Conceptualizing Virtual Instructional Resource Enactment in an Era of Greater Centralization, Specification of Quality Instructional Practices, and Proliferation of Instructional Resources

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This article conceptualizes the enactment of virtual instructional resources. We propose a framework that combines traditional concepts of curricular enactment (e.g., the designated, intended, and enacted curriculum) with concepts more salient to the implementation of virtual instructional resources. More specifically, we develop a model that considers the purpose of virtual instruction resources (core or supplemental), the social organizational contexts (e.g., district administrators, teacher professional communities, individual teachers) that shape the enactment of virtual instruction resources, and the process—from creation to enactment—through which virtual instructional resources impact classrooms. We first offer a brief overview of the greater specification of desirable instructional practices and greater centralization, because it is our assertion that virtual instructional resource enactment can best be understood in the context of other important changes and contexts in education more broadly. Next, we introduce our conceptual model of virtual instructional resource enactment. We then specify the concepts of purpose, social organization, and process and situate these concepts in our model. Third, we explain how purpose, social organization, and process influence different aspects of life in schools, including sensitivity to specific contexts, teacher learning, affordances for search and transfer, opportunities for participation in professional communities, and consistency of implementation. We conclude with a discussion in which we articulate the potential tensions and provide direction for future research.
In the past 20 years, schools have undergone three distinct, but interrelated, changes. First, reformers have devised greater clarity about the characteristics of quality instruction, most particularly in mathematics (e.g., Common Core State Standards Initiative, 2010; National Council of Teachers of Mathematics [NCTM], 2000). Second, through the standards and accountability era that began in the mid-1990s and continues to the present day, schools have become more centrally controlled by state and federal authorities (Cusick, 2014). Third, instructional resources that both claim congruence with reform ideals and promise to help schools with their accountability and performance challenges have proliferated beyond the scope of traditional publishers and medias (Torphy, Hu, Liu, & Chen, 2017).

In this chapter, we use the context established through greater clarity of teaching expectations and greater centralization to understand the third change: rise in the proliferation of nontraditional, virtually available instructional resources. Because research on the proliferation of virtual instructional resources available through a myriad of online providers (e.g., Teachers Pay Teachers, Etsy) is still in its infancy, endeavoring to conduct research in this area is critical for our understanding of teaching in the 21st century. The rise of online instructional resources is likely having an important, but to this point unknown, impact on life in classrooms.

With this in mind, the purpose of this chapter is to conceptualize the enactment of virtual instructional resources. We propose a framework that combines traditional concepts of curricular enactment (e.g., the designated, intended, and enacted curriculum) with concepts more salient to the implementation of virtual instructional resources. More specifically, we develop a model that considers the purpose of virtual instruction resources (core or supplemental), the social organizational contexts (e.g., district administrators, teacher professional communities, individual teachers) that shape the enactment of virtual instruction resources, and the process—from creation to enactment—through which virtual instructional resources impact classrooms.

In what follows, we first offer a brief overview of the greater specification of desirable instructional practices and greater centralization, because it is our assertion that virtual instructional resource enactment can best be understood in the context of other important changes and contexts in education more broadly. Next, we introduce our conceptual model of virtual instructional resource enactment. We then specify the concepts of purpose, social organization of enactment, and process and situate these concepts in our model. Third, we explain how purpose, social organization of enactment, and process influence different aspects of life in schools, including sensitivity to specific contexts, teacher learning, affordances for
search and transfer, opportunities for participation in professional communities, and consistency of implementation. We conclude with a discussion in which we articulate potential tensions and provide direction for future research.

**MAJOR CHANGES AFFECTING THE USE OF VIRTUAL INSTRUCTIONAL RESOURCES**

**GREATER CLARITY OF EXPECTATIONS FOR TEACHING**

The history of education has been marked by spirited debate about what is worth learning and how it should best be taught (Ravitch, 1983). On one side of this debate, for more than 100 years, a vocal carousel of reformers expressed the opinion that teachers should construct their lessons on the foundation of student understanding. Nevertheless, many reform movements came and went. Some teachers embraced new ideas about instruction. Others did not (Cohen, 1998; Cuban, 1993; Cremin, 1990). Early-19th-century reformers lacked both the specificity of ideas and strategies for changing modal instructional practices (Cohen, 1998). However, starting in the mid-1980s, new visions of instruction became embedded in official state policy documents (Cohen & Barnes, 1993; Wilson, 2008). Furthermore, the authors of these documents (e.g., *NCTM Framework*) insisted that instruction should stress conceptual understanding rather than execution of routine procedures or memorization of facts. Similar ideas have come from a variety of sources over the years but became most powerfully distilled in the Common Core State Standards (CCSS).

Concrete ideas about teacher–student interactions have also been explicitly articulated in observation protocols used for teacher evaluation systems (e.g., *Framework for Teaching*; Danielson Group, 2013). These broadly applicable observation frameworks share the expectation that classrooms should feature student construction of understanding through active discussions and engagement in meaningful, cognitively demanding activities.

Greater clarity of expectations for teaching, then, articulate the expectations that teachers will provide cognitively demanding activities for students, probe deeply into student thinking, and use student thinking to modify their instruction. This clarity has found expression in policy documents (e.g., CCSS, teacher evaluation observation protocol) that can press in on teachers through the increased accountability that accompanies greater centralization.
GREATER CENTRALIZATION

In the 19th century, many schools and districts consolidated and became hierarchically structured, bureaucratic systems (Tyack, 1974). Despite this organizational tightening through common structural features (e.g., classroom organization, course descriptions, grading scales), however, classrooms long remained “loosely coupled” from the organizational structure. What actually happened in classrooms was highly variable from one class to the next (Meyer & Rowan, 1977).

In recent decades, a growing consensus about exemplary instructional practices, coupled with a general dissatisfaction with school performance, led to the heightened desire to standardize the “technical core” of schooling. Thanks to collective calls for action, like the National Commission on Excellence in Education’s *A Nation at Risk* (1983), educational matters that were settled by local districts, schools, and teachers through traditional arrangements have now become the purview of central authorities (Boggs, 2014; Henig, 2013; Mehta, 2013). Through the past 35 years, state authorities have developed the political will necessary to activate their formal authority that they have always possessed, but never used, to shape educational policy (Boggs, 2014; Henig, 2013; Mehta, 2013).

This decades-long push for greater standardization and accountability culminated in 2001 with the reauthorization of the Elementary and Secondary Education Act as No Child Left Behind (NCLB). NCLB required states to develop their own content standards in reading/language arts and mathematics, assess students annually against these standards, and hold schools accountable for results (Cohen & Moffitt, 2009). Therefore, standards and accountability went hand-in-hand. Standard expectations for content mastery and standardized assessment to gauge student learning made comparison across schools (and, thus, accountability for results) possible. Later federal initiatives Race to the Top (RTTT) competition and NCLB Waivers intensified the trend toward centralization, as states were pressured to abandon their own state standards and adopt the CCSS—and most states did.

RTTT and NCLB Waivers also shifted the focus from performance of schools to the performance of individual teachers (Cusick, 2014). Each of the initiatives featured the expectation that states would revamp their teacher evaluation laws to hold teachers accountable for teaching in ways embodied in the various observation protocols promising to make reform-style teaching a matter of bureaucratic oversight (Murphy, Hallinger, & Heck, 2013). Thus, NCLB, RTTT, and NCLB Waivers ushered in an era of greater centralization where centralized authorities specified what and how teachers should teach and coupled these expectations with various mechanisms of accountability.
PROLIFERATION OF VIRTUAL INSTRUCTIONAL RESOURCES

The combination of these two forces—accountability expectations of centralized authorities and greater specification of exemplary instructional practices—joined with improved facility for sharing and has intensified the search for promising instructional materials and, consequently, led to the expansion of available virtual instructional resources.

Teachers can now find virtual instructional resources on nearly any topic concerning teaching from websites that organize these resources (Torphy et al., 2017). Torphy and colleagues (2017) termed websites that serve as marketplaces of ideas and associated products “virtual resource pools,” or VRPs. VRPs include websites (e.g., Etsy, Pinterest) that feature products and sharing ideas about a wide variety of topics (including teaching). Other websites are more specific to education (e.g., Teachers Pay Teachers). In some cases, the virtual instructional resources located in VRPs cost money; in other cases, they do not. Regardless of these specific features, VRPs have opened up a new space for teachers and other educators to become content developers and publishers of instructional resources. Emerging evidence suggests that teachers are accessing VRPs with great frequency to locate and download instructional materials to help them with their teaching (Hu, Torphy, Jansen, Opperman, & Lane, in press; Hu, Torphy, & Opperman, 2019, this yearbook; Hu, Torphy, Opperman, Jansen, & Lo, 2018).

The technological developments and educational context that helped stimulate the rise in virtual instructional resources are likely to influence how these resources ultimately impact classrooms. Yet, as they become an increasingly greater part of teachers’ lives, little is known of the role that VRPs and virtual instructional resources are playing in classrooms. Furthermore, we know very little about the likely tensions that surround the enactment of virtual instructional resources and how these tensions are managed.

Thus, we find ourselves with many unanswered questions. First, what purpose do virtual instructional resources serve and in what contexts? Specifically, how are virtual instructional resources integrated into the core curriculum? Second, how is the enactment process socially organized? Is the enactment process primarily controlled by individual teachers, communities of practice, or district administrators? Third, what stages characterize the enactment process? What activities and action characterize each stage?

We can begin to answer these questions (or at least provide a framework for investigation) by borrowing concepts from a recent conceptualization of traditional curricular enactment detailed by Remillard and Heck (2014) and modifying them as needed to help us understand virtual instructional resource use.
UNDERSTANDING THE ENACTMENT OF VIRTUAL INSTRUCTIONAL RESOURCES

A MODEL FOR ENACTMENT OF VIRTUAL INSTRUCTIONAL RESOURCES

An enacted curriculum comprises the classroom activities that support student learning of specified content (Remillard & Heck, 2014). Prior frameworks for curricular enactment have centered on the idea that actors at multiple levels (e.g., federal, state, district, school, classroom) transform the curriculum through interpretation and greater specification as it moves through the system and approaches classrooms (Remillard & Heck, 2014). Remillard and Heck captured the transformation of curriculum with three main concepts: the designated curriculum, the intended curriculum, and the enacted curriculum. The designated curriculum is that which state or district administrators specify will be taught. These expectations can be found in content standards, content pacing guides, assessment schedules, and the like. Teachers craft an intended curriculum from the designated curriculum as they make planned adjustments to fit their particular contexts. Finally, the enacted curriculum is what is actually realized in real time with students. Because a teacher’s plans may be modified in situ, the enacted curriculum is likely to vary from the intended curriculum.

Unlike Remillard and Heck (2014), we are not concerned here with the enactment of all curriculum or curricular materials. Rather, our interest (and thus our model) is restricted to the enactment of virtual instructional resources found in VRPs. Thus, in the following, we provide a conceptual framework for understanding the enactment of virtual instructional resources by combining Remillard and Heck’s ideas about the designated, intended, and enacted curriculum with consideration of (1) the intended purpose of the virtual resource, (2) the social organization through which the virtual resources will be enacted, and (3) a delineation of the process that leads to enactment. Keeping these three concepts—purpose, social organization, process—in mind will allow researchers to investigate important issues, including the virtual resource’s sensitivity to specific contexts, potential for teacher learning, affordances for search and verification, opportunities for participation in a learning community, and consistency of implementation. Our model for the enactment of virtual instructional resources is included in Figure 1.
Figure 1. Conceptual model of virtual instructional resource enactment
THE PURPOSE OF VIRTUAL INSTRUCTIONAL RESOURCES

Purpose is the first important consideration in our model for analyzing virtual instructional resource enactment. We divide intended purpose into two broad categories—core and supplemental. If virtual resources are being used for core purposes, they are the foundational part of the curriculum. In extreme cases, the entire curriculum could be composed of virtual resources assembled by individual teachers, teacher teams, or district administrators. On the other end of the spectrum, school or district administrators could discourage or forbid the use of virtual instructional resources and instead demand that teachers implement the core instructional materials with “fidelity” (i.e., as originally designed without bringing in any supplemental material). Between these two extremes, virtual resources may be used frequently, occasionally, or sparingly to supplement the core instructional program. For instance, teachers might seek resources to help them reteach or remediate a concept or provide students more practice in ways not provided for in the core curriculum. Alternatively, teachers might want to improve an activity in the core curriculum and seek out a virtual instructional resource to help them make content more engaging. Teachers might also use virtual instructional resources to provide for particular student needs as individuals or small groups of students master core curriculum easily and are ready for more advanced content or, conversely, struggle with core content and need remediation.

Our model posits that the purpose of a virtual instructional resource will be shaped by the district’s designated curriculum and the available publisher materials. In instances in which the district designates a curriculum through specification of content tied to publisher-provided resources (as indicated by the solid line in our model), virtual instructional resources are likely to be used for supplementary purposes, if at all. However, when a district’s designated curriculum is vague, weak, or nonexistent, the virtual instructional resource is likely to serve a core purpose. Additionally, when the district-designated curriculum specifies content to be covered but does not link the content to publisher materials (as indicated by the dotted line in our model), the virtual instructional resource is likely to have a core curricular purpose.
SOCIAL ORGANIZATION MODELS OF ENACTMENT: BUREAUCRATIC, PROFESSIONAL COMMUNITY, AND AUTONOMOUS PRACTITIONER

Recent work on enactment of virtual instructional resources found that teachers search for, vet, and curate resources on their own or through informal interactions with colleagues (Hu et al., in press). Although there can be little doubt that teachers enact virtual instructional resources in this way, we propose that the social organization of the enactment process may be more various than previously thought. Specifically, we suggest that enactment of virtual instructional resources is embedded in three social organization models: bureaucratic, professional community, and autonomous professional. As depicted in our model (Figure 1), the searching, vetting, curating, and adapting stages of the enactment process (described more fully later) occur in one of these three social organization models. We contend that the social organization of enactment will govern most of the enactment process (e.g., searching, vetting, curating, adapting).

The social organization models represent competing ideas about teaching. These ideas stem from the fact that teachers have long been organizationally subordinate while simultaneously enjoying broad discretionary powers about what and how to teach (Ingersoll, 2003; Lortie, 1975). Some see teaching as a true profession in which teachers use both their technical and contextual expertise to address challenges as they arise. Other versions of teaching stress that teachers are subordinates in large bureaucracies who will respond to greater specification of expectations, regulation, and rewards/sanctions for results. As argued earlier, centralization has eroded some of the long-standing ideas of teacher professionalism and autonomy through a procession of more specific and demanding policies (Cusick, 2014).

These competing ideas are crucial in understanding the enactment process of virtual instructional resources. For conceptual clarity and analytic purposes, we describe each of these models as “ideal types” while readily acknowledging that in most instances, each type will not be fully realized in practice. Furthermore, there will likely be some crossover among the models. The models might also coexist in the same setting depending on purpose (as represented by the cascading lines in Figure 1). In any event, the social organization that primarily characterizes the enactment process will have a powerful influence on how virtual instructional resources eventually impact classrooms. Table 1 represents which actors (district/state administrators, professional communities, or individual) in each social organization ideal type control the five stages (creating is excluded) from searching to enacting.
Table 1. Overview of the Implementation Process by Social Organization Model

<table>
<thead>
<tr>
<th>Social Organization Model</th>
<th>Searching</th>
<th>Vetting</th>
<th>Curating</th>
<th>Adapting</th>
<th>Enacting</th>
</tr>
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<tbody>
<tr>
<td>Bureaucratic Model</td>
<td>District or State</td>
<td>District or State</td>
<td>District or State</td>
<td>Individual Teacher</td>
<td>Individual Teacher</td>
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<tr>
<td>Professional Community Model</td>
<td>Professional Learning Community</td>
<td>Professional Learning Community</td>
<td>Professional Learning Community</td>
<td>Individual Teacher/Professional Learning Community</td>
<td>Individual Teacher</td>
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<tr>
<td>Autonomous Professional Model</td>
<td>Individual Teacher</td>
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**The Bureaucratic Model**

The bureaucratic social organization of virtual instructional resources is the model of greatest centralization. In this model of enactment, states or districts find, vet, and curate all virtual instructional resources. Districts and states may then monitor the implementation of resources through regulation, evaluation, and accountability (e.g., sanctions for poor implementation). The bureaucratic model reflects the effort of centralized authorities (in this case, district/state administrators) to secure a high degree of coordination and control. They can accomplish this through control of the searching for, vetting of, and curating of virtual instructional resources.

**Teacher Professional Community Model**

Situating the enactment process in teachers’ professional learning communities may provide a middle ground between the bureaucratic and autonomous professional models because professional communities may empower teachers and extend their discretion or serve as a bureaucratic tightening mechanism based on the extent to which team meetings are structured to reflect organizational priorities (e.g., completing compliance/reporting documents, analyzing performance data). In the teacher professional model, the state or district administrators may search for and initially vet resources, but the teacher team is responsible for further vetting and curating centrally identified resources. This model engages the collective professional expertise of the teachers while still maintaining a common set of curricular expectations within a school building.
The Autonomous Professional Model

The autonomous professional model privileges the expertise and discretion of the individual teacher. In this model, the teacher has control over virtually the entire enactment process. The individual teacher searches for, vets, curates, adapts, and enacts the virtual resource. While the autonomous professional model allows for expediency and specificity, it may also result in uneven enactment, as individuals use their own calculus for searching out resources, determining quality, creating collections, adapting, and enacting.

THE ENACTMENT PROCESS OF VIRTUAL INSTRUCTIONAL RESOURCES

We propose a six-stage process of enactment of virtual instructional resources that consists of creating, searching, vetting, curating, adapting, and enacting. Furthermore, as explained earlier, the enactment process of virtual instructional resources is socially organized and can be controlled by individual teachers, professional learning communities, or district/state administrators. The qualities of each stage of the enactment process are described briefly in the following paragraphs. Notably, the stages we have outlined may parallel those of more traditional teacher-created and shared resources. The degree to which these stages are shared by both virtual and traditional instructional resources should be a subject of future research.

Creating and Presenting

Quite obviously, materials have to be created. Creators may include publishers, consultants, district curriculum specialists, bloggers, within-school colleagues, or the teacher herself. Once resources have been created, they must become available to teachers. Resources are presented in a variety of non–mutually exclusive VRPs (i.e., the resource may appear on both Teachers Pay Teachers and Pinterest, for example). They may then been gathered and presented into a secondary forum (e.g., district-maintained resource, Pinterest boards, Google Drive). In this way, the creation of instructional resources is drastically different from 30 years ago, when most resources were likely publisher produced or teacher created and shared within a single school building community.
Searching

After virtual instructional resources become available in VRPs, individual teachers, professional communities, or district administrators will search for them, depending on the social organization of enactment. The characteristics of the search process are of great interest, with the development and the proliferation of available resources from traditional and nontraditional (i.e., virtual instructional resources) sources. Details about the search for virtual instructional resources are beginning to emerge. For instance, Hu et al. (in press) detailed three “curation processes” that subsume three of the stages (searching, vetting, and curating) described in our conceptual model. The first is a “self-directed” curation process. In this case, the teacher recognizes a need that emerges during teaching, and she seeks for a solution in a VRP. Second, “incidental” curation involves teachers who browse a VRP and find a virtual instructional resource solution that they can map onto problems. That is, the teacher finds the solution before the problem. Finally, “socialized curation” occurs when a teacher asks a colleague for advice, and the colleague connects the teacher to a virtual instructional resource or a VRP, or both. In our model, we posit that search is even more diverse and extensive than Hu et al. (in press) suggested. Specifically, Hu et al. (in press) focused on the search of individual teachers (even when aided by colleagues). Our model proposes that search can also involve district administrators or more formal teacher professional communities.

Vetting

Because of the abundance of availability, virtual instructional resources must be vetted in some way. Although the specifics vary by the social organization of enactment, individual teachers, professional communities, or school administrators must discern particularly promising resources from those of less suitability. Standards for vetting can range from the highly formal (e.g., CCSS, Framework for Teaching) to the highly informal (e.g., an individual teacher’s assessment of what is likely to be effective).

Curating

After being vetted, materials are integrated into a collection, a process commonly referred to as curation (Hu et al., in press). During the act of curation, resources are organized into a collection that teachers can draw on to enact the curriculum. Again, curation can be performed by individual teachers, professional learning communities, or district administrators.
Adapting

Typically, successful implementation of reform includes a process of “mutual adaptation” (Berman & McLaughlin, 1978) in which the practitioner (e.g., the teacher) adjusts to the demands of the resource while at the same time modifying the resource to meet local needs. Teachers will adapt available resources in ways that resonate with prior beliefs, knowledge, and habits of practice (Spillane, Reiser, & Reimer, 2002). This process can happen among a group of teachers, such as in a grade-level meeting for the next week’s lesson plan writing. This process can also happen within individual teachers, who have specific demands in their classrooms. Furthermore, as suggested in our conceptual model (Figure 1), adapting may take place twice. District administrators or professional communities may initially adapt a resource, and then the resource can be adapted a second time as teachers envision the resource’s intended use in their classroom.

Enacting

Enactment—the realized interactions among teachers, students, and the resource—is the final stage in our proposed enactment process. Teaching is a social act that must be simultaneously negotiated among teachers and students (Cohen, 2011; Kennedy, 2005). Therefore, classroom contexts will shape teachers’ plans for adapting a resource. Intention will likely differ from actual enactment.

USING PURPOSE, SOCIAL ORGANIZATION, AND PROCESS TO ANALYZE THE ENACTMENT OF VIRTUAL INSTRUCTIONAL RESOURCES

Having laid out our model of virtual instructional resource enactment, we now explore how our three central concepts—purpose, social organization, process—impact virtual instructional resource use and, by extension, life in schools. Specifically, we consider the impact of purpose, social organization, and process on the following: sensitivity to specific contexts; potential for teacher learning; affordances for search and verification; provision for participation in professional communities; and quality and consistency of implementation. At the outset, we note that many of the processes and dilemmas are not new or exclusive to virtual instructional resources. Indeed, the extent to which virtual instructional resources approximate or differ from more traditional resources (e.g., within-building resources, colleague-generated resources, publisher-created resources) is an important topic for future researchers. However, we do suggest that the recent rise in production and use of virtual instructional resources makes the tensions we describe more acute, and the need for improved understanding more pressing.
SENSITIVITY TO SPECIFIC CONTEXTS

Once reformers developed more refined ideas about what they wanted instruction to be like (see the major changes in education section at the beginning of this article), questions remained about how teachers could take up these ideas and enact them successfully in their classrooms. In the most effective enactments of instructional innovations, reforms shape local contexts at the same time that local contexts shape reforms (Berman & McLaughlin, 1978). Teacher change and adaptation of instructional resources, then, is a desirable condition for reform and should be a focus of inquiry for researchers of virtual instructional resources.

As “frontline implementers,” teachers are responsible for providing instruction that helps students achieve mastery of the official curriculum while at the same time responding to demands that emerge from the contexts in which they work, such as the school context and policy requirements (Goldstein, 2008). This dual role has two consequences that affect the use of virtual instructional resources. First, teachers are likely to shape resources in ways that reflect their backgrounds, beliefs, knowledge, and understandings of their situations (i.e., student capabilities and interests, parental expectations, collegial norms, administrator demands). Second, teachers are likely to have needs—both academic and otherwise—specific to their own classrooms, and they will search for material resources that help them meet these needs.

Ball and Cohen (1996) outlined five ways that contexts shape curricular material and reforms, which we argue are also applicable to virtual instructional resources. First, teachers are influenced by their perceptions of the capabilities, commitment, and interests of their students. Second, teachers interpret curricular materials through their previous experience, and this “sensemaking” influences how teachers frame learning activities and present learning tasks to students (see also Coburn, 2001; Spillane et al., 2002). Third, teachers construct lessons from a variety of material resources that they have available to them in their environment. Fourth, teachers must attend to the social dynamics of the class and its norms for participation, discourse, and fulfillment of role obligations by both the teacher and students (see also Kennedy, 2005). Finally, teachers work in complex environments that are shaped by both institutional and community demands. Their work (and therefore their enactment of curriculum) is shaped by parents, principals, and the larger community. This all builds the case that, when implementing instructional resources, context matters.
Purpose

We posit that whatever social organization model is being employed (bureaucratic, professional community, autonomous professional), the demand of creating a core curriculum from virtual resources is likely to influence the shift from specific challenges to the broader goals of the official curriculum imposed externally through articulation of content standards, assessments, and pacing charts. When a teacher is enacting a resource for a supplemental purpose, there is a high likelihood that the teacher has some specific, highly contextualized need in mind (Torry et al., 2017). For example, teachers are likely to search for virtual instructional resources to fulfill supplementary purposes, such as review of specific content, accelerated activities for advanced students, remediation materials for struggling students, a game to energize students when they seem to have lost interest in a topic, and the like (Hu et al., 2019; Opfer, Kaufman, & Thompson, 2016).

Social Organization Model

The social organization model employed to enact virtual instructional resources is likely to have a more important impact on how well virtual instructional resources respond to the demands of particular contexts than either purpose or process. When virtual instructional resources are implemented through the bureaucratic model, they are likely to be least sensitive to the needs that arise in specific classroom contexts. Rather, the bureaucratic model of enactment is likely to reflect the centrally determined needs of students represented in content standards, pacing guides, and standardized assessments. Teacher professional communities can likely respond to school needs better than the bureaucratic model can, but these communities may only partially address the specific challenges that a particular teacher is facing. The autonomous professional model is likely to be most sensitive of all, as teachers search for, vet, curate, adapt, and enact resources to meet highly localized demands.

Process

Sensitivity to local contexts can occur during most stages of the enactment process and will likely vary with the purpose of the resource and the social organization model being employed. For instance, under the bureaucratic model, in which searching, vetting, and curating are centrally controlled, considerations for local contexts are likely to be postponed until the adapting and enacting stages. In this way, teachers are “street-level bureaucrats” who contour organizational resources to meet local demands.
(Goldstein, 2008; Lipsky, 1980). When the enactment process is socially organized in teacher professional communities, sensitivity to local contexts is of moderate concern during search, vetting, and curating before becoming intensely local during adaptation and enactment. Under the autonomous professional model, local demands dominate the process throughout, from search to enactment. Teachers have grassroots agency to map virtual instructional resources to the challenges of their particular classrooms.

POTENTIAL FOR TEACHER LEARNING

Because teachers use their backgrounds, beliefs, knowledge, and understanding of context, they will need opportunities to learn about reform principles if they are to enact new methods of teaching that align with emergent ideas about how teachers and students best interact around content. Without this learning, teachers will likely implement new materials in traditional ways, and the goal of scaling up effective instruction will not be reached (Cohen, 1990; Cohen & Hill, 2001).

Instructional materials (e.g., virtual instructional resources) embedded with reform principles constitute one intriguing option for promoting teacher learning and scaling up instructional reforms because externally developed instructional resources are already a routine element in most schools (Ball & Cohen, 1996; Cuban, 1993). Despite this advantage, however, material resource developers have not taken teachers’ learning needs seriously or addressed the issue of how individuals are likely to interpret and respond to the instructional materials they are given (Ball & Cohen, 1996). Without the explicit provision for teacher learning, teachers are likely to enact new curricular materials in familiar ways regardless of developers’ intentions (Ball, 1990). This problem has likely been exacerbated as virtual instructional resources have increased in availability and use and comingled with traditional publisher-provided print resources in recent years.

Therefore, it is important to consider both formal and informal provisions for teacher learning in the enactment of virtual instructional resources. Formal opportunities are embedded in organizational routines, such as professional development sessions or professional learning community meetings. For example, teachers may discuss a particular counting-by-5 virtual resource pack in their grade-level meeting and then modify and adapt this resource pack into counting-by-2 to meet their curriculum requirements. In this case, teachers learn within their professional community in a formal way.

Informal learning includes the teachers’ attempts to implement instructional resources in ways that are logistically efficient, appealing to
students, and effective at promoting student understanding of academic content (Kennedy, 1999). In other words, teachers learn by doing. In the process of enactment and feedback from students, teachers discover “what works” for them in their particular context. For instance, a teacher may search and download online advanced reading worksheets to satisfy her advanced students’ needs and use this resource repeatedly if she learns from experience that the resource is successfully enacted with her students. Over time, teachers may curate a variety of resources that prove successful in this way. Hence, teachers can learn informally and autonomously. However, in this process, teachers are unlikely to reimagine their instruction or to align it with reform principles of ambitious instruction (if they were not consistent with these principles before). That is, ambitious instruction is unlikely to spontaneously emerge from informal learning.

We argue, then, that informal teacher learning is likely to be necessary but insufficient in promoting reform-congruent enactment of virtual resources. We further suggest that teacher learning is most robust when it includes both formal and informal opportunities. When formal learning complements teachers’ informal experimentation to determine what works, teachers may be able to search, vet, curate, adapt, and enact virtual instructional resources through a experimental utilization cycle, which can ultimately allow teachers’ informal learning to accumulate and be flexible enough to help them reimagine their instruction and align it with reform principles. Over time, teachers may curate a collection of virtual instructional resources that they can enact with greater effect from one use to the next. Therefore, teachers can accumulate their learning through reusing and remodifying those collected virtual resources based on particular context and circumstances.

**Purpose**

The greater the reliance on virtual instructional resources to constitute the core curriculum, the greater the need for accommodations for teacher learning. If, for example, districts provide a single core instructional program and express the expectation that teachers will follow this program closely, learning needs can be approximated and more easily provided. District administrators commonly provide opportunities for teachers to learn about core curricular programs through provision of ongoing professional development workshops. If, on the other hand, the core curriculum is cobbled together from virtual instructional resources, teachers’ learning needs become much more difficult to anticipate and accommodate; providing coherent opportunities to learn about a diffusion of loosely connected resources would be a terrific challenge.
Social Organization Model

The social organization model will also likely affect teachers’ opportunity to learn formally and informally about virtual instructional resources. In the bureaucratic model, providing learning opportunities typically comes by way of formal professional development sessions that are the responsibility of district administration. As mentioned earlier, formal opportunities to learn are easiest to provide when virtual instructional resources are used for supplemental rather than core purposes. The reliance on a multitude of virtual instructional resources to constitute an entire instructional program would easily overwhelm a district’s capacity to provide formal opportunities to learn. The professional community organization model is an intuitively appealing method for teacher learning; teachers can learn about instruction through interaction with colleagues and sharing information about specific virtual instructional resources, and these meetings may also serve as a forum for the mutual questioning of traditional or ineffective practices (Lord, 1994). However, evidence suggests that teacher interactions in group settings tend to focus on external expectations and demands (particularly in this era of greater centralization) and, thus, to neglect consideration of instructional materials and matters of teaching and learning (Coburn, 2001).

Furthermore, teacher teams might abandon the careful consideration of particular virtual instructional resources when they feel the pressure to “get things done” (Little, 2003), especially when they are using virtual instructional resources for core (rather than supplemental) purposes. Finally, in the autonomous professional model, teachers learn in the context of their own classrooms from their experiences enacting particular resources. Teachers can and do learn from these experiences, but in the process of determining what is suitable for their purposes and seems to “work” for their students, they are likely to enact resources in traditional ways that reflect their typical, and most likely traditional, practice.

Process

One of the questions that will determine the use of virtual instructional resources is where, if at all, teacher learning will be situated in the implementation process. There is no natural placement for formal teacher learning, and it is not built directly into the enactment process that we have outlined. Because we know that teacher learning is important in the enactment of curricular resources, however, it is important to ask where in the enactment process of virtual instructional resources formal learning will be situated. It is also important to consider how formal and informal learning will be secured and how these two forms of learning can occur simultaneously to promote the scaling up of ambitious instructional practices.
AFFORDANCES FOR SEARCH, TRANSFER, AND VERIFICATION

Searching for and transferring important resources is a key challenge that any organization faces. Although the full integration of effective resources enhances productivity and improves organizational responses to uncertain environments and other challenges, search and transfer are not without associated costs (Hansen, 1999; Szulanski, 1996). Searching for and transferring resources can be an arduous task that increases the workload for both the resource provider and the recipient. This is particularly true when the information embedded in resources is “sticky”—that is, difficult to transfer because it deals with nonroutine problems that are not well understood (Szulanski, 1996).

Szulanski (1996) proposed four origins of internal stickiness. The first has to do with the knowledge embedded in the resource. When knowledge is unproven, or, more important, the causal link between behavior and outcomes is uncertain (i.e., causal ambiguity), the knowledge is less likely or more difficult to transfer, respectively.

The characteristics of the resource provider are the second factor making transfer of knowledge difficult. The knowledge source (i.e., help provider) may be reluctant or unable to provide help because she has a monopoly on knowledge that affords certain organizational benefits or because she is unable to communicate knowledge effectively. Furthermore, the recipient may not perceive the resource provider as being reliable, and this perception might cause the recipient to ignore the provider’s advice.

Third, the recipient herself might lack the motivation or the capacity to learn, or both. Finally, the organization might inhibit knowledge transfer when the climate is acrimonious or when, for whatever reason, there are few substantive interactions among people. In other cases, the transfer of knowledge might require an interpersonal burden between the provider and the recipient that simply outstrips what either party is capable of dedicating to the endeavor.

Each of the four challenges in search and transfer of new resources and ideas is acute in education in general, and for virtual instructional resources in particular. The “core technology” that firmly establishes the causal link between teachers’ instructional practices and students’ learning remains modest (Cusick, 2014; Kennedy, 2016; Lortie, 1975). Furthermore, the resource provider (district administrators; colleagues) may be ill equipped to communicate the principles embedded in the instructional resources, or the demands for communication of a myriad of resources might outstrip local capacity. Even when resource providers (e.g., district administrators) have the capacity, the recipients (e.g., teachers) may not
trust them. Teachers also have wide variation in the willingness, capacity, and preparedness to make productive use of instructional resources, and this variance must be addressed if teachers are to enact virtual instructional resources in ways that align with principles of reform teaching and learning. Finally, teachers spend the majority of their day teaching students, isolated from other adults, and teachers may rarely, if ever, interact with colleagues about their instruction or observe directly how colleagues are enacting particular resources. Learning from one’s own experience is built into the fabric of teaching as an occupation; learning through observation of others is not.

Verifying the quality of resources is another challenge closely related to search and transfer. Greater specification of quality teaching that has emerged in recent decades does not guarantee that instructional resources will reflect these principles. Rather, instructional resources could completely ignore or gainsay the imperatives of reform teaching that stress the importance of student engagement and active construction of knowledge and critical thinking about content. Consequently, verification is an important component complementing search and transfer. It answers questions about how resources are vetted for quality and by whom (see also the third step in our enactment process). These questions have undoubtedly become more complex with the rise in virtual instructional resources. Previously, most externally generated resources were publisher created and ostensibly vetted by the textbook series’ developers and editorial teams. These resources were vetted again by the school board, district administrators, and teams of teachers as they “piloted” new programs. Thus, the quality of instructional resources was assured through bureaucratic processes. Vetting of instructional materials in the new era of widely available virtual resources may focus on bureaucratic processes or market forces, depending on the social organization model being used. How these resources are vetted for initial quality is vitally important to how they are ultimately enacted.

Recent research has begun to shed light on how teachers search for and verify virtual instructional resources. For instance, when examining teachers’ curation of virtual instructional resources on Pinterest, Hu et al. (in press) found that teachers collected mathematics resources that aligned with the content and cognitive demands of the CCSS. In other words, teachers make sense of policy demands and ideas about instructional practices when searching for, vetting, and curating virtual instructional resources found on VRPs.

Next, we explain how purpose, process, and model might help us analyze the search for, transfer of, and verification of virtual instructional resources.
Purpose

The purpose of virtual instructional resources (core, supplemental) will be closely associated with costs. If the purpose of virtual instructional resources is to create a core curriculum (as opposed to more supplemental purposes), the work required to search for, verify, and transfer the compendium of materials needed to construct a full curriculum is likely to be vast. Conversely, if virtual instructional resources are restricted only to occasional, supplemental purposes, the work of search, transfer, and verification becomes much easier. This is true regardless of the social organization model (bureaucratic, professional community, autonomous professional) employed.

Social Organization Model

The social organization model used for searching for, verifying, and transferring virtual instructional resources will have a consequential impact. Regardless of the social organization of enactment, teachers will need to engage in some search (e.g., locating and looking through on their own or consulting a district-provided curation of resources) and will likely use some internal calculus to verify resources against their own standards of quality. This is especially true when one considers that resource recipients do not always trust the resource provider, especially when the core technology is uncertain. Nevertheless, some models of social organization of enactment provide more affordances for search, verification, and transfer than others.

For instance, if the enactment process is primarily bureaucratically controlled, the district administrators bear the heaviest burden for searching for and verifying instructional resources. Although questions remain about how district administrators would conduct these functions, it is quite possible that they would search for and verify resources in traditional ways by creating rubrics to gauge the quality of resources and working with committees of volunteer teachers to vet the resources against these standards. Likewise, they could make traditional provisions for transferring information about the resources through providing formal opportunities for teachers to learn via district-directed professional development sessions.

The professional community social organization model likely employs intense collegial review during search, transfer, and verification. Specifically, transfer of information would occur naturally as teachers search for and discuss the merits of particular virtual instructional resources. This learning would be enhanced to the extent that teachers discuss plans for
adaptation and enactment both before and after teaching. The professional community, then, could provide a robust opportunity for search, verification, and transfer. However, the process of search, verification, and transfer in this model is laborious, and the time for teachers to meet is likely scarce. Thus, the demands of search, verification, and transfer may outstrip the capacity of the professional learning communities to process more than a few resources at a time.

In the autonomous professional model, the search, verification, and transfer of information process is a private matter for individual teachers. Rather than bureaucratic oversight or professional review, in the autonomous professional model, the process of searching, verifying, and transferring is dominated by market forces. The teacher may look for other sources of information (e.g., reviews of other consumers), but she is relying primarily on her own internal calculus to determine which sources are most helpful (e.g., Google, Pinterest, Teachers Pay Teachers) and what constitutes quality. Furthermore, the transfer of information is likely to be incomplete, given that teachers might simply rely on what makes sense to them. As noted earlier, learning will later be shaped as teachers enact the resource and learn from their experiences. An overview of how the purpose and social organization of enactment affect the likely burden for teachers is presented in Table 2.

### Table 2. Teacher Burden for Search and Verification

<table>
<thead>
<tr>
<th></th>
<th>Supplemental</th>
<th>Core</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bureaucratic Model</td>
<td>Very Low</td>
<td>Low</td>
</tr>
<tr>
<td>Professional Community Model</td>
<td>Low</td>
<td>Moderately High</td>
</tr>
<tr>
<td>Autonomous Professional Model</td>
<td>Moderately High</td>
<td>Very high</td>
</tr>
</tbody>
</table>

**Process**

Unlike the other considerations discussed so far in this section (e.g., sensitivity to local contexts, potential for teacher learning), search for and verification (but not transfer) of virtual instructional resources is built directly into our virtual instructional resource enactment model (Figure 1). Specifically, search and verification of virtual instructional resources occurs during the searching and vetting stages of enactment. Deliberate efforts to transfer information about virtual instructional resources might occur anywhere in the process after the vetting stage. Furthermore, attempts to transfer information about virtual resources can be modest or considerable. In this way, transfer closely resembles teacher learning.
OPPORTUNITY FOR PARTICIPATION IN A PROFESSIONAL COMMUNITY

For many decades, teaching was considered a lonely occupation (Lortie, 1975; Waller, 1932). Teachers worked with groups of children or adolescents but for the most part were shut off from the outside adult world. More recently, teaching has become a more connected occupation as a result of both the teacher professional movement, which saw teachers as a part of a larger community of committed practitioners who could learn a great deal about teaching and learning from interaction with colleagues, and the standards and accountability movement, which made teacher meetings to discuss standards, curricular pacing, and assessment results part of regular organizational routines. Thus, teacher meetings have been used to strengthen professional standing and promote greater organizational influence through common content coverage, pacing, and assessments (Spillane, Hopkins, & Sweet, 2015).

With the rise of virtual instructional resources, we are now in a new era. Some of teachers’ community participation concerning enactment of virtual instructional resources will likely be mapped onto the organizational routines (e.g., teacher collaboration meetings) already in place. The enactment of virtual resources also makes available the opportunity for teachers to find a virtual community of support and idea sharing on the VRPs. How teachers enter into, enjoy, and benefit from participation in these communities is, to this point, largely unknown. Next, we consider how purpose, social organization, and process might impact how teachers are engaging with both physical and virtual communities in the new era of widely available virtual instructional resources.

Purpose

The purpose of the virtual instructional resources will affect the manner in which teachers participate in professional communities. Specifically, if teachers are expected to construct an entire curriculum from virtual instructional resources, they may spend the bulk of their time hastily searching for, vetting, and curating instructional resources. This would likely crowd out extensive participation in either a virtual or physical community. When the virtual instructional resources will be used to supplement a core curriculum, the demand for searching, vetting, and curating slackens, potentially freeing collaboration time for teachers to discuss and analyze how resources might best be adapted and enacted. Teachers might even have time to reflect communally on how well resources were enacted and how they impacted student engagement and achievement.
When demands for virtual resources are restricted to supplemental purposes, teachers may find that they have more time for participating in virtual community activities as well.

Social Organization Model

The three social organization models offer different affordances for participation in professional communities. Not surprisingly, the professional community model offers the greatest opportunity for interacting with and learning from colleagues. The entire model is predicated on the idea that teacher collaborative work is the best way to search for, vet, curate, and adapt virtual instructional resources. However, while the physical, local community of teachers is the most commonly referenced model for teacher professional community, it is not the only one. Rather, in the virtual age, teachers can embed themselves in community participation even when the autonomous professional model is employed. Teachers can find like-minded virtual colleagues through forums, community boards, blogs, and the like. Thus, while the teacher is working independently in her own physical space, she can rely on virtual colleagues to help her search for, vet, curate, adapt, and maybe even enact virtual resources. The affordances of the bureaucratic model are likely to be the most modest, because searching, vetting, and curating occur (at least in the pure model) without much teacher input or with the input of only a few teachers selected to participate on district committees for this purpose. Thus, the model may provide intense participation in professional communities for a select few while neglecting the communal experiences for the vast majority.

Process

Participation in professional communities may look different depending on where in the enactment process and how far along the process community involvement extends. For instance, if teachers are pressed for time, teacher teams may focus mainly on searching for resources, paying only scant attention to vetting the resources for quality and neglecting topics of curating and adapting. In such cases, opportunities for participation in professional communities would be quite modest. In contrast, however, if participation in professional communities begins with a search for resources and extends through enactment (e.g., opportunities for team teaching or collegial instructional rounds), teachers’ opportunities for community participation would be robust. Another example of the intensity of community participation may depend on the community’s composition. When the community includes members with considerable experience and expertise, experienced teachers may mentor new teachers in vetting virtual instructional resources,
slowly cultivating new teachers’ expertise over time. In this case, teachers’ community participation grows, and expertise develops. Conversely, when a community lacks both experience and expertise, the enactment process of virtual resources may be inhibited.

CONSISTENCY OF IMPLEMENTATION

No matter how well formulated or intended, reforms rely on the skill and will of local implementers (Berman & McLaughlin, 1978; McLaughlin, 1987; Odden, 1991). This consistent finding is an inconvenient one for reformers because it suggests that reforms rely not only on the beliefs, knowledge, and attitudes of their authors, but also on those of teachers. Some teachers enact reforms very well (at least in the opinion of reformers); others enact reforms poorly. Thus, reforms that may have a well-articulated and consistent message about instruction may be enacted differently because of wide variation in teachers’ interests, beliefs, knowledge, and abilities. Dependence on teachers’ semiprivate interpretations, adaptations, and enactments of resources potentially heightens variance among classrooms and, ultimately, an inconsistency of implementation results. Next, we consider how purpose, social organization, and process are likely to shape the consistency of implementation of virtual instructional resources.

Purpose

It stands to reason that when the curriculum is constructed from multiple sources of input (as opposed to a single textbook series), consistency across classrooms is undermined. Indeed, for more than 100 years, common instructional materials (i.e., textbooks) have been the primary way through which outsiders standardized classroom learning experiences from one classroom and school to the next (Cuban, 1993). The rise in virtually available resources has likely ended the near monopoly that large and moderately sized publishing companies enjoyed on the production of instructional resources. We conjecture that the prevalence of virtual instructional resources has implications for consistency of implementation that will be brought into sharp relief when considering the resources’ purpose. Namely, when virtual instructional resources are used for supplemental purposes or not at all, a greater consistency in implementation of the broader curriculum (comprising traditional materials, teacher-created materials, and virtual instruction resources) likely results. In contrast, when virtual instructional resources constitute the bulk of the curriculum (i.e., they are used for core purposes), curricular implementation is less consistent; in this scenario, resources from myriad sources may not be consistent with each other or commonly used across classrooms.
Social Organization Model

Consistency of implementation (e.g., standardization) is one of bureaucracy’s key attributes. Therefore, the bureaucratic model of implementation holds the greatest promise for implementation consistency. However, this promise likely has its limits. The bureaucratic model may be able to reduce variation across classrooms, but because it ultimately relinquishes control of the process to teacher adaptation and enactment, it cannot eliminate variation entirely. This will likely also be true of the enactment of virtual instructional resources. Even when the search, vetting, and curating stages are centralized, implementation ultimately ends with teacher-centric enactment.

The professional community implementation model will likely produce high consistency of implementation of virtual instructional resources within a school but low consistency across schools. As noted earlier, consistency of implementation in the professional community model is likely to be greatest when teachers work together through the enactment process and discuss important matters, including standards for quality, strategies for organizing resources, ways to adapt resources to local contexts, and instructional practices that are likely to improve student learning.

Finally, because it relies on the interests and discretion of atomized individuals, the autonomous practitioner model likely produces the least consistency of all, particularly when virtual instructional resources are used for core purposes. When teachers rely on their own specific needs, standards for quality, and habits of practice, they are likely to search for resources differently, vet and curate them idiosyncratically, and adapt and enact them in ways that reflect their personal preferences and styles. This would likely culminate in considerable inconsistency of implementation across classrooms. An overview of how the purpose and implementation model affects the likely consistency of implementation is presented in Table 3.

Table 3. Consistency of Implementation

<table>
<thead>
<tr>
<th></th>
<th>Core Purpose</th>
<th>Supplemental Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bureaucratic Model</td>
<td>High Consistency</td>
<td>Highest Consistency</td>
</tr>
<tr>
<td>Professional Community Model</td>
<td>Moderate Consistency</td>
<td>Moderate Consistency</td>
</tr>
<tr>
<td>Autonomous Practitioner Model</td>
<td>Lowest Consistency</td>
<td>Low Consistency</td>
</tr>
</tbody>
</table>
Process

While we suggest a process of enactment that is more or less constant regardless of the purpose of the resource or the social organization model through which it is enacted, variation across and within schools can be introduced at virtually any stage. As a general hypothesis, however, we propose that the more each of the processes is centrally controlled or conducted in large teams of teachers, the greater the consistency across classrooms will be.

DISCUSSION

For conceptual clarity and to guide future research, the purpose of this article is to propose a conceptual model for understanding the various ways that virtual instructional resources reach classrooms and impact the “enacted curriculum” in the context of recent trends in education that include greater centralization, refined descriptions of quality instructional practices, and proliferation of instructional materials from an increasingly wide variety of sources (e.g., VRPs). To this end, we detail three central concepts—purpose, social organization, and process—and use these concepts to analyze the potential impact that virtual instructional resources have on commonly held school goals: sensitivity to specific contexts; potential for teacher learning; affordances for search and verification; provision for participation in professional communities; and quality and consistency of implementation.

Our conceptual model and subsequent analysis reveal several tensions regarding the use of virtual instructional resources that we hope researchers will investigate empirically. Briefly, we suggest that all the goals cannot be achieved simultaneously, but rather will involve compromises and a series of tradeoffs. In other words, virtual instructional resource use is rife with tensions, and most of these tensions have yet to be investigated. An overview of these tensions is presented in Table 4.

Table 4. Implementation Model and the Potential for Attaining Common Goals

<table>
<thead>
<tr>
<th></th>
<th>Sensitivity to Specific Contexts</th>
<th>Potential for Teacher Learning</th>
<th>Affordances for Search and Verification</th>
<th>Community Membership</th>
<th>Consistency of Implementation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bureaucratic</td>
<td>Low</td>
<td>Moderate</td>
<td>High</td>
<td>Low</td>
<td>High</td>
</tr>
<tr>
<td>Professional Community</td>
<td>Moderate</td>
<td>High</td>
<td>Low</td>
<td>High</td>
<td>Moderate</td>
</tr>
<tr>
<td>Autonomous Professional</td>
<td>High</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
</tr>
</tbody>
</table>
ARTICULATING THE TENSIONS AND ANSWERING QUESTIONS

As suggested, the enactment process of virtual instructional resources will require the management of many tensions. For instance, the autonomous teacher model of implementation increases sensitivity to local contexts and allows for nearly immediate use, but it also places the burden for search and verification squarely on the individual teacher, makes little or no provision for teacher learning, diminishes teachers’ opportunities to participate in professional communities (at least physical communities), and likely yields an inconsistent enactment of virtual instructional resources. Likewise, the professional community model of virtual resource enactment has a high potential for robust community membership and teacher learning, but searching, vetting, and curating resources in this way can become cumbersome and labor intensive. Furthermore, the potential for the professional community model to ensure a consistent implementation and allow for specificity to particular needs and contexts is only moderate. Finally, the bureaucratic model has extensive provisions for search and verification and can help promote a more consistent implementation, but this model lacks sensitivity to local contexts and has only modest potential for promoting teacher participation in professional communities.

We know precious little about how districts, schools, professional communities, and individual teachers manage these tensions, nor do we know much about how the purposes, social organization, and processes (presented here as distinct for conceptual and analytic purposes) might blur in the complex world of schooling. For instance, districts might provide greater resources for some subjects than for others. Thus, the purpose (supplemental, core) might differ by academic subject. Additionally, when implementing virtual instructional resources, teachers may act independently and autonomously in some contexts, as members of professional learning communities in other contexts, and as frontline subordinate workers in still other contexts. Yet, little is known about when and under what circumstances teachers assume different roles in the enactment process of virtual instructional resources. Finally, the six stages of the enactment process we have detailed might be challenged in future research; new findings may vary from the rather linear, ordered progression of stages we have suggested here. Specifically, the stages of enactment might be different when teachers are working on their own to find supplemental resources, as opposed to when implementation is bureaucratically controlled. In short, the enactment process is likely more flexible and context specific than we have suggested here.

As we have posited throughout this chapter, answering questions about the purpose, social organization, and process that concern the enactment of virtual instructional resources is critical to our understanding
Figure 2. Organizational tensions of virtual resources
of teaching in the 21st century. We have also argued that although we currently know very little about the enactment of virtual instructional resources, former implementation studies will be quite helpful in setting the course of future research. Yet, there are new elements of virtual instructional resource use that are novel and must be considered carefully.

The selection of the virtual instructional resources will ultimately be vetted by the educational bureaucracy (e.g., central administration of a school district), teacher professional communities as a group, or individual teachers (or some combination of these). This process will run along a continuum of tensions among what is good for the entire district, the school, and the individual teacher, and will involve knowledge and choices about the virtual materials’ alignment to (or lack thereof) curricular frameworks and standards for teaching. It also has implications for individual teachers’ professional judgment of what will or will not serve the needs of her students in that moment. In Figure 2, we summarize a few of these considerations. Specifically, tensions that concern access, vetting, and curricular alignment must be better understood. In the High Access and Vetting–High Curricular Alignment quadrant of the figure, teachers have easy access to highly vetted resources that align to well established curricular frameworks or standards for teaching. In this case, the social organization model would most likely be either bureaucratic or professional learning community.

In the High Access–Low Curricular Alignment quadrant in Figure 2, teachers have easy access to highly vetted instructional materials, but these materials do not align with well-established curricular frameworks or standards for teaching. Again, in this quadrant, the enactment process is likely organized by the bureaucratic or professional community model. Two related circumstances prevail in the Low Access and Vetting–High Curricular Alignment quadrant. First, teachers may have access to resources that have not been well vetted. Conversely, they may not have access to highly vetted resources. In any event, each teacher’s internal calculus for quality aligns with well-established curricular frameworks and standards for teaching. In this quadrant, the implementation process is controlled by the individual teacher, albeit one who is experienced, highly capable, and ambitious. Finally, in the Low Access and Vetting–Low Curricular Alignment quadrant, teachers again either lack access to vetted resources or have access to resources that have not been well vetted. However, in this quadrant, teachers search for, vet, and curate resources that do not align with well-established curricular frameworks or standards of teaching.

These tensions lead to several researchable questions. In Table 5, we provide an initial set of questions that our conceptual model surfaces. Surely, future researchers will modify the conceptual model that we have presented here as we learn more about virtual instructional resource use as the field advances.
<table>
<thead>
<tr>
<th>Purpose</th>
<th>Social Organization</th>
<th>Process</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sensitivity to specific contexts</td>
<td>How do the different implementation models employed for VIRs seem to influence the teachers’ ability to use the resources to meet contextual demands?</td>
<td>How does the need for sensitivity to local context affect the implementation process?</td>
</tr>
<tr>
<td>Purpose</td>
<td></td>
<td>Is the order of the stages of enactment consistent with the order of the process presented here?</td>
</tr>
<tr>
<td>Social Organization</td>
<td></td>
<td>Where, if at all, is teacher learning embedded in the enactment process?</td>
</tr>
<tr>
<td>Process</td>
<td></td>
<td>How do teachers engage in different types of learning by stage (e.g., searching, vetting, curating, adapting, enacting)?</td>
</tr>
<tr>
<td>Potential for teacher learning</td>
<td>How does the purpose of the VIR influence teachers’ opportunity to learn?</td>
<td>Under the bureaucratic model, how do districts provide teachers opportunities to learn about VIRs?</td>
</tr>
<tr>
<td>Affordances for search and verification</td>
<td>How do teachers search and verify VIRs?</td>
<td>What are the processes of search and verification? Is the order of the stages of implementation consistent with the order of the process presented here?</td>
</tr>
<tr>
<td>Provision for participation in professional communities</td>
<td>How do teachers construct virtual learning communities, and how does this construction vary by the social organization model of VIRs?</td>
<td>How does the nature of the community (physical, virtual) influence the enactment process?</td>
</tr>
<tr>
<td>Quality and consistency of implementation</td>
<td>How does the enactment model affect the quality and consistency of implementation?</td>
<td>How is consistency enhanced or undermined during the different stages of implementation?</td>
</tr>
</tbody>
</table>

*Note. VIR = virtual instructional resource.*
CONCLUSION

In this chapter, we have provided a conceptual model of virtual instructional resource enactment to help guide research endeavors into virtual instructional resource use in the context of greater centralization and greater clarity of instructional expectations. Instructional materials have proliferated in recent decades as schools and teachers search to find ways to improve student achievement and satisfy accountability demands. Virtual instructional resources are chief among these materials, and they are likely having a profound but underexplored impact on life in classrooms. How the intended purpose, social organization, and implementation process lead to enactment of virtual instructional resources and affect commonly held priorities (e.g., sensitivity to local contexts, potential for teacher learning, affordances for search and verification, provision for professional community participation, quality and consistency of implementation) is of great importance. There is much to be learned and much work to be done. Given the current lack of an explanatory model for virtual resources in education, this framework could be used as a guide to categorize and make sense of the impact of virtual resources in teaching and curriculum practices.
REFERENCES


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