Designing Virtual Teams for K-12 Teachers

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The COVID-19 pandemic turned many homes into virtual workspaces. Until the pandemic hit, business organizations were the primary users of virtual team models in the workplace. As a result of the pandemic, organizations outside the business sector had to deploy communication technologies to support virtual teams and virtual teamwork amongst employees. K12 teachers were and still are amongst those impacted by this shift. However, the current literature does not reflect enough evidence to support disciplines outside of business organizations with virtual teams in the workplace. As a result, K12 teachers do not have access to virtual team models that best support their progress toward desired outcomes. This article addresses this gap by first reviewing and sharing relevant literature on virtual teams. This paper then follows with a model for virtual team use by K12 practitioners based on the literature around virtual teams and professional learning.

Introduction

The COVID-19 pandemic forced many people to change the way they live and how they work. Over the last year, homes turned into virtual workspaces as COVID-19 mandates forced many employers to run their businesses remotely (Marshall & Moody-Marshall, 2020). With this shift came an increased focus on online professional learning methods to continue to grow their employees. However, shifts to online professional learning across various contexts occurred before the pandemic. Advances in technology and internet connectivity have led to continuously changing professional learning approaches as new tools for collaboration and communication entered the workforce (Handke et al., 2019). An example of this exists in education: for teachers to continue to grow their practice, they have taken part in a variety of models of online learning.

A recent article by Charteris et al. (2021) discussed the shift K12 teachers experienced from in-person to virtual teams due to the COVID-19 pandemic. Drawing on a professional learning and development (PLD) framework from the Australian Institute for Teaching and School Leadership (AITSL, 2012), Charteris et al. (2021) discuss how practitioners in education can use virtual teams to deliver PLD that is relevant, collaborative, and future-focused. Since literature is almost absent on virtual teams for K12 teachers, Charteris et al. (2021) call for more research and models for virtual

team application in education to support teacher PLD. Overall, Charteris et al. (2021) found that teachers successfully transitioned into virtual teams during the pandemic and need continued PLD that supports their contexts.

Professional learning and development support participants' professional learning related to improving their knowledge and skills to be successful in their roles. Online professional development supports professional learning facilitated in one or more of three different ways. may include synchronous, asynchronous, and hybrid strategies (Charteris et al., 2021). Synchronous learning happens in real-time and often mimics face-to-face learning with digital tools. Next, asynchronous learning happens across different times for participants. In this setting, participants may engage in instructor-directed activities such as discussion boards and other social networks for collaborating across time and space. Finally, hybrid learning includes a mix of both synchronous learning and asynchronous learning. Hybrid learning could include in-person sessions followed by virtual asynchronous work (Bates et al., 2016). One model that can consist of all these approaches is a virtual team. Virtual teams are online teams used for various reasons across organizations (Dulebohn & Hoch, 2017). Virtual teams are groups of individuals who work together across space and time, usually toward a common purpose (Bell & Kozlowski, 2002; Gillam & Oppenheim, 2006; Handke et al., 2019; Lin et al., 2008; Snellman 2014). There are several different structures for virtual teams depending upon the team's purpose (Ebrahim et al., 2011). Regardless of the design, these teams typically use digital communication and project management tools to support teams meeting goals.

School leaders often bring teachers together to develop teaching practices through professional learning (Charteris et al., 2020). Professional learning is essential for schools to facilitate teacher learning continuously. Schools and districts apply professional learning to address gaps between their current reality and desired state. In addition to traditional, face-to-face professional learning for teachers, educational leaders have had to explore online approaches to professional learning. Given the potential of professional learning on teacher growth, it is vital for professional learning to be effective. As a result, extensive literature explores effective design features for face-to-face professional learning and online professional learning. Virtual teams provide an avenue for professional learning for teachers. Thus, it is important to consider a possible virtual team model to consider what constitutes effective online professional learning (Charteris et al., 2021). Even though the COVID-19 pandemic forced organizations to move to informal virtual team models, research exists on effective virtual team models (Charteris et al., 2021). However, there is very little research on how virtual teams might support K12 teachers as a form of online professional learning. Therefore, this article aims to explore current research on virtual teams and online professional learning to provide a framework to guide practitioners who seek to deploy virtual teams in an educational setting.

Literature Review

The following section discusses the relevant literature related to online professional learning and virtual teams. The beginning of this review discusses key ideas and delivery modalities for delivering online professional learning. Next, a description and explanation of virtual teams and their defining features follow. Finally, the review ends with discussing the current literature on virtual teams related to teacher education and professional learning.

Online Professional Learning

Professional learning is a common approach to teacher development across school districts. According to Johnson (2014), "professional development is the strategy schools and school districts use to ensure that educators continue to strengthen their practice throughout their career. The most effective professional development engages teams of teachers to focus on the needs of their students" (p. 1). Additionally, characteristics of professional development often include an emphasis on changing knowledge, skills, and practices (An, 2018). Although the purpose remains the same, professional learning can be delivered using a variety of structures that include face-to-face and online components. Online learning has become a popular and prevailing way for adults to learn (Sharp & Whaley, 2018). This popularity may primarily be due to the flexibility online learning provides (Anthony, 2020). Adults taking part in online learning typically choose when and to complete assignments. As a result, this allows participants to learn during a time that best suits their needs and unique contexts.

Regardless of the approach, teachers report issues with current professional learning models, such as time constraints, misaligned content and context, and alternate agendas by administrators (Hanson, 2009). As a result, online learning received increased attention, potentially alleviating some of these barriers and providing more choices for teachers (Elliot, 2017). Currently, research focuses on effective design components of online learning experiences so that those designing the experiences can maximize instructional outcomes.

Current research shows that practical professional learning experiences for teachers include content-focused learning, encourages active participation, is coherent, timely, and considers the learners' context (Desimone, 2009; Yurtseven Avci et al., 2020). Furthermore, State et al. (2019) shared that a core feature of effective professional development is acquiring and translating skills into practice. Therefore, it is important to plan time during professional learning experiences for participants to practice their skills from the session actively. However, when facilitators feel the pressure of time, they may leave out the practical application or suggest it after the learning. As a result, the lack of application may make professional learning irrelevant to the learner's context. Some research indicates that professional development for K12 teachers may feel "top-down," coming from the administration, with little power or control given to the teachers (Hanson, 2009).

In-person and online professional learning can come in many forms for K12 teachers, including conferences, in-service training, online modules, professional learning communities, and coaching. Over the last year, school districts deployed professional learning opportunities through asynchronous, synchronous, and hybrid methods (Hartshorne et al., 2020). Furthermore, these delivery modalities exist in formal and informal professional learning settings.

Asynchronous Online Professional Learning

Asynchronous learning is learning that happens at a time designated primarily by the learner. Examples of this kind of learning include recorded training sessions distributed to employees to watch and complete activities, instructional videos or slideshows sent to learners for viewing, and the use of discussion boards. A primary benefit of asynchronous learning is flexibility (Anthony, 2020). This approach to asynchronous online learning models allows instructors to provide learners with materials and use the resources to learn at their own pace and during a self-selected time. However, providing learning materials, regardless of their quality, is insufficient for supporting learning (Murphy, 2004; Schaefer et al., 2019). Many studies have shown that learner interaction plays an essential role in producing favorable learning outcomes (Bond, 2016; Castro, 2019; Schaefer et al., 2019). For instance, Murphy (2004) shared a model for online asynchronous discussions that include collaboration in asynchronous online learning. Therefore, those designing online professional learning experiences must consider maximizing participant collaboration.

Collaboration in asynchronous environments can happen in many forms, but it must be carefully designed and implemented in online learning environments. For this kind of interaction to show effective results, the collaboration must clarify a purposeful relationship between the learners and where they work to achieve an outcome (Göktürk & Dikilitaş, 2020; Schrage, 1995). When the design of online learning environments considers this component, the social interactions amongst peers support reflection and high learning processes (Schaefer et al., 2019). Furthermore, collaborative environments promote psychological well-being and social competence (Laal & Ghodsi, 2012). Overall, collaboration is an important component of asynchronous learning as it supports instructional outcomes and social well-being.

Synchronous Online Professional Learning

Online synchronous learning happens in real-time between the learners and the instructor. For example, instructors may use some parts for synchronous learning, such as discussion or other forms of interaction (Finol, 2020). However, some research explores the impact of synchronous learning for teachers for online professional learning. For example, Francis and Jacobsen (2013) analyzed the effect of synchronous online discussions on math teachers. Findings suggested that more straightforward mathematical tasks promoted the highest level and quality of interaction. Furthermore, Chen et al. (2009) explored the impact of synchronous learning on pre-service teachers. The survey results suggested that synchronous models could benefit this group of teachers, but these conditions depended on safety, environment, self-efficacy, and competency. While these studies provide a couple of examples exploring the impact of

synchronous learning on teachers, they only focus on specific content or teaching experience. Additionally, both suggest considering components for the teaching to be effective. These results give little to no insight into how teachers perceived the learning experience and whether they would have instead had the learning delivered in a different online delivery form.

Hybrid Online Professional Learning

Hybrid online professional learning combines both asynchronous and synchronous teaching methods. Current research shows many benefits to utilizing hybrid learning for teachers (Anthony et al., 2020; Belland et al., 2015; Matzu, 2013). For example, both Anthony et al. (2020) and Belland et al. (2015) reported positive results with hybrid learning connected to instructional outcomes for participants. Furthermore, Matzu (2013) reported positive effects of hybrid learning for teachers related to increased engagement. Overall, current research on online professional learning provides implications for designing a successful virtual team experience for K12 teachers. For example, a virtual model must include content relevant to the learners' context. Additionally, the content should be focused and timely. Finally, participants should have many opportunities to collaborate and work toward a common goal or purpose. Many of these components are also crucial design components for effective virtual teams.

Virtual Teams to Support Professional Development

One online learning approach for professional development is a virtual team. Based on the current literature, virtual teams are defined as team members dispersed across time and space using communication technologies to work toward a common goal or purpose (Bell & Kozlowski, 2002; Gillam & Oppenheim, 2006; Handke et al., 2019; Lin et al., 2008; Snellman 2014). Businesses frequently use virtual teams, especially those with employees spread out globally (Dulebohn & Hoch, 2017). Despite its popularity, very little has been written about virtual teams in education (Charteris et al., 2021; Rolando et al., 2014). Additionally, research on virtual teams lacks empirical data in the academic sphere, and there is very little known about virtual teams as a pathway or model for e-learning (Makani et al., 2016).

Even though little research exists, some researchers see virtual teams as an opportunity to support professional development for K12 teachers (Charteris et al., 2021). Some even argue that virtual teams are the next stage of organizational evolution (Martin, 2021). The following section discussed the current literature on virtual teams to provide definitions and typical characteristics of virtual teams, and ends with an explanation of existing studies on virtual teams for K12 teachers.

Defining Virtual Teams

Virtual teams provide an opportunity for a flexible learning environment that still guides learners toward goals. Most of the interdisciplinary literature on virtual teams provides definitions that include members dispersed across time and space using communication technologies to work toward a common purpose (Bell & Kozlowski, 2002; Gillam & Oppenheim, 2006; Handke et al., 2019; Lin et al., 2008; Snellman, 2014). For instance, according to Dulebohn and Hoch (2017), virtual teams include groups of people who are "geographically dispersed, have limited face-to-face contact, and work interdependently through the use of electronic communication media to achieve common goals" (p. 1). Another definition from Martin (2021) explains virtual teams as "teams with a common purpose that use technology to cross time zones, distance, and the boundaries of organizations" (p. 17). Practitioners in education may see similarities between these definitions and online communities of practice. However, Charteris et al. (2021) explain that a critical difference is that virtual teams are continuous, ongoing professional learning cohorts. Whereas a community of practice, online or in person, might exist as an isolated, informal professional learning event. Overall, slight variance exists between definitions of virtual teams across the literature.

Even though many researchers agree on a standard definition of virtual teams, the 'virtual' component can include different approaches. There are many technologies available in the workplace used by teams to support organizational goals. However, Gibbs et al. (2019) made an important distinction about virtuality in that there is not an "on-and-off switch," but instead, virtuality should be seen as a "continuum ranging from low to high" (p. 8). In this way, virtual teams could include several online learning modalities such as asynchronous, synchronous, and hybrid approaches. However,

what makes virtual teams differ from other online communities is that they don't take as much time to grow (Owen, 2014), and they are centered around a core purpose with intentional and relevant outcomes (Bell & Kozlowski, 2002; Gillam & Oppenheim, 2006; Handke et al., 2019; Lin et al., 2008; Snellman, 2014).

Design Features and Characteristics

Virtual team designs include a variety of features and characteristics. According to Stevenson (2017), virtual teams harness the power of collaboration. Moreover, collaboration can happen over time and space (Dulebohn & Hoch, 2017). This collaboration is important for schools as a virtual team model could connect K12 teachers in rural and urban areas, providing knowledge-sharing opportunities. (Charteris et al., 2021). There are also a variety of virtual team types. According to Duarte and Snyder (2006), there are seven basic types of virtual teams: networked, parallel, project, production, service, management, and action. Each of these types differs based on the group output or goal. Other research explains that it is best to consider their mode of interaction, context, and group (Jarvenpaa & Leidner, 1998).

Principles and practices guide many virtual teams. For example, Watkins (2013) shared ten guiding principles for virtual teams that include in-person and virtual meetings, virtual "water coolers," and commitments to shared communication channels, tasks, and processes. Current research and writing show that while agreement exists on definitions of virtual teams, approaches to a successful implementation of virtual team models vary. However, many authors emphasize the importance of successful interactions to help sustain a virtual team community (Charteris et al., 2021; Dulebohn & Hoch, 2017; Jarvenpaa & Leidner, 1998; Marlow et al., 2017; Watkins, 2013; Wilson, 2007).

Effective Virtual Teams

A number of researchers have begun to explore the critical components of successful virtual teams. Overall, trust is crucial to the success of virtual teams (Brahm & Kunze, 2012; Erez et al., 2013; Kiffin-Peterson, 2004; Pangeli & Chan, 2012). For example, Pangeli and Chan (2012) explored the relationship between trust and virtual team effectiveness, where they deployed a survey used within a cross-sectional study in Malaysia and found that three types of trust are significantly related to virtual team effectiveness. These three types of trust are personal-based, institutional-based, and cognitive-based trust. Personal-based trust connects to trust that builds from a mutual exchange of knowledge. Next, institutional-based trust relates to accountability measures from the institution in that there will be rewards and punishments for not sharing knowledge. Finally, a cognitive-based trust includes the type of trust that builds from the professional credibility of the team members (Pangeli & Chan, 2012).

Parke et al. (2017) explored how some face-to-face interactions impacted the performance of a virtual team model. They tested a virtual team model focused on the initial meeting approach and embedded team-building activities. The researchers set up an experiment that included 644 participants and 161 virtual team members. They found that virtual teams with an initial face-to-face meeting instead of a completely virtual one increased knowledge sharing. However, in these cases, the structured team-building exercises diminished knowledge sharing in some areas. In addition to trust, Parke et al. (2017) provided some additional insights into the benefits of an initial face-to-face meeting before virtual teamwork begins.

Finally, Cohen and Gibson (2003) shared five factors that support virtual team effectiveness: (a) supportive organizational structure, (b) task characteristics, (c) technology, (d) team member characteristics, and (e) team processes. Even though a few of these factors might not require in-depth levels of trust or collaboration, the effectiveness of these factors is dependent upon strong organizational structures (Berry, 2011). To provide supportive organization structures, practitioners facilitating virtual teams should develop norms and expectations around communication and collaboration, including accountability measures (Gibson & Cohen, 2003; Whitener et al., 1998).

Virtual Teams and K12 Teachers

Virtual teams exist across various organizations; however, very little is known about virtual teams in education (Charteris et al., 2021). Two studies provide insight into how virtual teams might fit into a professional learning model for K12 teachers. First, Wilson (2007) applied an action research study with 24 preservice middle school teachers. This study aimed to explore the impact of a simulated interdisciplinary virtual team on the participant's development. Data

collection included student artifacts, interviews, and field notes. The study took place at a university during a required course for preservice teachers. Wilson (2007) created eight 3-person teams while intentionally ensuring interdisciplinary teams. Wilson (2007) documented their journey through reflective journals using three forms of data throughout the semester.

Participants provided journal entries and reflections, and photographs. The researchers explicitly asked participants to reflect on their teaming experiences throughout the study. This study revealed that the participants built community, developed skills to work more effectively on teams, and valued the teaming approach as an authentic experience. In addition to these findings, Wilson's (2007) reflections serve as a guide to future virtual team models for K12 teachers. First, collaborative structures and practices can be taught and modeled for teams. For Wilson (2007), preservice teachers have minimal experience with collaboration and often approach their work together as more cooperative. Another exciting reflection came in the importance of compromise in problem-solving. Teams were given authentic tasks that required conflict resolution, problem-solving, and compromise. Even with initial reports of discomfort around compromise, groups reported that this felt like an asset to the group over time. However, perhaps the most fundamental component of virtual teaming was the time Wilson (2007) took on building community and team cohesiveness. While this work provides some general guidelines for creating effective virtual teams for K12 teachers, preservice teachers have very different experiences and needs than those who have had exposure to teaming efforts in schools.

Chapman (2016) focused on teacher growth around curriculum implementation, ELA resources, enhanced learning management tools, and content/resource curation. They developed a Virtual English Faculty that met in person once a semester. The participants include teachers from several rural and remote communities who work together via video conferencing and an online drive. They communicate and share resources online to support pedagogical practices that increase student achievement and outcomes. While the author briefly discusses the purpose and activities of this group, they do not provide any empirical evidence of the impact of this model on their intended purpose and outcomes.

In summary, professional learning is a crucial component of teacher development and success. Additionally, professional learning can be delivered through different online modalities, including synchronous, asynchronous, and hybrid approaches to online learning. The COVID-19 pandemic forced many organizations to explore these online learning approaches more deeply for their employees as people began working from home. K12 teachers have experienced this shift as well by moving into virtual teams. The business discipline dominates the literature on virtual team use. Overall, Wilson (2007) and Chapman (2011) provide some initial information on how virtual times might benefit K12 teachers as a form of professional learning. While many studies exist devoted to defining virtual teams and exploring effective features of virtual teams, very little is known about how virtual teams would best serve K12 teachers. The following section focused on applying the current literature on virtual teams into a design framework that would best suit the needs of teachers.

Designing Virtual Teams for K12 teachers

Designing an effective virtual team model for K12 teachers should reflect best practices connected to professional learning and instructional design principles. Therefore, the following section includes an overview of the considerations for these best practices to inform the design of a virtual team model for K12 teachers. First, this section begins with a description of best practices around PLD according to a synthesis study from the Australian Institute for Teaching and School Leadership (AITSL). Next, the section follows with a description of instructional design models and theories that foster the components of the AITSL framework when applied. Finally, this section summarizes the key ideas that informed the development of the virtual team model presented at the end of this paper.

AITSL Professional Learning and Development Framework

As little research exists on the design or impact of virtual teams for K12 teachers, some researchers have created models using a combination of available research on virtual teams and literature on professional learning for K12 teachers. Charteris et al. (2021) draw on the work of the Australian Institute for Teaching and School Leadership (AITSL) to recommend a virtual team model for K12 teachers. The AITSL (2012) created 'Teacher Professional Learning and Development – Iterative Best Evidence Synthesis,' which involved an analysis of 97 individual studies and groups of

studies that showed a substantive link between student outcomes and teacher professional learning and development. Charteris et al. (2021) use AITSL's (2012) strategic characteristics of professional learning development for teachers (relevancy, collaboration, future-focused) as a recommendation for creating an effective virtual team model that supports professional learning for teachers. First, relevant PLD considers goals, aspirations, and the needs of the participants. Next, collaboration is fundamental to PLD for teachers and includes activities that encourage knowledge sharing. Finally, future-focused PLD supports participants with adapting and embracing change and challenges that come with the profession. Future-focused PLD incorporates and leverages the professional context by encouraging participants to examine job-embedded problems of practice and solutions. Overall, based on the findings and recommendations from AITSL (2012), a virtual team delivery model for professional learning should include relevant learning, collaborative opportunities, and future-focused content. Consequently, instructional design approaches and learning theories were explored to achieve these components within the virtual team model presented at the end of this paper.

Virtual Team Framework for Teachers

We present here a planning guide to support practitioners considering adopting a virtual team model for K12 teachers as professional learning. This guide brings together the literature on virtual teams and effective instructional design models to produce considerations for a virtual team model that aligns with evidence-based instructional practices for adult learners working together in an online environment. This guide has three phases: pre-instruction planning, instructional planning and facilitation, and evaluation and revision. Table 1 provides an overview of these three phases, the rationale from research, and an example outline for a professional learning plan that adheres to this model.

Phase I: Pre-Instruction Planning

The IPO framework, alongside constructivist and connectivist learning principles, support the pre-instruction planning process. Before thinking about instruction, it is crucial to consider a few factors. These are also referred to as inputs. Inputs include individual, team, and environmental or organizational factors. (Forsyth, 2008). These factors can directly or indirectly impact the virtual team as they work together toward common goals. Within this phase, a practitioner considers selecting team members to work together in a virtual setting. Since a primary draw of virtual teams allows those to connect regardless of time and space, practitioners in education should consider how to connect K12 teachers across these elements. For example, a virtual team might be composed of teachers at different schools who all use the same curriculum for math.

Additionally, a survey that includes a self-assessment given to prospective participants will help designers know their learners' strengths and experiences. This information can then be used to support connectivist elements such as personalization and learner skills (Siemens, 2005). This also helps the analysis phase of the ADDIE instructional design framework by analyzing current learner contexts. This process allows the designer to be aware of the learners' needs so that the instructional goals and outcomes are relevant to learning needs, a critical component of effective professional development for teachers (AITSL, 2012) and connectivist learning environments (Siemens, 2005). Furthermore, aligning outcomes with participants' needs in the context of their profession helps plan a future-focused learning experience. During the pre-instruction planning phase, designers should consider which technologies support network structures, interactions, and resource sharing. This keeps the groundwork for much of the collaboration and interaction necessary for learning to occur under constructivist and connectivist learning environments (Allen, 2006; Siemens, 2005). Moreover, collaboration is a critical component of evidence-based practices for teacher professional working (AITSL, 2012).

Phase I requires practitioners to gather data and conduct some preliminary planning. For example, to ensure that the instruction will meet the needs of the learners, data should be collected on the learners. The examples provided in Table 1 include strategies for successfully preplanning for this phase. For instance, surveying groups of teachers who will be a part of the virtual team to learn about needs, digital communication preferences, and experience with digital knowledge sharing is a start to learning more about how individual team members might be paired together to function

the most effective in a virtual team. In summary, this phase provides practitioners with the foundational information necessary to design the instructional processes.

Phase II: Instructional Planning and Facilitation

As with Phase I, the frameworks and learning theories guide much of the work in Phase II. This portion of the design includes the processes that become a bridge between the inputs and team outcomes (Forsythe, 2008). However, designers should plan initial face-to-face or synchronous meetings with all participants before planning for instruction. This gives everyone a chance to build community and provides an opportunity to review goals and outcomes and create group norms. Second, take some time to plan to set up and practice with communication and resource technologies. This helps address technical issues that arise when using digital tools and platforms. These initial steps will help transition into the instructional scope and sequence of learning.

The instructional scope and sequence should begin with the BSCS 5 Es Instructional Model (Bybee, 2006). This allows for a strong foundation built on constructivist practices that allow for the integration of connectivist strategies. This model suggests that the BSCS 5 Es Instructional Model (Bybee, 2006) be used in 4-week cycles. This instructional model can be used to support the design and implementation phases of the ADDIE framework (Allen, 2006). Each week focused on a different 'E' barring the first week, which combines *engage* and *explore*. These elements provide participants with time to find to engage in activities and tasks requested throughout the week. It also gives learners processing time that better meets their needs. For each week, designers should provide specific individual and group expectations and outcomes based on the 'E' for that week. In addition, clear communication expectations should be set by and with the group. Communication expectations can be set up during the initial face-to-face meeting and reinforced each week.

After applying this model as a base, connectivist elements can be integrated alongside the model's current features. For example, designers could evaluate areas of their plan to ensure that there is a place for learners to personalize the experience or explore diverse perspectives. These can be added to group discussions or tasks. Some elements already overlap with the BSCS 5 Es Instructional Model. For instance, opportunities to practice occur naturally in an authentic context during the elaboration phase. These two instructional models provide overlapping elements that support participants with learning by providing them a space to interact and construct knowledge together.

Phase II of this model requires practitioners to create an instructional map that meets the needs of the learners. Table 1 describes how to use the BSCS 5 Es Instructional Model to map out instructional goals and tasks from week to week. This instructional model provides a simple foundation for practitioners to focus on ensuring participants build and share knowledge from week to week. Additionally, practitioners should plan ways to build community and trust during this phase. Community builders could include "water cooler" spaces or virtual meetings where the goal is simply to get to know each other or play community-building games. This phase is also a time for facilitators to assess instructional purposes from week to week, such as participant journals, discussion posts, or projects. In the end, Phase II will be an iterative process and will take up the bulk of the planning time.

Phase III: Evaluation and Revision

Finally, Phase III includes evaluating how the process supported the virtual teams and individuals in achieving desired outcomes. The final phase of ADDIE encourages the evaluation of both participants and instructors after the learning experience (Allen, 2006). Outcomes might include a variety of variables such as performance, satisfaction, or innovation (Landy & Conte, 2016). At the end of the first cycle, an assessment of learning should be conducted. The assessment provides data on how well the model helped meet desired outcomes and goals. The assessments also allow learners to self-assess their growth and satisfaction with the experience.

Furthermore, discussions can take place about the next steps for the group. Designers can use this feedback to plan another cycle around the same topic or move on to a more immediate need that the group would like to explore together. Using the same approach, the designer creates a new cycle using the integrated instructional models, and the process repeats for the team.

The final phase in this model emphasizes the importance of evaluation and revision. There are several ways for instructors to evaluate the effectiveness of their instruction while also engaging learners in self-reflection. For instance, Likert-scale surveys can collect participant feedback on the relevancy, collaborative aspects, and future-focused content at the end of every four-week interval. Furthermore, participants can journal or evaluate their understanding before and after the learning experience. Overall, this phase focuses on assessing the instructional model from various angles so that the designer can continue to modify learning cycles to keep the professional learning relevant, collaborative, and future-focused.

Table 1

Phase Elements and Rational

Phase I: Pre-instructional Planning	Rationale	Example
- Virtual Team selection strategies - Survey team participants - Evaluate and decide on communication technologies - Evaluate and select file and resource sharing software - Create instructional outcomes aligned to participants needs at the individual level and team level	- Relevant, just-in-time learning opportunities (AITSL, 2012) - Technology and network selection (Siemens, 2005) - Future-focused, adult learning experiences (AITSL, 2012) - Analyze learners and context (Allen, 2006; Bybee, 2006) - Design learning relevant learning outcomes (AITSL, 2012; Allen, 2006; Bybee, 2006)	7th grade math teams from different schools in same district - Send out survey to participants to gather data on perceived strengths and areas of growth with student discourse - Use GSuite features for communication and resource sharing: Gchat, Google Drive, and Google Classroom - Design group outcomes based on survey feedback and have participants set individual goals for their practice
Phase II: Instructional Planning	Rationale	Example
- Plan initial synchronous meeting - Develop norms and expectations - Apply 5Es Instructional Model to learning - Incorporate frequent community and trust building activities - Integrate Connectivist elements into weekly planning - Incorporate 4-week learning cycles - Plan for reinforcing expectations - Weekly Checks/Formative Assessment	- Build community through synchronous initial meeting, norm creation, and community building activities (Brahm & Kunze, 2012; Erez et al., 2013; Kiffin-Peterson, 2004; Pangeli & Chan, 2012) - Apply instructional design frameworks to create a learner-centered, interconnected experience (Allen, 2006; Bybee, 2006, Siemens; 2005) - Collaborative opportunities and structures lead to knowledge sharing (AITSL, 2012; Bostanciaglu, 2018; Desjardins & Bullock, 2019; Gray & Smyth, 2012) - Create a means of continuously assessing progress toward outcomes (Allen 2006; Bybee 2006)	- Kickoff meeting: bring participants together for community building, norm development, expectations, and logistical overview - Group to generate norms and accountability measures - Instructional Scope Cycle #1 - Week 1: Engage and explore student discourse in a math classroom through independent research - Week 2: Explain learning on students discourse in a math classroom through shared network - Week 3: Elaborate on learning through practical application of discourse strategies and videotape example - Week 4: Evaluate learning through self-assessment - Collaborative norms and expectations each week for engaging in GChat and Google Classroom - Weekly portfolio and reflection for formation assessment checks and individual coaching opportunities - Positive narration in GChat and Google Classroom when meeting deadlines and adhering to group norms
Phase III: Evaluating and Revising	Rationale	Example

Phase I: Pre-instructional Planning	Rationale	Example
• Assessment of learning • Participant self-assessment • Satisfaction survey • Evaluate and plan next cycle	• Evaluate instruction and learner experience for revisions to next learning cycle (Allen, 2006; Landy & Conte, 2016)	• Review teacher videos for application of learning • Participants self-assess on norms, expectations, satisfaction, and new learning • Review data and revise for next cycle

Conclusion

This article has addressed the gap in the literature around virtual teamwork for K12 teachers by providing an overview for how virtual teamwork can support professional learning. As a result of the COVID-19 pandemic, the shift to virtual teamwork and professional learning across many different organizations has created a need for more research on how virtual team approaches might best fit across disciplines. This paper builds on Charteris et al. (2020) by providing a specific instructional framework for virtual teamwork as professional learning for K12 teachers. This instructional framework was developed by synthesizing the literature for online professional learning, effective virtual teams in organizations, and instructional design and learning theories. It is our belief this framework provides a way for practitioners in education to deploy and evaluate a structured virtual team model for various content-area teachers.

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