OPEN PRAXIS

The Open Guidebook Approach: Designs to Support Collaborative, Close-to-Practice Teacher Learning

INNOVATIVE PRACTICE ARTICLE

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ABSTRACT

Teacher learning to enact desirable yet knotty teaching practices is a complex challenge that requires innovative support. Most materials intended to support professional learning fall short and do not leverage the benefits of modern technologies to address historic barriers at school, district, and broader systemic levels. We provide a synthetic literature review of teacher learning, identify impediments, and suggest a new, technology-enabled approach to the co-design of teacher collaborative learning materials enabled by open technologies, a revolutionary mindset enabled by open technologies. We frame the Open Guidebook Approach (OGA) in terms of five values: collaboration, practicality, continuous improvement, accessibility, and adaptability. We illustrate OGA with an ongoing project, called "Making Meaning," to support teachers learning to enact equitable practices, drawing on concepts, indicators, and observation rubrics from the Classroom Assessment of Sociocultural Interactions. Supporting teachers to transform their teaching is our objective, OGA via open technologies is the innovative means, and Making Meaning illustrates our arguments. We conclude with recommendations and ongoing questions.

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I. INTRODUCTION

Improving learning opportunities for students requires doing the same for teachers (Gallimore et al., 2009; Horn et al., 2017; Jensen et al., 2021; Saunders et al., 1992). In this article we provide a synthetic literature review of teacher learning and introduce the Open Guidebook Approach (OGA) as a technology-enabled solution that supports teachers across a wide variety of school contexts to learn in and from their practice together. We show how OGA provides real-time insights for teachers to realize and sustain desirable yet knotty teaching practices, such as fostering meaningful participation for every student in collaborative, complex thinking tasks, or positioning students from minoritized[1] communities as knowers by incorporating their experiences, validating identities, acknowledging insights, addressing injustice, etc. Furthermore, rather than relying on technocentric views of technology in education (Papert, 1990), we propose what values and processes must be embraced in conjunction with open publishing and sharing technologies to allow us to use them in ways that lead us to better futures (Kimmons & Irvine, 2023).

Drawing on an "expansive" notion of openness (Kimmons, 2016) from the open education and open technology movements and recent research on teacher learning (Lefstein et al., 2020; Russ et al., 2016) and school improvement (Bryk et al., 2015), we frame OGA as a process for developing learning materials via open technologies to help teachers enact important yet knotty practices. OGA seeks to align technology-empowered resource development, principles of teacher learning, and local uses and needs. Resources can include rich descriptions of teaching concepts in situ, illustrative scenarios, lesson videos, classroom observation systems, inquiry protocols for teacher teams, frames for lesson planning, learning checks, case studies, teacher learning progressions, etc. We identify five core values (collaboration, practicality, continuous improvement, accessibility, and adaptability) of OGA, and illustrate them in the context of an ongoing OGA project, called "Making Meaning," to support teacher learning in Title-1 (low-income) elementary schools to enact interactions with minoritized students that are communal and connected to their everyday lives (Jensen, 2021; Jensen et al., 2018).

Whether made explicit or not, values underlie the development of all educational resources and fidelity to these values is an essential element of teacher learning. Values also underlie technology adoption in schools and other professional settings and either lead to futures that are more equitable and charitable or less so (Kimmons & Irvine, 2023). For instance, imagine training teachers about universal design for learning through a resource that was not accessible to them or training teachers about self-directed learning in a manner that did not honor agency and self-direction in the teachers themselves. Such disconnects between what is purportedly being taught and the inscribed values of the resources, technologies, and practices being used to teach is a matter of serious concern as teacher education resources and practices must exemplify a high level of fidelity to their own purported outcomes in order to be adopted or even taken seriously. This means that any attempt at teacher learning that espouses a value such as accessibility or adaptability must itself be accessible and adaptable, embodying the message in the materials and practices themselves.

Furthermore, resources designed to support teacher learning must address documented conditions that enable continuous improvement, especially when seeking to address equity issues in teaching (Neri et al., 2019). Recent research shows effective professional learning is close to teachers' daily practice (Desimone et al., 2009; Gallimore et al., 2009), collaborative (Horn et al., 2017; Lefstein et al., 2020), and iterative/ongoing (Bryk et al., 2015; Saunders et al., 2009; Lewis et al., 2006). Professional learning is most effective when teachers work together in small job-alike teams, focus on a shared instructional goal, and designate a willing and capable peer facilitator (Desimone et al., 2009; Feiler et al., 2000; Gallagher & Cottingham, 2019; Garet et al., 2001; Kennedy et al., 2011; Vangrieken et al., 2015). Open technologies and pedagogies can play a critical role in these processes as they allow for continuous improvement and collaboration in ways that are not possible without them (Wiley et al., 2020).

1 We use "minoritized" rather than "minority" as a student descriptor to emphasize that even when part of a numerical majority in many schools, students of color—Native Americans, Latinxs, African Americans, Pacific Islanders, etc.—are underprivileged due systemic exclusion. Many conventional teaching practices unwittingly favor White, upper-middle-class ways of being, thinking, feeling, and interacting, further marginalizing minoritized students (Baker-Bell, 2020; Flores & Rosa, 2015; Jensen et al., 2018).

The process of resource development in OGA must espouse these same values as designers work in close collaboration with (rather than for) teachers and instructional leadership teams to iteratively develop open guidebooks. Open technologies allow this to happen by removing participation and access barriers and by allowing for increased transparency and connection between designers, teachers, and the public. In this way, designers center the improvement process (i.e., plan-do-analyze-revise cycles within teacher learning teams; Bryk et al., 2015; Saunders & Marcelletti, 2015) as well as teacher views regarding the "practicality" (Janssen et al., 2015) of open guidebooks. For scalability or travel of the innovation to various types of school settings, open guidebooks must also be adaptable to respond to local needs and be freely available to all through the Internet, which is only made technologically possible via open licensing of materials (Wiley, n.d.) and provision of content via open platforms, APIs, etc.

Before discussing and illustrating these values vis-a-vis extant research to argue for OGA, we review research on teacher learning to realize and sustain meaningful change to their practice, particularly classroom practices shown to be critical for student learning yet very difficult even for the most well-intended teachers to implement. We identify research-based principles to support on-the-job teacher learning and describe and illustrate integration of these principles into the development of open guidebooks via open technologies. We end with directions for research-practice partnerships interested in designing, testing, and scaling open guidebooks to improve teaching and learning across content, social contexts, and educational institutions.

II. SUPPORTING TEACHER LEARNING

Extant research suggests several principles to support teacher learning in and from their practice to improve it. Because "[t]eachers' professional identities are created and realized in their interactions with the multiple communities of practice in which they reside" (p. Russ et al., 2016, p. 403), it is critical to examine the times and places set apart for teachers to improve their practice with their colleagues (Horn, 2005; Little, 2002; Saunders et al., 2009; Spillane & Hopkins, 2013). Gallimore, Ermeling, Saunders and Goldernberg (2009) refer to these times and places as "school-based settings for continuous improvement" (p. 538). These *settings* enable continuous improvement of instruction through a series of structures and processes.

Team Setting Structures. Job-alike teams (by content area or grade level) are critical because they allow teachers to address common instructional problems in similar contexts (Garet, Porter, Desimone, Birman, & Yoon, 2001). Without a shared purpose, discussions in team meetings drift into broad discussions unrelated to the task of improvement (Gallagher & Cottingham, 2019). Teams should comprise three to seven teachers. Smaller teams are better able to set and work toward specific improvement goals (Vangrieken, Dochy, Raes & Kyndt, 2015). The cohesion and solidarity of the team is strengthened when all members plan and teach lessons to solve a common problem (Gallimore, et al., 2009).

Having willing teachers act as peer facilitators for continuous improvement within teams is also essential for teacher learning (Feiler, Heritage & Gallimore, 2000). Trained facilitators frame inquiry for the team, ensure protocol steps for team inquiry are followed, and encourage and affirm team efforts until a shared goal is reached (Kennedy, Deuel, Nelson & Slavit, 2011). Though instructional coaching generally has positive effects on teacher practice and student achievement, a recent meta-analysis suggests taking coaching to scale is problematic (Kraft et al., 2018). Larger-scale studies demonstrate "only a fraction of the effects found in efficacy trials of smaller programs" (p. 547). Reasons for this include cost, sustainability, and variation in coaching quality. Peer facilitators, on the other hand, "are uniquely and credibly positioned to model intellectual curiosity" for fellow teachers, precisely because "facilitators try out in their classrooms the same lessons as everyone else" (Gallimore & Ermeling, 2010, p. 2). Peer facilitation engenders communal trust within the team (Muijs & Harris, 2003), "free[ing] up coaches and content experts to play a knowledgeable resource role rather than team-leader role" (Gallimore et al., 2009, p. 548). The facilitator role can rotate among team members as capacity grows.

Team Setting Processes. Plan-do-analyze-revise (PDAR)[2] cycles of teacher collaborative inquiry are a foundational to their professional learning (Saunders & Marcelletti, 2015; Vangrieken et

2 Various labels are used to characterize these stages. Most trace their origins to W. Edwards Deming's plan-do-study-act (PDSA) framework for organizational improvement (Langley et al., 2009).

al., 2015; Vescio, Ross & Adams, 2008). In the planning stage, teachers prepare to teach a lesson and identify aims and predictions that guide lesson design; predictions--hypotheses with underlying assumptions--discipline joint inquiry in subsequent stages. In the doing stage, lessons are implemented and teachers gather data (e.g., teacher logs, classroom video, peer observation, student work samples) for later analysis. Doing is about testing teaching concepts as a team rather than evaluating individual teachers. In the analysis stage, teachers interpret gathered data in the context of their predictions; and in the reflection stage they revisit and revise aims and predictions, in light of analysis, for the subsequent improvement cycle.

The PDAR cycle, executed well, "should produce a wealth of insights and learning" for teachers (Saunders & Marcelletti, 2015, p. 14). Achieving desired gains in student achievement, however, requires perseverance of teachers to work through multiple PDAR cycles (Saunders, Goldenberg & Gallimore, 2009). The quality of PDAR cycles—and the fulfillment teachers derive from it—is enhanced by following well-designed inquiry protocols (Gallagher & Cottingham, 2019). These protocols support teacher learning by keeping their inquiry "close-to-practice" (Ermeling & Gallimore, 2014). They prompt contributions of knowledge, creativity, and related skills of each team member to the improvement effort. Teacher inquiry protocols focus and propel joint improvement by bolstering teachers' collective sense of responsibility for student learning (Louis et al., 1996; Muijs et al., 2004). They orient the team to establish joint goals, plan and deliver lessons, develop common student assessments, and make data-based decisions to revise goals and lesson and analysis plans as needed.

Though we know that organizing teachers into job-alike teams for collaborative inquiry that is close to their day-to-day practice is critical for improvement (Bryk et al., 2015), we need to know much more about designing support materials to realize, sustain, and scale this form of teacher learning to improve their practice, especially when instructional aims are as desirable yet knotty as equity in teaching–i.e., affording opportunities for every student to participate meaningfully in academic activities (Jensen et al., 2021). These materials include, for example, lesson plan templates, illustrative case scenarios, peer observation systems, exemplary videos of classroom lessons or teacher collaboration meetings, curricular materials, and charts of teacher learning progressions.

III. THE OPEN GUIDEBOOK APPROACH

The idea of an open guidebook is that teachers need opportunities to collaboratively create openly-licensed guidebooks to assist them in professional learning and teaching. The open guidebook approach (OGA) is centered around an ethic of "expansive openness" (Kimmons, 2016), which is enabled by open technologies and manifested in developing open educational resources (OER) to support continuous improvement within collaborative, close-to-practice teacher learning teams. OER are freely-licensed educational materials that (a) are provided at no cost to learners and (b) are free for teachers and learners to access, copy, adapt, remix, and redistribute as desired (UNESCO, 2011). OER can take many forms, but in the case of OGA, the goal is to create an openly-licensed guidebook to assist teachers in their professional learning and teaching and to use technological platforms that empower rapid access, adoption, revision, and sharing of the guidebook.

The notion of expansive openness emerged from studying teachers as they learned about, created, and used OER in their classrooms, and it articulates teachers' views of how the use, creation, and adaptation of OER provide transformative opportunities for improving teaching (Kimmons, 2016). Contrasted with the obvious, oft-repeated benefits of openness—such as cost savings—expansive openness suggests that the true benefits of openness in teaching include far-reaching opportunities for improving equity, enabling collaborative teacher learning, improving school-world connections, ensuring information accuracy and access, etc. (Kimmons, 2016). Similar benefits have also been theoretically proposed in the literature under the labels of open pedagogies (Hegarty, 2015; Paskevicius & Irvine, 2019) and OER-enabled pedagogies (Wiley & Hilton, 2018), which are compatible with expansive openness in that they view open practices and OER as vehicles for systemic improvement to student learning opportunities. In all three of these formulations, open technologies allow teachers to actively engage in the use, creation, and adaptation of OER, empowering new possibilities and bypassing traditional copyright and print-medium restrictions.

Expansive openness is essential to innovation and improvement in teacher professional learning because it pushes back against the technocentric determinism that often creeps into technology-focused fields (Papert, 1990) and gives teachers and designers a way forward for actually leveraging the benefits of open technologies toward overcoming historic and systemic problems. Because the use of open technologies alone is not sufficient to change teacher practices in valuable ways (Mason & Kimmons, 2018), their use must be coupled with vision and values that seek to leverage the possibilities of openness toward better futures (Kimmons & Irvine, 2023). In our case, OGA takes the vision of expansive openness and provides an essential framework for using open technologies toward the futures we desire.

OGA proposes to take the benefits of open technologies and to apply them to teacher learning in an attempt to make local improvement activities more meaningful and consequential for teachers and their students as well as to articulate how external designers work alongside school-based teams of teachers. OGA comprises five core values—(1) Collaboration, (2) Practicality, (3) Continuous Improvement, (4) Accessibility, and (5) Adaptability—which are applied as teacher and design teams coordinate their efforts to create an open guidebook to support their own learning and as a resource for educators in other school settings to learn together to improve. Notably, all these values are either benefited by the use of open technologies or fundamentally require them. These values are applied across three features of OGA: (a) the process of OER development, (b) the process of teacher learning, and (c) the resulting open guidebook that is created through these efforts (see Figure 1). We will proceed by explaining each of these core values in more detail and how they are manifested within each OGA feature.

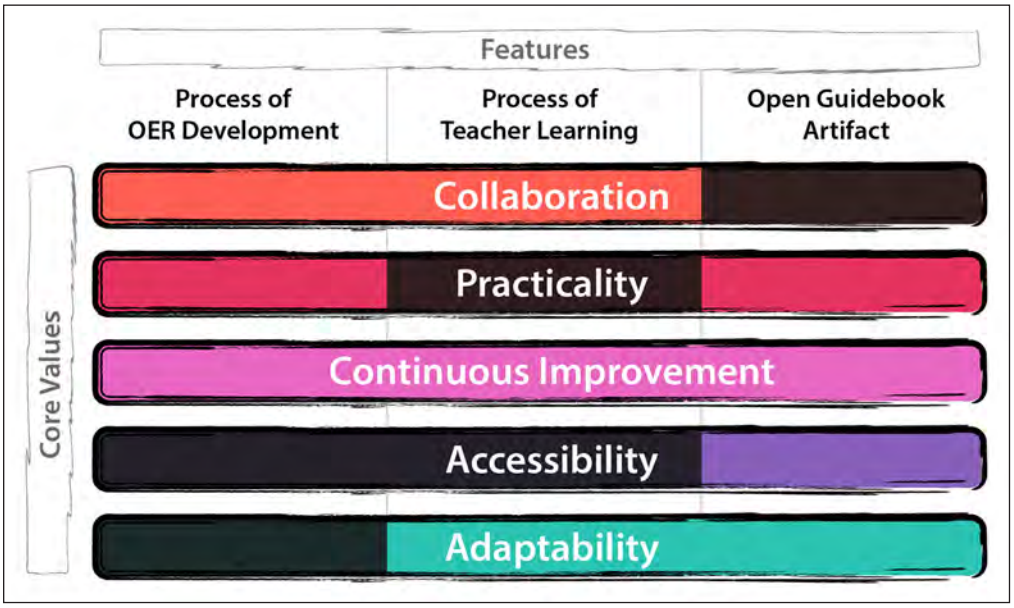

Figure 1 Core Values of the Open Guidebook Approach by Feature.

1. COLLABORATION

The commitment to collaboration means design teams (a) work internally with job-alike teacher teams and (b) with external design or research teams to synchronize their efforts in making high-quality resources that support structures and processes for teacher learning. This is manifested in OGA features as teacher and design teams collaborate to create the open guidebook and as job-alike teacher teams collaborate to improve their teaching. For the past several years, research-practice partnerships (RPPs) have been encouraged to develop long-term and mutually-beneficial collaborations among educators and scholars to provide insight into vexing problems of practice that extend the knowledge-base in education (Penuel & Gallagher, 2017). When developing an open guidebook, the design team will need to represent as many of the skills and perspectives necessary to create, test, enact, and improve the product. Though this may vary somewhat between settings, this team will often require the diverse expertise of classroom teachers, educational researchers, instructional designers, and media developers (e.g., graphic designers, animators). RPPs require goal-driven, well-organized activity that draw on differing expertise of all team members or "partners." This is true of both the design team

and the teacher teams because both must effectively collaborate to develop and use open guidebooks if learning is to be durable and coherent.

Intentional supports are needed to sustain collaboration. Support processes include (a) cycles of planning/preparing, implementing/observing, examining/debriefing, and reflecting on/revising teaching practice (b) to accomplish a clear goal or address a bounded problem within teachers' daily practice (Gallimore, et al., 2009). Educators require support to sustain qualities of interaction within these settings for close-to-practice inquiry to realize and sustain practice improvement. Extant research points to at least four qualities of interaction among teachers to transform their practice: (a) active listening, (b) deliberate coordination, (c) negotiation, and (d) shared ownership (Andrews-Larson et al., 2017; Goddard et al., 2007; Horn et al., 2017; Horn & Little, 2010; Lefstein et al., 2020a; Little & Curry, 2009; Strahan, 2003; Vangrieken et al., 2015; Vescio, Ross & Adams, 2008).

First, active listening is necessary to demonstrate understanding of one another's needs and contributions. Collaborating teachers understand one another and detect needs and insights through pausing, close listening, nodding, sustained attention, eye contact, and asking clarifying questions to make sure each partner is understood. Indicators of active listening include admitting ignorance (e.g., "wow, I didn't know that"), restating, affirming (e.g., "great idea!"), or referencing a partner's contribution later on (Little & Curry, 2009). Though correcting a specific misconception can be indicative of active listening, active listeners are concerned with communicating understanding before correcting.

Second, deliberate coordination should also be used within teams to underscore the complementarity of contributions among partners to understand and complete the learning task together (Lefstein et al., 2020a). Hierarchies in roles should be avoided, allowing roles to change quickly and regularly as current demands require and allowing the focus of all efforts to remain on developing the open guidebook rather than on who does what. Indicators of coordination include sharing materials, fluid turn-taking, synchronized participation, rapid question-answer exchanges, extending one another's responses, scaffolding ideas with further questions, and asking for reasons for another's decision. Peer facilitators enable coordination by encouraging and re-directing as needed to assist and support and by emphasizing the collective and formative value of the open guidebook (Saunders et al., 2009).

Third, as with any collaborative process, disagreements will inevitably arise in developing open guidebooks. When this occurs, negotiation—or the sincere and respectful exchange of views and rationales—should be used to make decisions about the guidebook. Collaborators negotiate by positioning themselves as learners, speaking up without speaking down, asking reasons for a partner's view (e.g., "why do you think that?"), acknowledging others' insights, changing views when presented with sound evidence, focusing on ideas over positions (i.e., contribution over contributor), and hashing out disagreements rather than coercing or dismissing others (Vangrieken et al., 2015). In a negotiation culture, participants openly express concerns and seek to hear one another, and they are flexible in their views when persuaded with well-reasoned argument (Lefstein et al., 2020). Facilitators support negotiation by reiterating common goals, validating differing perspectives, clarifying points of disagreement, maintaining momentum, and asking for evidentiary bases for views presented (Barton & Tusting, 2005).

Lastly, each partner should have shared ownership in the open guidebook. Ownership concerns personal identification with the product through free expression and the distribution of responsibility and authority (Vescio et al., 2008). Indicators of ownership include monitoring, evaluating, and directing their own participation in and understanding of the guidebook. Partners ask for support or guidance when needed, identify their own misconceptions, participate without apparent rewards or incentives, contribute insights/original ideas, ask unsolicited questions, lead discussions, and carry out responsibilities that are significant to developing and using the guidebook. Shared ownership deepens intrinsic value and understanding by applying the guidebook to personal professional experience, focusing inquiry, and examining next steps (Louis et al., 1996; Strahan, 2003). Facilitators enable ownership by encouraging unsolicited comments, modeling creativity, assigning leadership roles, or following others' leads.

2. PRACTICALITY

The commitment to practicality means OGA supports teacher teams to improve their practice through resources that are relevant, recognizable, and feasible for partner teachers–by collecting data and using feedback to ensure quality of resources and learning opportunities. This is manifested in OGA features as the open guidebook is designed and evaluated according to practicality considerations and as the final product provides a useful guide for teachers to follow. Because OGA assumes that teachers will need to willingly use a technology tool to influence their learning and behavior, it is essential to understand why, when, and how teachers adopt technology tools. Kimmons and Hall (2016) found that when considering whether to adopt new technologies in their classrooms, the most important teacher beliefs about new and innovative technologies focused on their perceived tangible effects in terms of producing student outcomes and improving efficiencies, outweighing various other beliefs related to compatibility, ease of use, cost, security, etc. This aligns with Rogers' (2003) diffusion of innovations model, which explains that a population's perception of *relative advantage* is the single most important factor in determining whether an innovation will be adopted over time. Rather than dismissively labeling teachers who fail to adopt proposed improvement innovations as laggardly or resistant (Neri et al., 2019), these realizations should help those involved in teacher learning to acknowledge that perhaps teachers often fail to adopt so-called innovations precisely because they provide little practical advantage and that partnerships should focus their efforts toward enthroning *practicality* and solving recognized classroom challenges as the primary goal. This is especially important if solutions require teachers to grapple with uncertainty and discomfort (such as examining their own white privilege, intersectionality, or racial biases), because it is not reasonable for someone to willingly submit to cognitive or emotional dissonance unless they see a clear, long-term benefit for them and their students in doing so.

In moving such innovations to the complexity of classrooms and the demanding work of educators, Doyle and Ponder (1977) and Janssen and colleagues (2015) identify three qualities of "practicality:" recognizability (instrumentality), relevance (congruence), and feasibility (cost). For teachers to enact an innovation, they must see resonance with their day-to-day practice to accomplish instructional goals. Recognizability concerns the extent to which innovative ideas incorporate existing classroom procedures to meet said goals. Relevance concerns alignment with the procedures of teacher work to prepare and enact classroom activity. That is, practice innovations must be congruent with the rhythm of lesson preparation, relational dynamics, and interactional patterns that teachers establish with students (see also "compatibility" in Rogers, 2003). Lastly, teachers must be persuaded an innovation is worth the cost—"the time, knowledge, and resources that would be required to adopt the innovation compared to the perceived benefits the practice would bring" (Janssen et al., 2015, p. 181).

When it comes to the design of materials for teacher learning, then, partnerships should be thoughtful about how they discern the practical advantages of their products and use this as their guiding quality consideration. Rather than abdicating responsibilities for vetting the quality of resources to a publishing house, which likely will interpret *quality* primarily in terms of *profitability*, local experts and collaborative teams must determine what constitutes a quality educational resource for achieving desired learning goals in their practical contexts. In this way, OGA broadly represents a paradigm shift in quality assurance by putting responsibilities and controls "in the hands of learners and teachers" (Dinevski, 2008, p. 121). UNESCO agrees, claiming that quality assurance with OER broadly should be "primarily the responsibility of [...] education institutions" (UNESCO & COL, 2011, p. 13). Central to this idea is that "quality cannot exist without an intended context, and the quality of [open guidebooks], as with any educational resource, is connected with the contexts in which they will be used" (Kimmons, 2015, para. 10). Thus, some design and teacher teams may consider factors such as the "presence of helpful illustrations" or the "inclusion of learning objectives" to be central to determining practical quality (Woodward et al., 2017), while others might value "standards alignment" or other factors (Kimmons, 2015). Such a view of quality as contextual practical value moves quality assurance away from simple criteria checking, such as type-editing, content accuracy, or aesthetics, and also away from quality-by-process approaches (cf., Wiley, 2013), such as in traditional peer review, to a more sophisticated attempt to evaluate the effects of materials in authentic settings to solve problems or to manage dilemmas in teaching.

3. CONTINUOUS IMPROVEMENT

The commitment to continuous improvement means that teachers will be engaged in an ongoing process of learning and that teacher and design teams will continuously improve resources and practices to better support their learning. This is manifested in all OGA features as teacher and design teams seek to improve their processes, teacher teams seek to improve their own teaching, and both teams work together to improve the guidebook. As with designing any technology-enhanced learning resource to exhibit high quality and practicality, creating an open guidebook is no small task. It requires a deep level of relevant expertise and forethought on the part of the design team, as informed by diverse fields, such as instructional design and software development. In their infancies, each of these fields began using linear project approaches that guided designers in a step-by-step process from start to finish (as with waterfall applications of ADDIE in instructional design; Branch, 2009). Such approaches had many limitations but one of the most problematic was that they tended to treat evaluation as a postmortem, using measures only to determine whether the project failed rather than using them to make the project succeed.

In more recent years, each of these fields has evolved to rely much more heavily on cyclical design processes that utilize quick releases, focused evaluation, and ongoing iteration for continuous improvement. Some common examples of this are agile design, rapid prototyping (Tripp & Bichelmeyer, 1990), and the successive approximation model (or SAM; Allen, 2014) in instructional design and perpetual beta approaches in software development, exemplified in Google's and other companies' unofficial mottos to "launch early, iterate often." As Allen and Sites (2012) explain:

> The undertaking of an instructional product design is very complex. There are too many variances in each project to make success with them as simple as applying our knowledge. We need to use our knowledge to formulate our best guess … and then find ways to evaluate it. We need to take quicker, smaller steps so that we can receive the additional guidance of evaluation before we have spent all our project's time and resources. (p. 16)

Applying this to the creation of open guidebooks means the design team should (a) approach design as an ongoing, iterative effort toward improving the product, (b) release iterations early (as minimum viable products) with ways of testing their practical quality, (c) use development and sharing approaches that support rapid iteration, and (d) never view the open guidebook as "done." Following build-measure-learn cycles (Wiley et al., 2020) and using learning analytics data via tools like continuous improvement dashboards (Kemsley, 2020) or experimentation via A/B or split testing (Kohavi & Longbotham, 2017) can assist in this process, as can formal design-based research methods (McKenney & Reeves, 2018) or less-formal guerrilla research methods (Maioli, 2018).

Because evaluation is emphasized throughout the development process, defining and testing for quality is an essential activity, and quality must be defined by the partnership in ways that are discernible in the products themselves rather than merely by the process used to create them. For comparison, in a traditional publishing model, quality is typically loosely controlled through process decisions (like peer review) but is not explicitly tested. In contrast, the open guidebook assumes quality indicators should exist and be measurable, though these indicators might vary by context and include various constructs ranging from content accuracy and standards-alignment to aesthetics and readability (Kimmons, 2015). By gathering, analyzing, and interpreting data through iterative cycles, the design team's final product should never be static or complete but is only ever a work-in-progress that must be dynamically tweaked, tuned, and revised. In contrast to traditional, static approaches to publishing, OGA provides potential for greater accuracy and quality simply because resources should be continually improved and updated, and material quality in practice cannot be understood as a static measure of a resource at the time of its production but as an ongoing measure of its value and accuracy over its entire life cycle (Kimmons, 2015).

The same value of continuous improvement should also be applied by teacher teams who seek to get better at improving their practice with the open guidebook. As mentioned, plan-do-analyze-revise cycles of collaborative teacher inquiry are foundational to their learning (Saunders

& Marcelleti, 2015; Vangrieken et al., 2015; Vescio, Ross & Adams, 2008). Through these stages and cycles of joint work, teachers develop aims and prepare materials together, implement lessons and purposefully observe one another's practice, examine lesson implementation and debrief together, and revisit aims and predictions prior to launching into another cycle. Executed well, the PDAR cycle "should produce a wealth of insights and learning" (Saunders & Marcelletti, 2015, p. 14) to achieve desired gains in student participation and performance. Also mentioned above, collaborative inquiry protocols enhance PDAR cycles by keeping deliberations close-to-practice, prompting contributions from each team member, and bolstering teachers' collective sense of responsibility for student learning (Ermeling & Gallimore, 2014; Louis et al., 1996; Muijs et al., 2004).

Open technologies are essential for allowing for continuous improvement and provide unprecedented opportunities for updating materials, testing their efficacy, and ensuring quality (Kimmons, 2021; Wiley et al., 2020). By publishing OGA in public, collaborative spaces, materials can be updated instantly without waiting for a new version to be published or determining the market viability of an update. Furthermore, open platforms allow for the collection and analysis of usage data at a large scale, thereby allowing for efficacy and quality to be determined in ways that are outcome-oriented (e.g., student learning, perceptions of quality) rather than just input-oriented (e.g., Kimmons, 2021). This ability constitutes a seismic shift in quality assurance processes of professional development materials that are permitted via openness but will only be realized via a value and process framework, like OGA.

4. ACCESSIBILITY

The commitment to accessibility means that all resources designed to support teacher learning are available and usable for all teachers. This is manifested in OGA features as the final guidebook is accessible for teachers to use and share. Accepting the foundational beliefs of open scholarship, open pedagogy, and open access publishing, OGA is similarly "rooted in an ethical pursuit of democratization, human rights, equality, and justice" (Veletsianos & Kimmons, 2012) by making materials freely available to all, with no access barriers and as few use restrictions as possible. In part, accessibility considerations focus on aligning the "what" of our materials with the "how" of our outreach.

Such a consideration may seem obvious, but it stands in stark contrast to how such initiatives are often implemented, with research on equity often being published in cost-prohibitive journals, professional development being provided via expensive training sessions, and teacher support materials being provided in restrictive ways. To address this issue, OGA seeks to remove as many barriers to access and use as possible, including removing cost barriers, legal barriers, and usability barriers that partners might face when using the guidebook.

Remove Cost Barriers

We believe that teachers and schools need constant, free access to the materials in order to support ongoing improvement efforts. Attempts to curtail access disadvantages teachers and students who need it most. To access an open guidebook, readers should not need to purchase an account or pay a fee; there should be no paywalls and no login walls of any kind. There also should not be a free-ish (limited) version or demo of the materials that is used to entice readers to purchase the full version, as many freemium approaches commonly use. Rather, in OGA, all materials should be always fully available to everyone, thereby avoiding classes of readers (e.g., standard vs. premium). There should be no restrictions placed on the materials to only allow them to be accessed a certain number of times. Access to the materials should be fully democratized and treated as a public good.

This means that any costs associated with the creation, hosting, and original distribution of the resource should be shouldered by the design team and not the community of teachers or schools who are accessing the guidebook itself. If members of the larger community would like to host their own copies of resources or to develop their own versions (as explained more in the section on adaptability), they could invest their own monetary resources toward this purpose, but access to the original resources themselves should come at no cost to target audiences.

Remove Legal Barriers

Additionally, though copyright laws theoretically exist to help support the creation of new knowledge and the dissemination of ideas, they can often have the opposite effect by harmfully restricting access and our freedoms to use resources in valuable ways (Lessig, 2004). As an example, consider a teacher who creates a lesson plan on the topic of Jim Crow laws in an eighth-grade classroom and then posts this lesson plan to their teacher website. Under U.S. copyright law, though this lesson plan may have been posted in a public space, it is nonetheless copyrighted by that teacher and cannot legally be shared, remixed, adjusted, copied, or printed without that teacher's express permission. Similarly, if a university researcher posts a professional development guide on equitable teaching to her professional blog, U.S. copyright law requires that schools, administrators, and teachers cannot legally save the blog post, print it, adjust it, etc. without first seeking permission from the author. The result is that these resources are either not used at all, are used in highly restricted ways, or are used in ways that may violate legal copyrights of the authors.

For this reason, leaders in the free and open source software movement (OSI, n.d.; Stallman, 2013) as well as the open education movement have long recognized the need to conceptualize "free" both in terms of "no cost" or gratis and also in terms of "freedom." Wiley (n.d.) articulated such freedom as the 5Rs of openness, providing everyone with the ability to (1) retain, (2) revise, (3) remix, (4) reuse, and (5) redistribute open resources without seeking additional permissions. Though discussing complexities of each of these Rs is beyond the scope of our current review and argument, the 5Rs apply to the development of open guidebooks in that they:

1. Retain: Anyone should be allowed to make and control their own copy of the guidebook;
2. Revise: Anyone should be allowed to adapt or modify their own copy of the guidebook;
3. Remix: Anyone should be allowed to revise their own copy of the guidebook or to combine it with other resources to make something new;
4. Reuse: Anyone should be allowed to use and display their own copy of the guidebook publicly;
5. Redistribute: And anyone should be allowed to share copies of the original guidebook or their own remixes of it with anyone else.

In simple terms, releasing a guidebook under an open license empowers anyone to make copies, to change and adapt to their local circumstances, and to print and share without worrying about violating copyright laws or seeking permission from the authors. This removes legal barriers to use and also alleviates fears that might prevent the use of a resource by teachers who may not understand the nuances of copyright law, thereby ensuring ongoing freedom of the resource.

Remove Usability Barriers

And third, accessibility also includes the need to make the open guidebook technically and practically usable for all teachers. This involves a variety of considerations, including (a) enacting the improvement of general user experiences (UX) with the product through testing and iterative improvement, (b) ensuring access for people with limited technology access or with visual, auditory, or other disabilities, and (c) designing for universal device compatibility.

First, regarding general user experiences, the design team should leverage collaborations with teacher teams and the larger teacher community to collect data about use cases, difficulties, bottlenecks, confusions, and inefficiencies with the open guidebook and use these to continually improve its navigability, flow, aesthetics, and ease of use for teachers. This might mean conducting interviews or focus groups, collecting analytics data, or designing experimental testing scenarios (such as A/B tests) to ascertain which design decisions to keep, which to change, and which to scrap. Throughout these efforts, best practices of user experience (UX) design, learner experience (LX) design, design-based research, and user-centered research should guide ongoing design efforts to iteratively improve the product's quality.

Second, because teachers have differential access to technology tools and teachers in underserved communities (and countries) will generally have smaller screens, less bandwidth, and fewer device options, the design team should take special effort to ensure that the

open guidebook is accessible by as many devices and in as many scenarios as possible. This includes (a) not relying upon proprietary or specialized technologies that require OS-specific compatibility and installation, such as an app or a plugin, (b) adopting a mobile-first, HTML-based design strategy, and (c) making resources easily shareable and printable via linking and alternative file formats (e.g., PDFs). Open guidebooks should also follow industry best-practices for making resources universally accessible to users with disabilities, such as WCAG 2.1 and ADA guidelines. This will include ensuring sufficient textual color contrast, appropriate text sizing, labeling of images and other elements, and so forth.

And third, developing open guidebooks as mobile-first HTML improves universal accessibility of resources across platforms and devices and streamlines and reduces cost of development efforts. In such approaches, designers develop web resources for the lowest-common denominator in terms of screen size, processing power, etc. This means that optimized websites are typically designed with smartphones in mind as their primary audience, because it is much easier to scale up a mobile design to work on desktops than it is to do the reverse. Thus, if any organization seeks to provide a web resource that is universally accessible, the simplest (and increasingly most-common) solution is to provide the resource in a manner that is designed for mobile devices, which can also be scaled up for larger, more robust devices. Doing this also makes resources easily convertible to alternative access formats, such as PDFs, which further increases accessibility. Because mobile design tends to provide linear page layouts (single-column from top to bottom), teachers who would like to print the resource or to convert it to other formats do not need to struggle with complex formatting requirements that might be present in other types of documents and resources, such as multi-dimensional layouts that utilize columns and floating objects to organize content both horizontally and vertically. Rather, a single-column, linear flow means that the content can be repurposed, copied, pasted, edited, and printed with minimal effort.

Addressing all of these considerations together means that anyone will be able to use the open guidebook no matter what type of device they use to access it. Making the technology seamless (and invisible as much as possible) allows teachers and designers to focus on content and teacher learning rather than the technology itself. It also means learners who have temporary or spotty internet access can also benefit from resources by downloading them in different formats (e.g., PDFs) or printing them for later reading, thereby improving access for all.

5. ADAPTABILITY

And finally, the commitment to adaptability means that teacher teams will need to adapt teacher learning experiences and resources to their own contexts and that provided resources should allow for and support such adaptation. This is manifested in OGA features as the guidebook is licensed and shared in ways that allow and encourage its adaptation and as teacher teams adapt the resource for localized implementation. Open guidebooks should be iteratively developed to address the learning needs of a universe of diverse teachers, via universal design for learning (UDL) principles, which will help to ensure that some teachers are not disadvantaged simply because their goals, strategies, abilities, or literacies are different from others (Rose & Meyer, 2002). From an andragogical perspective, herein lies the true benefits of open approaches to teacher learning, because the adaptable nature of OGA empowers the adaptation of the guidebook for contextual differentiation and remixing (through unforeseen collaborations around localized versions of the guidebook) and also empowers teachers to be engaged as trusted, competent professionals both individually and within communities.

Sadly, teacher learning is often approached without recognizing the unique needs of individual teachers and their classrooms and in a manner that does not honor teacher diversity or agency. We rightly bristle at one-size-fits-all approaches to student learning but often implement one-size-fits-all approaches to teacher learning. Instead, there should be alignment between the practices and attitudes we desire teachers to use with their students and the practices and attitudes we use with our teachers. After all, how can we expect teachers to develop skills, competencies, and dispositions necessary to be student-centered in their classrooms, if teacher educators and facilitators fail to be teacher-centered in professional learning experiences? And how can we help teachers promote equity with their students if we do not treat teachers equitably ourselves as facilitators, researchers, and designers?

The first step of our solution is to provide the open guidebook to teachers in a technology platform that allows it to be easily adapted to their individual needs and local contexts. By releasing the guidebook under an open license, teachers are legally able to copy, edit, redesign, and share their own versions of the guidebook or, in software development terms, to make their own fork of the project. Our preferred license for this is the Creative Commons Attribution 4.0 International license (CC BY), due to its many freedoms and few restrictions, but other types of Creative Commons or open licenses could also be used as long as they allow for remixing and the creation of derivative works. If the design team does not release the guidebook under a remixable open license, it will severely restrict future teacher teams from using it in valuable ways. As a simple example, translating a resource is typically considered under copyright law as the creation of a derivative work. So, if a design team creates a guidebook in English for helping teachers to develop skills in second-language learning, and a dual-immersion school wants to translate this resource into Spanish or Korean to better support a teacher learning team, if the design team did not release the guidebook under an open license, then the school would not legally be able to make its own translation without the original design team's permission. Such unnecessary restrictions reduce positive potentials for impact that the guidebook could have by limiting creative possibilities for its future use.

As a second step, empowerment for differentiation is improved by releasing the guidebook through a technology platform that is intentionally designed to make remix activities easy via copying all or selected chapters of the guidebook's content or allowing teachers to create their own personalized pathways through the content. A teacher might be able to open a PDF on their computer, for instance, but they will generally lack the proprietary tools and expertise necessary to edit that PDF, adjust its contents, or make corrections.

To address this, the lead author has developed free and easy-to-use open textbook authoring platforms—edtechbooks.org and equitypress.org—that allow anyone to easily (a) create their own books, (b) copy any chapters from any books in the platform into their own books, (c) edit them, and (d) share them with the world in a variety of formats. Other popular open textbook platforms also exist that allow for similar activities—such as ck-12.org, pressbooks.org, or libretexts.org—and as open guidebooks are created, the design team should utilize tools and processes like these to empower others to build upon and adapt their work for unforeseen needs and contexts. Otherwise, though the content might be *legally* remixable, it will not be *practically* remixable, meaning that though openly-licensed guidebooks released on another platform could be remixed without violating any laws, they probably will not be adapted by teachers in any meaningful manner.

And as a third step, the actual design of open guidebooks should be modular in nature to allow future teacher teams to select, edit, or remove components representing a reasonable level of granularity to be useful. Greater granularity in media and learning objects encourages greater reuse (Johnson & Hall, 2007) but allowing for this granularity can also require much more work and can remove necessary context. A balanced approach should be taken to make contents both modular and contextually valuable as meaningful, self-contained learning objects (McGreal, 2004). Reasonably-sized, stand-alone chapters are a simple example of this. Rather than creating a 90-page book with 3 lengthy chapters of 30 pages each, design teams can improve remixability by creating more chapters of shorter length (in this case, perhaps 9 chapters of 10 pages each). Another example would be that each figure, image, or infographic should be released under an open license and labeled in such a way that teacher teams know what it is and that they can use it on its own, such as copying an illustration of a theoretical construct for presentation in a PowerPoint. This allows teacher teams and instructional leads at schools to be empowered to only use the parts of the guidebook that will be most helpful for them in their local contexts and to adapt it as needed without losing valuable context.

By making such choices with our open guidebooks that empower differentiation and remixing via open technologies, we are also making potentially radical assumptions about the roles that teachers should play in their teams, schools, classrooms, and communities. That is, we are tacitly saying that teachers are professionals that should be trusted to co-design and direct their own professional learning, using and adapting the guidebook as necessary to help them solve unique problems that require localized or even personalized solutions. This view may be seen as radical because many sweeping policy shifts in the U.S. and elsewhere have long been critiqued for their overall effect of deprofessionalizing teaching practice, by shifting, for

instance, to scripted curricula (instead of the application of professional judgment by teachers) or the treatment of teaching as a relatively low-skill career (Hoyle, 1980; Milner, 2013).

In response, OGA assumes that there are no monolithic solutions to improving learning in all classrooms, but there are principles and practices that should be shared, explored, understood, and wisely applied through teachers' professional judgment to meet the needs of the unique students that they teach. Thus, just as the professional learning of teachers might be conceptualized as a "wicked problem" that defies easy solutions and always needs "fixing" or adjustment (Southgate et al., 2013), so too is each teacher's lifelong pursuit to improve their own practice, meaning that any supports provided through a professional learning experience should be both practical and malleable to considerations and constraints that are ever-changing, vexing, knotty, and ultimately impossible to fully predict. Just as designers and researchers in the design team must adapt to ever-changing realities, new research results, new tools, and new design constraints, so too must teachers adapt their own professional practice to their communities, schools, and classrooms, and this latter adaptation is something that only localized teacher teams and individual teachers can ever be fully equipped to do. For these reasons, we see the core values of OGA and expansive openness as serving as a means of reprofessionalizing teachers (Kimmons, 2016) as skilled, agentic professionals who should have a hand in directing their own learning and development.

As an anecdotal example of local adaptation, I (lead author) have conducted several multi-day professional development seminars with teachers to help them create open textbooks for their students, utilizing many of the core values outlined above (Kimmons, 2015). On multiple occasions teachers have expressed how grateful they were for how the experience was conducted. One teacher, through tears, expressed, "Thank you so much for treating us as professionals. This is the first time in my [20+ year] career that I feel like I have truly been treated like a professional." Experiences like this shape how we think about adaptation to support the exercise of teacher agency to learn for themselves. They help us to recognize how many professional development initiatives fall short when delivery methods undermine the message. For instance, we tell teachers not to apply deficit mindsets to their students but unwittingly apply deficit mindsets to them; we tell teachers to be equitable but do not treat them equitably; we tell teachers to honor student agency but do not apply this value in our work with them. Rather, treating teachers as true professionals by providing information in and from their practice and supporting joint inquiry to improve is the moral thing to do (Jensen & Kimmons, 2022; Osguthorpe & Jensen, 2021), and building our training and support systems around open technologies allows teachers to more fully access moral rewards internal to teaching practice (e.g., fulfillment, professional community, relationships; Santoro, 2018).

IV. AN ILLUSTRATIVE EXAMPLE: "MAKING MEANING IN MY CLASSROOM"

OGA is multi-faceted and complex, drawing upon divergent expertise and enacted through settings for teacher collaborative inquiry and technological systems that must be aligned with one another in terms of aims and processes. As mentioned, this has led the lead author to create an open publishing platform that embodies the five values of the approach and provides the technical ability to enact them. This platform is available freely at EdTechBooks.org and EquityPress.org. We offer an example of one project in the platform to illustrate OGA, including progress, processes, benefits, and difficulties as we continue to design and enact it.

Making Meaning in My Classroom: Fostering Equitable Learning for All in My Elementary Classroom (available at https://edtechbooks.org/making_meaning) is an open guidebook for supporting in-service teachers to understand, identify, realize, and sustain equitable teaching practices in their classrooms (see Figure 2). Led by the first and second author and initially funded by an experiential learning grant at the sponsoring university, this book seeks to take a validated research instrument used to observe equitable practices in classrooms, the Classroom Assessment of Sociocultural Interactions (CASI; Jensen et al., 2018; Jensen et al., 2020), and to provide information and training materials to teachers to support incremental improvements toward equitable learning opportunities for students in elementary classrooms from minoritized communities. Equity in teaching is defined as high-quality instructional interactions that resonate with what students know, do, and identify with in their everyday lives (Jensen et al.,

2018; Jensen et al., 2020; Jensen, 2021). Teaching practices in *Making Meaning* concern the extent to which teacher-student and student peer interactions are *communal* (i.e., agentive and interdependent) and *connected* to the everyday knowledge, practices, experiences, and identities of minoritized students (Jensen et al., 2021).

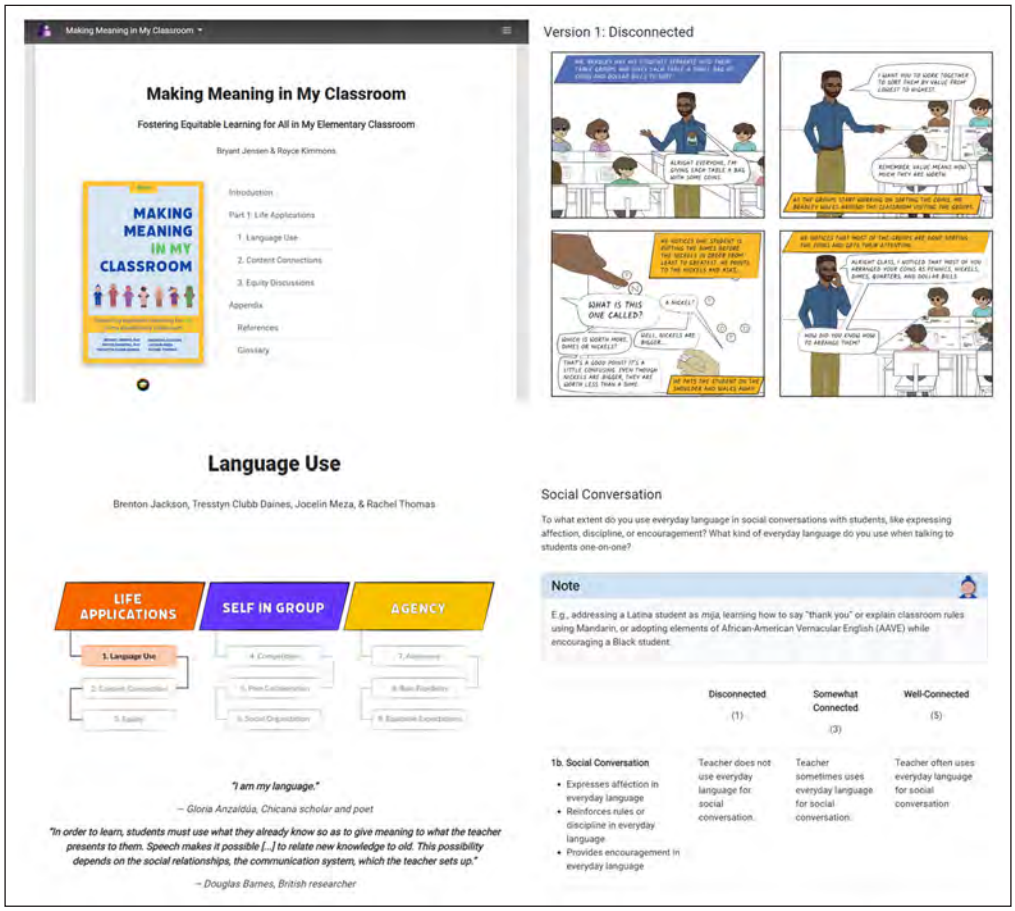

Figure 2 Screenshots of the Making Meaning Open Guidebook.

The initial (phase 1) design team for the book consisted of one graduate student in learning design, who served as the project manager and as a collaborative author, two undergraduate students in teacher education, who served as collaborative chapter authors, one undergraduate student in graphic design, who served as an illustrator, one undergraduate student in English, who served as the copyeditor, and the two sponsoring faculty members, who served as consultants and subject matter experts. Led by the graduate student, the team collaboratively wrote chapter drafts and created cartoon illustrations of classroom practices. Drafts were originally written collaboratively through Google Docs and then were transferred to the online platform to allow for better dissemination, branding, and sharing. These online drafts were then provided to cooperating teachers in schools, who were paid to read chapters and to provide feedback and guidance for improvement (e.g., clarity, practicality, understandability) via surveys, interviews, and focus groups, which the graduate student analyzed as his Master's thesis project.

This first phase allowed us to create a few chapters as minimum viable products (MVPs) that could be tested and iteratively improved upon so that as the students on the original team graduated, future team members could build off of their efforts by further iterating on the provided chapters and follow their established pattern in creating new chapters.

Currently in phase 2, this project has now evolved into an RPP with a partner elementary school wherein practicing teachers are paid to enhance existing chapters, to appraise chapters via PDAR cycles, and to collaboratively write subsequent chapters. Undergraduate students continue to participate by providing copyediting and illustration support to teacher authors, and supporting faculty and graduate students serve as project managers and writing collaborators. At the same time, developed chapters are shared with the universe of practicing teachers via the free online platform, and analytics on usage patterns are collected to inform ongoing development.

The *Making Meaning* project exemplifies the five values of OGA as follows:

> Collaboration. Team members represent a diverse combination of scholars, students, and teachers, and all team members work as contributors to the final product and have a voice in the ongoing development of the final guidebook. Initial collaboration around artifacts occurred via Google Docs and Zoom, but polished artifacts were then published openly on EdTech Books, allowing them to be continually revised and updated by the project team.
>
> Practicality. Chapters are tested by teachers and in classrooms by participating authors in an iterative manner to ensure that content and guidance are practical and useful in authentic settings. Embedded learning checks and quality assurance surveys ensure that we are collecting data from existing teachers on the practical value of the resource.
>
> Continuous Improvement. Guidebook contents continue to evolve in light of new findings and realizations and as further expertise of diverse teachers is added to the expanding team of collaborators. Data are collected to support these efforts via traditional research means (e.g., focus groups) as well as learning analytics (Welsh, 2020) in the online system (e.g., page views, time on page, reading heat maps, in-text responses).
>
> Accessibility. Chapters are provided freely to all with no cost barriers, limited legal barriers (via a Creative Commons Attribution License [CC BY]), and no usability barriers. This last point is achieved via the online platform which provides content both as a mobile-first, accessible web page and also via multiple formats for users to download (e.g., PDF, MS Doc).
>
> Adaptability. By being released under a CC BY license, anyone who accesses the book or a chapter within it has legal permission to use or remix it as they would like. The platform further makes this technically possible by allowing anyone to create an account and to make their own version of the guidebook with a few clicks.

V. CONCLUSION

This article has sought to simultaneously provide an argument for the value of the Open Guidebook Approach (OGA) as a framework for the use of open technologies in teacher learning as well as a how-to for achieving it in general terms (along with an illustrative example). How useful OGA may prove for moving teacher learning forward in valuable ways is an unanswered empirical question. Though OGA draws upon many traditions and value systems prevalent in other teacher education approaches (such as collaboration and practicality), its embodiment of these practices into a collaborative, practical, living, accessible, and adaptable open guidebook represents a novel (and we believe critical) step forward that far too many teacher learning initiatives ignore. Far from merely representing the creation of a website or ebook, OGA embodies essential and radical shifts in both dispositions and practices by valuing openness, sharing, and teacher collaboration and agency over restrictive, isolating, and deprofessionalizing practices that common in other approaches to professional development (Lieberman & Miller, 2014). This allows us to escape historic problems of teacher learning that persist as artifacts of a pre-digital and non-open world and to use open technologies in ways that are liberating and empowering. These values are also critical for scaling improvements.

Furthermore, building off many important insights and values from the literature on research-practice partnerships in education, OGA proposes the articulation of important teacher learning practices and dispositions into tangible artifacts via open technologies that can be freely studied, shared, and adapted in contextual and practical ways. In this way, OGA seeks to solve a serious disconnect that we currently face in teacher education between the practices that we claim to value, the artifacts we create, and the technological systems we use to create them.

COMPETING INTERESTS

The authors have no competing interests to declare.

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