, & Kennedy-Lewis, 2013; Elmore, 2005). Examining the institutional beliefs, norms, and routines that push and pull, shift and constrain actors within these context is vital to create technology efforts that live up to their promise.

To do so, we need high quality research using institutional theories to better understand the logics, governance structures, and actors impacting these efforts to bring successful technology programs to scale. As a starting point, researchers can begin to shift the unit of analysis from those working in middle schools to middle schools themselves, perhaps conducting cross case analysis of technology intervention efforts in different types of middle schools and the ways the institutional context including school structures, norms, and routines impact middle grade teachers' technology implementations over time. For example, do the different structures of schools serving middle years students (e.g., those working in a 6-8 versus a K-8 school) impact how teachers and leaders engage in technology integration? If so, in what ways? What impact does this structure and the corresponding beliefs and norms have on change initiatives?

The MLER SIG Research Agenda (Mertens et al., 2016) calls for middle grades researchers to investigate teacher perceptions and beliefs about technology and the changing pedagogies that may follow. Institutional theory can offer roads

into these questions by examining these beliefs as rooted in existing logics of educational technology and change. Institutional investigations may reveal the interactions between existing logics and individual understandings that would offer ways to embrace or shift teacher and administrator beliefs that may enhance or inhibit successful implementation of 1:1 technology programs. Similarly, institutional isomorphism may help us to understand how successful programs and innovative practices move to a larger scale influencing whole schools, districts, and states, or fade entirely. Within these contexts, it would also be helpful to consider the ways the political context of the educational technology marketplace and state-level accountability measures impact the institutional field of middle schools. We hope those interested in these issues and technology integration more broadly will begin to take up such questions to help accelerate our already promising paths to ensure that all adolescents experience the best of what technology integration has to offer.

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