Designing Online Collaborative Professional Development

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ABSTRACT

Designing Online Collaborative Professional Development

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Trends in teacher education increasingly emphasize the need for quality ongoing teacher professional development that is accessible, flexible, fosters advanced skillset development, and has the power to change teachers’ practice. Participatory approaches to learning that are situated, collaborative, dialogic, and inquiry-oriented promote the development of such knowledge, skills, and practices within professional communities of practice and form a foundation for quality teacher professional development. Current online and collaborative technologies offer significant access, flexibility, and economic advantages and afford individuals ways to connect with others without time and space restrictions, making online teacher professional development possible. Online learning environments where deep knowledge and complex understanding emerge through dialogue and collaboration within communities of practice must be carefully designed. These learning environments are typically context-dependent, and the design solutions and their implementation may vary substantially. Therefore, these designs must be guided by the most current theoretical understanding and best instructional and design practices. Research in this dissertation adds to our understanding of effective online teacher professional development design, development, and implementation practices by responding to a local problem of redesigning existing teacher professional development courses into an online modality.

This dissertation is presented in a three-article format. The first article is an integrative literature review. It contributes by bringing together theories, frameworks, and practices from several different disciplines and could inform online participatory professional development design solutions across various contexts. The second article is a design case featuring a template designed to support progressive knowledge-building discourse, a fundamental feature connecting multiple characteristics that contribute to effective teacher professional development. The third article presents findings from a self-study of design practice. It provides insight into decision-making during purposefully employing technology to meet pedagogical needs during the design process. This study demonstrates that aligning technology and pedagogy is feasible. The concept of pedagogical intent is proposed as a potentially valuable guiding principle that could enable such alignment while designing technology-mediated instruction. Designing high-quality online teacher professional development is a complex yet worthwhile endeavor. This dissertation offers valuable information about theoretical grounding related to designing online professional development, ways that productive dialogue and collaboration can be supported online, and the importance of technology-pedagogy alignment during the design process. We are only beginning to understand what works in online teacher professional development and why it works. More research is needed to identify theoretical frameworks, principles, and processes that could guide both practitioners and researchers in its design, development, implementation, and evaluation.

Keywords: teacher professional development, online collaborative learning, design
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To my husband and children who encouraged me on this wonderful journey of completing a PhD and lovingly supported me through the process. To my chair, Heather, who mentored me, guided me, and encouraged me to finish when it almost seemed impossible. To my committee who provided excellent feedback and support. To all those who inspire me to be a better person.

“Let the main object… to seek and to find a method of instruction, by which teachers may teach less, but learners learn more.”

-- John Amos Comenius
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DESCRIPTION OF RESEARCH AGENDA AND STRUCTURE OF DISSERTATION

This dissertation, *Designing Online Collaborative Professional Development*, is written in a three-article format. The format meets traditional dissertation requirements while also presenting articles that can be published. The first dissertation pages conform with university requirements for dissertation submission. The dissertation chapters are in journal article format and meet the stylistic requirements for submission to education journals.

The three articles presented in this dissertation are part of a larger project to redesign, develop, and successfully implement six classroom-based teacher professional development (TPD) courses, part of the Teaching English Language Learners (TELL) endorsement, into online courses. The project’s main goal was to improve accessibility yet maintain the program’s participatory instructional character. The project was guided by the principles of design-based research, a collaborative approach that supports researchers and practitioners as they systematically engage in an iterative process of analyzing, designing, and evaluating educational interventions with a goal to solve complex and highly contextualized problems in a real-world context (McKenney & Reeves, 2018).

The purpose of the first article, *Engaging Multiple Theories in the Design of Online Professional Development: An Integrative Literature Review*, was to provide an overview of the literature relevant to designing online TPD, identify relevant theories, and recognize best instructional and design practices. Such systematic inquiry into current research forms the basis of design-based research, helps establish what is already known about the problem, reveals the underpinning processes and variables, indicates how they potentially impact the learning process and learning outcomes, and guides the development of potential solutions (Herrington et al., 2007). One of the challenges of this review was that valuable guidance on the topic can be found
across several disciplines (teacher education, learning sciences, educational technology, and instructional design), each with its own terminologies, assumptions, and theoretical and methodological preferences and practices. Therefore, it was necessary to analyze, examine, and combine existing knowledge related to designing online TPD in a way that would consolidate these varied perspectives using an integrative literature review approach (Snyder, 2019). This integrative review of literature presents theories, frameworks, and practices that best support the design of successful online TPD and proposes a way to engage multiple theories in the design process.

The second article, *Facilitating Progressive Instructional Conversation Online*, is a design case that describes the Progressive Instructional Conversation (PIC) template and its intended utility in supporting successful facilitation of progressive knowledge-building discourse in an online teacher professional development course. Design case studies are a rich “description of a real artifact or experience that has been intentionally designed” (Boling, 2010, p. 2) and present a precedent, a particularly valuable form of design knowledge, allowing the reader to grasp the design as it was envisioned and intended by the designers. The integrative literature review presented in the first article identified participation in progressive educational discourse within a professional community of practice as a fundamental feature connecting effective TPD characteristics (Hofmann, 2019). This design case describes individual elements of the template, explains their intended functionality, and provides a theory-based rationale for how the structure and the flow within the template could support progressive knowledge-building discourse online. Examples from the Understanding Second Language Acquisition course illustrate how the template was used in an online TPD course. Although the PIC template was valuable in the course redesign by integrating key pedagogical elements and providing a cohesive structure, its
main contribution is in supporting instruction and learning online through dialogue and collaboration.

The third article, *Pedagogical Intent: Aligning Technology With Pedagogy in Online Course Design*, presents a self-study of design practice that was conducted as part of designing the PIC template intended to support progressive knowledge-building discourse within the online TELL courses. The effectiveness of technology in instructional design is, in part, determined by matching the technology with underlying pedagogical purposes (Antonenko et al., 2017; Bower, 2008; Graham et al., 2014). This study examined collaborative decision-making processes related to designing the template and using it in the design and development of the first online TELL course, Understanding Language Acquisition. The study’s main goal was to identify underlying patterns of decision making during purposefully employing technology to meet pedagogical needs within the design process in order to better understand and improve these practices. Nineteen collaborative conversations and related artifacts were analyzed using process tracing and continuous comparative techniques within the self-study methodology (LaBoskey, 2004; Pinnegar & Hamilton, 2009). The analysis of the data revealed a dynamic yet patterned process of aligning technology with pedagogy within the context of the online TPD course design. Core attributes guiding the template and course design processes contributing to effective online TPD were identified from the data. The concept of pedagogical intent has emerged as the driving principle guiding the alignment process within the context of this project. Furthermore, the iterative process of purposefully selecting technological tools to meet identified pedagogical purposes is described.

Each article provides the references cited at the end of the article. Dissertation references are presented at the end of the whole dissertation document to offer a list of references.
mentioned in the Description of Research Agenda and Structure of Dissertation section and the Dissertation Conclusion section. The appendix at the conclusion of the dissertation contains the Brigham Young University Institutional Review Board for Human Subjects study approval related the study presented in the third article. No Institutional Review Board approvals were needed for studies presented in articles 1 and 2 since no human subjects were involved. Articles 2 and 3 have been submitted to peer-reviewed journals. It is expected that manuscript of the Article 1 will be submitted for review to appropriate publication outlets, such as *Educational Research Review* and *Educational Technology Research and Development*. 
ARTICLE 1

Engaging Multiple Theories in the Design of Online Professional Development:

An Integrative Literature Review

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Abstract

Increased demand for quality professional development programs, the need for flexibility and accessibility of instruction, and rapid adoption of online approaches create an urgency to understand the professional literature’s guidance for designing online teacher professional development. Guidance on the topic is found in related yet distinct fields of teacher education, learning sciences, educational technology, and instructional design, each with its own terminologies, assumptions, and theoretical and methodological preferences and practices. This integrative literature review brings together ideas presented in studies examining different aspects of designing or enacting online teacher professional development and generate a conceptual framework of commensurate theories, frameworks, and practices that could be utilized as a tool while designing online professional development. This review also proposes how to engage multiple theories coherently as part of the design process. Findings from this review can be used to guide decision-making during the design, development, implementation, and evaluation of online professional development design solutions in various contexts.

Keywords: professional development, online learning, dialogic, collaborative, theory, design
Introduction

Professional development supports career growth and advancement and promotes lifelong learning. Whether it is upskilling the employee workforce in the rapidly changing work environment or supporting the continuing development of professionals, there are many common elements that promote individual and team learning, encourage change in beliefs and attitudes, and lead to improvement of skills and practices. Effective teacher professional development (TPD) is necessary for improving the overall quality of education and benefits teachers as they assist individual students with acquiring increasingly complex 21st-century skills. Online and blended approaches to TPD offer significant access to resources, the flexibility of instruction, as well as economic advantages to teachers and teacher educators (Dede et al., 2009; Lay et al., 2020; Parsons et al., 2019; Powell & Bodur, 2019). The ubiquitous presence of online tools that facilitate collaboration and dialogue makes the design and enactment of online participatory TPD an increasingly viable option.

Increased demand for quality professional development programs, the need for flexibility and accessibility of instruction, and rapid adoption of online approaches create an urgency to understand the professional literature’s guidance for designing online TPD, identify relevant theories, and recognize best instructional and design practices. One of the challenges of this task is that valuable guidance on the topic is found in related yet distinct fields of teacher education, learning sciences, educational technology, and instructional design, each with its own terminologies, assumptions, and theoretical and methodological preferences and practices. Therefore, it may be necessary to analyze, examine, and combine existing knowledge related to designing online TPD in a way that would consolidate these varied perspectives using an integrative literature review approach rather than provide a comprehensive literature review that
may be limited to one field (Snyder, 2019). The purpose of this integrative literature review is to bring together ideas presented in studies examining different aspects of designing or enacting online TPD and generate a conceptual framework of commensurate theories, frameworks, and practices that could be utilized as a tool while designing online TPD instruction.

**Designing Successful Teacher Professional Development**

Designing successful TPD is inherently a complex endeavor. TPD and online TPD designs need to be actively developed with an eye firmly on our best theories of how people, and teachers in particular, learn. The other eye needs to look toward the affordances of new technologies and how they might be incorporated … to support teacher [and student] learning effectively and efficiently. (Fishman et al., 2014, p. 263)

This quote brings three key ideas to the forefront. First, careful attention needs to be paid to the way that teachers learn and transform their practice (e.g., Borko et al., 2010; Darling-Hammond et al., 2017; Dede et al., 2009). Second, when we design online TPD, we need to consider how to align our choices of technology and related affordances with the underlying pedagogies and instructional strategies (Graham et al., 2014; Fishman et al., 2013, 2014). Finally, as we seek innovative online TPD instructional solutions that have the potential and power to bring about the desired change in learners’ attitudes, beliefs, knowledge, and practices, it is necessary to deliberately engage a variety of theories in a coherent and strategic way (Ertmer & Newby, 2016; West et al., 2020; Yanchar et al., 2010). Subsequent sections present ideas related to these three topics in more detail, laying a foundation for this integrative literature review’s methods, findings, and discussion sections.
Participatory Teacher Professional Development Transforms Teachers’ Practice

We know that effective TPD plays a vital part in teachers’ growth, promotes student learning, and impacts the overall quality of education (Darling-Hammond et al., 2017; Fischer et al., 2018; Powell & Bodur, 2019). When designing TPD, teacher educators and instructional designers need to consider that effective TPD programs support teachers’ change in beliefs, attitudes, knowledge, and practices (Darling-Hammond et al., 2017; Desimone & Garet, 2015; Guskey, 2002). Decades of research on teacher professional learning suggests that TPD associated with these learning outcomes is typically content-focused and of sustained duration, incorporates active learning and principles of adult learning theory, supports collaboration in job-embedded contexts, models effective practices, offers coaching and expert support, and provides opportunities for feedback and reflection (Borko et al., 2010; Darling-Hammond et al., 2017; Desimone & Garet, 2015; Penuel et al., 2007).

Effective TPD programs assist teachers as they adopt nuanced responses to emergent dilemmas and situated problems encountered in everyday practice (Craig & Orland-Barak, 2015; Desimone & Garet, 2015). These problems are described in the field of instructional design as ill-structured problems and hold multiple solutions, present varied solutions paths, and contain a level of “uncertainty about which concepts, rules, and principle are necessary for the solution … and which solution is best” (Jonassen, 1997, p. 65). Teachers are typically guided to define the problem, seek knowledge and skills from a variety of resources, collaborate with peers to identify ways to resolve it, and apply a solution based on their professional judgment. Development of such a mastery of conceptual complexity and the ability to use gained knowledge in novel classroom situations with a variety of learners demands situated and constructivist approaches to learning, such as inquiry and case-based learning within
communities of practice (Borko et al., 2010; Darling-Hammond et al., 2017; Desimone & Garet, 2015; Jonassen, 1997).

Sociocultural perspectives on learning and teaching (Lantolf et al., 2018; Rogoff, 1990; Tharp & Gallimore, 1989; Vygotsky, 1978; Wells & Claxton, 2002) and related pedagogic models (e.g., Dalton & Tharp, 2002) provide a research-based foundation especially suitable for professional development of teachers. Sociocultural perspective and related approaches are congruent with principles and theories guiding effective TPD and create environments where deep knowledge and complex understandings emerge through dialogue and collaborative participation in carefully designed, contextualized activities supported by experienced instructors. These situated, collaborative, discourse-based, and inquiry-oriented approaches to TPD may be characterized as participatory and stand in contrast with currently more prevalent content-driven and objectivist-oriented approaches to instruction (Sfard, 1998).

Participatory TPD has been typically enacted in face-to-face instructional environments. However, online collaborative technologies make involvement in participatory learning experiences in online and blended modalities increasingly viable options. Online and blended modalities offer significant access, flexibility, and economic advantages and potentially other benefits, such as opportunities for more democratic discourse and space for reflection, which are attractive for teachers as they engage in their ongoing professional development efforts (Dede et al., 2009; Uzuner Smith, 2014). Online collaborative technologies afford new and unique ways of interacting within professional communities of practice, promote collaboration, and enhance critical reflective thinking opportunities that reach beyond the affordances of face-to-face environments (Harasim, 2017; Hrastinski, 2009; Parsons et al., 2019; Swan & Shea, 2005). The implementation of specific TPD features and concrete practices in online settings is contextually
dependent and may vary substantially (Elliott, 2017; Moon et al., 2014; Opfer & Pedder, 2011; Parsons et al., 2019). However, research consistently suggests that pedagogy-based characteristics that guide quality TPD and positively impact teacher change are not dependent on modality and can be successfully enacted online when attention is paid to the underlying pedagogical structures (Borko et al., 2010; Dede et al., 2009; Fishman et al., 2013; Powell & Bodur, 2019).

**Pedagogy-Driven Instructional Design Process**

The notion of aligning technology and its affordances with underlying pedagogy guided by applicable theories and practices is not new. Designing technology-mediated instruction cannot be achieved separately from pedagogical goals. Technology is “simply the means by which students engage in relevant and meaningful interdisciplinary work” (Ertmer & Ottenbreit-Leftwich, 2013, p. 176). When technology and collaborative tools are intentionally used for pedagogical purposes and viewed as a tool to mediate learning, they enable learners to more freely access, analyze, interpret, and represent knowledge to others. Purposeful use of technology enables learners and teachers to connect, communicate, collaborate, and participate with others without time and space restrictions, with a potential to transform the learning process into a more agentive, learner-centered endeavor (Ertmer & Newby, 2016; Ertmer & Ottenbreit-Leftwich, 2013; Jonassen, 1999; Wegerif, 2015).

In this paper, *pedagogy* is conceptualized as a set of theories, theoretical principles, and related practices guiding instructional actions with an overall goal to positively influence the learning process and bring about educationally valuable learning experiences. These instructional actions include judgments, decisions, teaching strategies, and tools suitable for specific instructional purposes in specific instructional contexts. In our view, pedagogy is not just a
random set of teaching strategies or procedures but rather a set of contextually-bound conditions purposefully designed to ensure that teaching and learning exist synergistically and mutually work together and interact to produce a greater combined effect (Craig & Orland-Barak, 2015). Although *andragogy* (Knowles, 1980) may seem to be a more appropriate term in situations where adult learners are involved, the more familiar term pedagogy will be used in this paper as we believe that current views of pedagogy have been assimilating the principles of andragogy, making the distinction between these two terms unnecessary.

Purposeful use of technology and greater attention to the design’s underlying pedagogical purposes is particularly critical for effective technology-mediated TPD designs. Modeling effective pedagogical practices and experiencing these practices firsthand significantly impacts teachers’ learning (Borko et al., 2010; Fishman et al., 2014). Attending to both pedagogy and technology while designing online and blended instruction is emphasized by Graham et al. (2014). Using a simplified theory of design layers (Gibbons, 2014), Graham and colleagues suggest carefully attending to both the physical and the pedagogical layers, each with its own set of core attributes. The physical design layer exemplified by the surface features of presentation and delivery of instruction is related to the medium and its corresponding affordances. This layer strongly influences the cost and access options of the instructional solution, which makes it typically the main focus of the technology-mediated instructional design and development process. On the other hand, the underlying pedagogical layer with its related structures and strategies is often neglected. Yet, the pedagogical layer identified by its core attributes tied to a specific design actually enables the achievement of the desired learning outcomes and is absolutely critical for the overall success of the design. See Figure 1 for a visual representation of the two design layers proposed by Graham et al. (2014).
Clearly articulating the core pedagogical attributes that are expected to influence learning outcomes and providing a theory-based rationale for their selection contributes to better instructional designs (Brown, 1992; Gibbons, 2014; Graham et al., 2014). Our selection of technological tools and their affordances impacts how we can use these tools for pedagogical purposes. Clarifying the strategy and theoretical grounding allows for an “intentional structuring of artifacts and intervention plans to increase the likelihood of particular outcomes” (Graham et al., 2014; p. 18). Core pedagogical attributes explain conditions under which successful learning is expected to take place and should guide our selection of technological tools. For the elements to work well together, both the physical and the pedagogical layer and related attributes need to be considered and aligned during the design process guided by a clearly articulated rationale (Graham et al., 2014).
In the context of educational technology, *affordances* are broadly defined as ‘action possibilities’ that an environment, or a tool, provides to an actor. But can be also seen as ‘enacted affordances’ related to a particular purposeful use of a tool to promote learning and meaning-making for an individual at a specific moment in time (Major & Warwick, 2019). The needed alignment needs to happen between the requirements of enacted affordances (what we need to accomplish pedagogically) and the choice of the action possibilities (what tools can accomplish those purposes). Along the same lines, others point out the need for a more systematic alignment between affordances required by learners’ needs or tasks (enacted affordances related to the underlying pedagogy) and affordances of available technologies (Antonenko et al., 2017; Bower, 2008). Both Antonenko and colleagues (2017) and Bower (2008) propose how such alignment can be practically carried out during designing technology-mediated learning experiences.

Pedagogy guided by apposite theories and theory-based practices should drive all technology-mediated learning designs and our choices of technology. Therefore, instructional designers ought to carefully identify and consider theories and pedagogic strategies suitable for their designs (Ertmer & Newby, 2016; Graham et al., 2014; West et al., 2020).

**Engaging Theory in the Design of Instruction**

Engaging theory as we seek instructional design solutions is critical (West et al., 2020). Theory informs both design and instructional practice and guides pedagogical decisions essential for a sound instructional design. It is the underlying pedagogy of instruction guided by theories that enable learning and lead to desired outcomes (Graham et al., 2014). When applied in practice, theories are conceptual resources that support an understanding of the world, allow for problem exploration, and stimulate innovation. Theories are soft technologies that enable designers to be more flexible and creative as they solve design problems, potentially driving the
Although theories always underlie and shape the design of a course, careful attention to theory is not an intuitive endeavor when instructional design solutions are explored. Instructional designers often struggle with finding ways to use the abstract representations provided by theories to solve specific design problems in particular contexts (Yanchar et al., 2010). Generally, more than one theory is required “because specific situations often demand flexible and nuanced tailoring of process, and no single theory or perspective offers all of the ideas and techniques needed” (Yanchar et al., 2010, p. 51). However, it is challenging to utilize multiple theories coherently. Many instructional designers tend to use a small subset of theories and have only a modest understanding of the underlying assumptions, limits, and alternatives, which may preclude them from applying multiple theories flexibly and in a mutually commensurate way (Gibbons, 2014; Kimmons & Johnstun, 2019; Yanchar et al., 2010). This may be of particular concern when designing online TPD as multiple theories, frameworks, and evidence-based practices originating from different fields of inquiry may need to be brought together.

Multiple theories could be successfully employed as we seek instructional design solutions. Experts recommend several guidelines to be considered: (a) a variety of theories that guide instructional design practice ought to be considered, (b) applicable theories and practices should be identified based on design specifications, (c) underlying assumptions guiding selected theories need to be carefully examined, and (d) it is necessary to apply theories in a conceptually coherent and commensurate manner (Burkhardt & Schoenfeld, 2003; Ertmer & Newby, 2016; Gibbons, 2014; McDonald et al., 2005; West et al., 2020; Yanchar & Gabbitas, 2011). These ideas represent a valuable framework for organizing and analyzing theories, frameworks, and
practices considered in this literature review. Each of these guidelines will be discussed in detail in the sections below.

\textit{A Variety of Theories Guide Instructional Design Practice}

Work in the field of instructional design is guided by a variety of general and localized theories that need to be considered: learning theories, instructional theories and theories of teaching (applied theories), and design theories (Burkhardt & Schoenfeld, 2003; Ertmer & Newby, 2016; Gibbons, 2014). The overarching theoretical paradigms of learning theories, behaviorism, cognitivism, and constructivism, frame our perspective and provide orientation for our understanding, values, and research, as well as design efforts (Ertmer & Newby, 2013, 2016; Harasim, 2017; Kimmons & Johnstun, 2019). Applied theories, such as theories of instruction, theories of teaching, domain-specific theories, and even contextualized approaches, strategies, and practices, which could be considered as an enactment of theories, guide our instructional and design practice in specific contexts and for specific purposes (Gibbons, 2014). Applied theories and practices may be specific to a certain overarching theoretical paradigm, or they can span across and be applicable independently of perspectives. Finally, designing instruction requires the use of design theories, such as curriculum design theories, instructional design theories, and theories guiding design thinking (Gibbons, 2014; Yanchar et al., 2010; Yanchar & Gabbitas, 2011).

Design (or technological) theories are different from scientific theories, which are typically analytic and used “to construct an understanding of the forces that drive natural and human-made phenomena” (Gibbons, 2014, p. 145). Researchers utilizing scientific theories typically control a number of variables in order to study a smaller subset of variables, their outcomes, and interactions and hope to infer a cause-effect relationship. Their goal is to explain
the *how* and *why* of observed outcomes. However, strictly scientific theories and related research are not sufficient to create and study interventions in the rich and constantly changing learning environments of traditional classrooms or online. “Components are rarely isolatable, the whole … is more than the sum of its parts. The learning effects are not even simple interactions, but highly interdependent outcomes of a complex social and cognitive intervention” (Brown, 1992, p. 166). Design theories and models that produce a set of synthetic principles, which can be used to plan, design, and orchestrate various elements necessary for meaningful learning experiences to take place, are needed.

Designers working with design theories utilize them with a different knowledge goal in mind than typical scientific researchers. Designers discover *ways to make things happen* (Gibbons, 2014). They begin with a known outcome and deliberately arrange and adjust a number of variables to reach that particular outcome. Such learning interventions are typically “based on theoretical descriptions that delineate why they work, and thus render them reliable and repeatable” (Brown, 1992, p. 143). However, instructional designers’ efforts are much more probabilistic than deterministic. This means that designers are able to plan for the impact their design will most likely have on the learners but may not be able to predict with certainty how a particular learning experience will unfold in a situated context until it is implemented. That is why learning interventions typically require iterative design efforts to refine learning experiences leading to anticipated learning outcomes.

**Design Specifications Guide Selection of Theories and Practices**

Instructional designers need to deliberately consider and carefully identify theories that could inform their designs. Design specifications identified as part of a project’s front-end analysis provide valuable information and help the design team decide which theories and
practices should be considered. Both explicit and implicit theories guide design solutions and allow engagement with new problems in innovative yet purposeful ways. Clearly articulating theory-based rationale is a necessary part of the design process and improves the overall effectiveness of the learning design (Brown, 1992; Gibbons, 2014; Graham et al., 2014).

Typically, the unique circumstances and constraints of a specific design guide selection of theories. A thorough front-end analysis provides a solid foundation for clearly articulating key design specifications, helping instructional designers identify design core attributes and recognize the most suitable theories and practices that may inform the design efforts. Additionally, closely collaborating with knowledgeable subject matter experts who recommend domain-specific theories and preferred practices provides valuable guidance in the process. As designers consider the design specifications of a particular case and identify its core attributes, it is necessary to consider which overarching learning theory paradigms would best align with the design. It is important to identify which applied theories and practices would support the design and development of the instructional pieces, as well as its successful enactment. Finally, instructional designers need to consider which design theories would align with and support the design and development process of the particular instructional project. Our rationale for selecting theories and practices should always match the purposes and specifications of the design project under scrutiny and inform our design decisions.

Examining Underlying Assumptions

Values are inherently embedded in theories that guide instructional design practice. Being aware of assumptions that accompany one’s instructional and design practices is critical. As instructional designers identify theories and practices applicable for a project, it is important to carefully examine underlying assumptions of selected approaches and recognize assumptions
embedded in specific instructional design solutions that are being developed. Even practitioners that claim to operate outside of theory use implicit theories and pragmatic approaches that carry values and guide their decisions (Boling et al., 2017; Burkhardt & Schoenfeld, 2003; Yanchar et al., 2010; Yanchar & Gabbitas, 2011).

Examining assumptions, including philosophical assumptions, as part of design practice is essential as these assumptions “heavily influence the manner in which instructional problems and solutions are conceptualized” (McDonald et al., 2005, p. 84). Carefully examining assumptions enables designers to consider how congruent a theory is with particular instructional design requirements, which can bring about creative yet conceptually sound solutions sensitive to specific learning contexts rather than rigid, mechanistic, and predetermined applications and practices (McDonald et al., 2005; Yanchar & Gabbitas, 2011).

**Applying Theories in a Conceptually Coherent and Commensurate Manner**

Deliberately selecting theories and practices to guide designs and carefully examining underlying assumptions makes it possible for instructional designers to employ theories and practices in a conceptually coherent and commensurate way. Yanchar and colleagues (2010) studied the views and uses of theories by practicing instructional designers who are frequently required to use theory flexibly and in eclectic ways to make sense of complex design situations and attend to specific contexts with a goal to achieve desirable outcomes and meet design specifications. They observed that although many practitioners find using theories as conceptual tools challenging, they value “having a rationale for design decisions based on theoretical knowledge, in conjunction with practical wisdom and accepted organizational processes” as “a more complete basis for sound professional judgement” (p. 56). Yanchar and colleagues further observed that as designers develop a sense of the craft in instructional design work, they are able
to more flexibly adapt to situations and apply their skills, intuition, and knowledge of theories coherently to produce innovative instructional solutions and not depend solely on technical processes, templates, and techniques (2010).

Examining underlying assumptions when utilizing multiple theories during the design process is one way to ensure that theories are not just used eclectically but are commensurable or compatible with one another (Kimmons & Johnstun, 2019; Yanchar & Gabbitas, 2011) and “achieve a certain [level of] integrity and consistency in our thinking” and design (Wilson, 1997, p. 4). Yanchar and Gabbitas (2011) refer to this careful use of conceptual tools as critical flexibility, allowing for reflective consideration of alternative assumptions that bring about improved design practices and potentially more effective instructional design solutions. Attending to critical flexibility may be especially useful in collaborative designs leading to developing online TPD. Close collaboration between instructional designers and teacher educators naturally leads to sharing different theoretical orientations and exploring assumptions, potentially revealing tensions that may need to be resolved in coherent and productive ways (Voogt et al., 2016).

**Statement of the Purpose**

In spite of all the research in teacher education and instructional design on the topic of online TPD, there is still limited understanding of effective online TPD instructional and design practices. Research needs to focus on what works in online TPD, why it works, and on developing research-based principles that would guide both practitioners and researchers in the design, development, implementation, and evaluation of these practices (Dede et al., 2009; Moon et al., 2014). As proposed above, such efforts ought to consider established effective TPD
characteristics, be pedagogy-driven, and deliberately engage a variety of theories in the design process.

Considering the rapidly growing demand for quality online TPD programs, it seems imperative to examine and bring together theories and best instructional and design practices related to online TPD that come from related yet distinct fields of teacher education, learning science, instructional design, and educational technology. This integrative literature review aims to present theories, frameworks, and theory-based practices relevant for the design, development, implementation, and evaluation of online participatory TPD and propose how these theories could be employed in a conceptually coherent manner. This review contributes in valuable ways and could be used to inform the design and redesign processes particularly in an era when there is a need for rapid transformation of in-person instruction into an online modality.

**Method**

The purpose of this integrative literature review was to bring together concepts, frameworks, theories, and practices presented in studies examining different aspects of participatory TPD in varied technology-mediated environments. The analysis aimed to review literature from the fields of teacher education, learning sciences, instructional design, and educational technology and generate a conceptual framework of commensurate theories, frameworks, and practices that could be utilized as a tool while designing online TPD instruction across varied contexts. Although related, varied historical developments influenced these fields to adopt distinct assumptions, different overall paradigm preferences, and diverse theories, terminologies, methods, and practices, resulting in seemingly conflicting yet parallel advancements (Allman & Pinnegar, 2020; Gibbons, 2014; Kimmons & Johnstun, 2019). Rather than offering a comprehensive investigation of all available sources as would be done in a
systematic literature review, the goal of this review was to connect, combine, and integrate existing knowledge relevant to designing online TPD from these distinct fields in ways that may be useful in additional activities and projects (Snyder, 2019).

An integrative literature review’s main objective is to “combine perspectives and insights from different fields, … analyze and examine the literature and the main ideas and relationships, (and) … generate a new conceptual framework or theory” (Snyder, 2019, p. 336). Such reviews are particularly useful when a researcher wants to study a topic that has been conceptualized differently across various disciplines, such as understanding conceptualizations of online TPD from perspectives of teacher educators, learning scientists, and instructional designers. Although the emphasis is on the integration of ideas rather than reviewing and synthesizing all available published materials, integrative literature reviews strive for high rigor, transparency about the process, data sources, and selection criteria, and follow similar reporting conventions as systematic literature reviews, which is a more common genre of literature reviews (Snyder, 2019). The following sections will specify details about the sources of data, parameters for review, and the analytical process.

**Data Sources**

This integrative literature review used a combination of methods to identify relevant literature as data sources for analysis: library databases, Google Scholar database, and the snowball method. The initial literature search was conducted in February 2019 using EBSCO Host Research Platform, selecting ERIC and APA PsychInfo databases, which are considered important databases when identifying literature related to education, teacher education, learning sciences, educational technology, and instructional design. The following selected keywords and phrases were used: ‘teacher professional development OR teacher PD OR teacher learning’,
online’, and ‘design process’ and yielded 185 results without any additional restrictions. When the phrase ‘English learners/English language learners/second language learners’ was added to specify online TPD for teachers of English learners, only three results were found.

Additionally, the Google Scholar database was used to search for publications that met the search criteria but were not found through the EBSCO Host Research Platform. Google Scholar is a valuable addition to traditional library database searches. Although it is not as focused, it helped locate additional non-peer-reviewed materials and provided valuable information about citation counts and links. The search phrases ‘online teacher professional development design process,’ ‘designing online teacher professional development,’ and ‘redesign online teacher professional development’ were used with the Google Scholar database. The search results were sorted by relevance, searched ‘any time,’ and ‘since 2017’ and the first 60 entries were reviewed for each query. Although there was a significant overlap with the library database search, an additional nine publications were found using this search.

The snowball method was also used to locate articles that met the search inclusion criteria for the review. The snowball method is a way of identifying literature by using a key document on a subject as a starting point, then consulting the biographies and articles that cite the key document to find other relevant titles on the subject. The search was done first retrospectively, starting with a set of key publications that best met the search criteria, searching their bibliographies to find other relevant titles. Google Scholar was used to search prospectively for publications that cited key publications that were found in the retrospective search. Dede et al. (2009), Borko et al. (2010), and Darling-Hammond et al. (2017) served as seminal pieces to guide this review.
The initial body of literature identified using a combination of these data collection methods exceeded 200 publications. Further screening using the inclusion and exclusion criteria was carried out, and a total of 48 articles and publications were identified for more detailed examination. Additionally, primary sources explaining the theories, frameworks, and practices referred to in these publications were identified, examined, and utilized in this review as needed.

**Parameters for the Review**

The searches included peer-reviewed articles, doctoral dissertations, published books, and professional reports. The searches were limited to literature published in English but included studies conducted in various international settings. Inclusion and exclusion criteria for literature selection were guided by the three seminal pieces on designing online TPD and effective TPD instruction, specifically Dede et al. (2009), Borko et al. (2010), and Darling-Hammond et al. (2017). Based on these pieces, the searchers targeted terms and phrases that indicated that the article presented ideas about designing online TPD, technology-mediated TPD, or TPD for teachers of ELs. In addition, publications discussing learner-centered, collaborative, dialogic, and inquiry-based instruction within communities of practice were also included for the review. Pieces that focused on online TPD instruction that did not align with ongoing participatory TPD, such as one-time workshops, just-in-time TPD, independent or self-directed TPD, and MOOCs, were excluded from the search. Studies focusing on ‘collaborative design’ rather than ‘design’ of ‘collaborative’ TPD were excluded unless they also represented the above-mentioned inclusion criteria.

**Analytical Process**

During the initial search, publication titles and abstracts were screened using the inclusion and exclusion criteria stated above. The content of the seminal articles and their
bibliographies were reviewed for additional publications. Google Scholar was used to locate and review articles that cited the seminal pieces (snowball method). This was repeated with other publications that best met the inclusion criteria until the point of saturation was met. Saturation was reached when bibliographies and articles that cited key publications began to repeat key references, and it was no longer feasible to continue to locate additional sources of data. The number of articles was narrowed down to a manageable number using the review parameters, identifying publications that best met the review criteria. Selected publications were reviewed, and the content was carefully analyzed.

The analysis was carried out in two steps, followed by a synthesis of the findings. First, literature was reviewed and organized based on the type of study, type of TPD, and content-areas targeted by TPD (language arts, math, science, etc.). This step helped us develop a general understanding of the data and recognize ideas, trends, and directions that this particular body of literature represented. In the second analytic step, attention was paid to the ways theories and frameworks guided design decisions and processes. We analyzed the ways how particular pedagogical elements, structures, and practices were implemented with attention to the context of the reviewed TPD cases. Paying attention to a particular context and the content areas that each TPD supported was important because pedagogical methodologies are content-specific, and effective TPD instruction typically aims to model the methodologies teachers are expected to enact (Fishman et al., 2014). Understanding this enabled us to see beyond content-specific applications and identify the overall pedagogical intent of the designs, the intended strategies for successful learning to take place, together with its theoretical grounding.

Underlying assumptions were evaluated wherever possible in order to support the integration of the understandings emerging from this review. Theories, models, and frameworks
guiding those decisions were then reviewed using the references to locate specific publications and further examined. Finally, the analyzed information was synthesized and combined to form a coherent framework of theories, models, and practices that could inform the design and development of online participatory TPD. Although these steps are presented as a linear process, the actual process was iterative and much more dynamic as data was continuously collected, analyzed, and interpreted. Trustworthiness in this study was ensured through prolonged engagement with the data, reflexivity, peer collaboration, peer debriefings, and audit trail.

**Findings and Discussion**

This section presents findings synthesized from the literature related to the design and development of online participatory TPD and associated discussion. This information is organized into three sections: (a) a survey of the literature related to designing online TPD, (b) review of theories and practices relevant for designing online TPD, and (c) theoretical orientation to facilitate progressive educational discourse in online TPD.

**Survey of Literature Related to Designing Online Teacher Professional Development**

Potentially, in integrative review, the first step is a survey similar to a systematic review of literature. This allows the researchers to develop a general understanding in which the integrative review can take place and begin to see possible patterns guiding the inquiry. The initial survey identified the following emerging patterns from the data.

First, there is a fairly consistent body of foundational literature guiding the research in TPD and online TPD (e.g., Borko et al., 2010; Darling-Hammond, et al., 2017; Dede et al., 2009; Desimone & Garet, 2015; Fishman et al., 2013; Guskey, 2002). Based on previous research, this body proposes that quality TPD and online TPD tend to be content-focused, ongoing, situated in practice, and incorporate principles of active learning and collaboration within communities of
practice. It also recognizes that these guidelines bring about a range of effective TPD and online TPD design solutions that successfully respond to specific needs in particular contexts.

A second important observation is that not much has been written explicitly about the process of designing and developing online TPD. Lee and Brett (2015), Liu (2012), Ostasheowski et al. (2011), Qian et al. (2018), Ruhalahti (2019), and Uzuner Smith (2014) are a few examples of papers that revealed decision-making during the design, development or implementation of different types of online TPD that were found through our review. Of particular interest to the researchers was Uzuner Smith's featured article discussing frameworks guiding the design and development of online TPD for teachers of English learners (2014). It offered a thorough discussion of theory, frameworks, and context-dependent issues guiding their online TPD design for K-12 teachers. Each study presented their particular design solution to online TPD in their specific context. The most valuable part of these studies was that the authors presented a theory-based rationale for their decisions and revealed their pedagogical intent guiding their particular design and technology tool choices.

Third, several studies featured online participatory TPD, but they typically focused only on a specific type of instruction or an instructional characteristic rather than explaining how multiple features work together to support a successful design solution. For example, Lantz-Andersson et al. (2018), Lee and Brett (2015), and Liu (2012) studied TPD enacted through online teacher communities, and Cho and Rathbun (2013) and Rillero and Camposeco (2018) focused on problem-based learning approach to TPD. Many studies limited their investigations to the effects of a single online course component (e.g., online discussions) on learners’ perceptions, interactional patterns, reflections, or other behavioral responses (e.g., Parsons et al., 2019; Ruan & Griffith, 2011; Yurkofsky et al., 2019). Only limited and fragmented discussions
of integrating multiple types features or instructional characteristics into an online TPD design and related theory-based rationale were found.

Finally, a subset of studies compared online and face-to-face TPD instruction, which was not the focus of our review, yet offered valuable insights into online TPD design decision-making and processes. Fishman et al. (2013) rigorous study, ensued commentary offered by Moon et al. (2014), and consequent Fishman et al. (2014) response is an academic exchange worth mentioning. Fishman et al. (2013) carried out a cluster-randomized experimental media-comparison study of online vs. face-to-face science TPD and found no significant differences between conditions. Specifically, they found that teachers’ learning, classroom practices, and student learning outcomes (a logic chain important for the field) exhibited significant gains in both online and face-to-face conditions, but the differences in gains between the face-to-face and online conditions were not significant.

Fishman and colleagues explained that their no significant differences findings seemed especially meaningful and important because one would expect at least some differences in outcomes since “the affordances differed and thus offered slightly different ways to engage each group of teachers” even if the content “was designed to be the same across both conditions” (2013, p. 435). Moon and colleagues (2014) commented and pointed out that their comparison and resulting findings may not have been “solely about the effectiveness of online versus face-to-face PD, but ... about how modality interacts with the constraints and goals of the particular task” (p. 174). In their response, Fishman and colleagues (2014) confirmed that as part of their design, they indeed aimed to carefully balance the two conditions “with respect to opportunities to learn, while not limiting the natural affordances offered by each medium” (p. 261). They concluded that the no significant differences findings potentially indicate that we ought to be more
concerned with meeting the specific needs and demands of particular contexts than with media effects. This clarification regarding Fishman and colleagues’ (2013; 2014) design choices and intents validates the notion that careful attention to the underlying pedagogy and matching the instruction, methods, and technological tools with intended pedagogical purposes is key to successful TPD and online TPD designs.

**Conceptual Resources Guiding Online Teacher Professional Development Design**

Because studies of online TPD are context and content-dependent, it was not easy to find clear guidance and common threads about the online TPD design process or decision-making across the studies reviewed. We were able to glean from the studies that certain common elements guided the design decisions, such as features of effective TPD. The literature also provided an insight into how these features were implemented in specific contexts and why, which provided further understanding. In order to synthesize the information in a way that would be useful in our own design practice, it was necessary to integrate the findings, insights, guidelines, and theory-based rationales in a new way (Snyder, 2019). We decided to explore theories, frameworks, and practices presented in these studies that could offer a sound theoretical rationale for our design decisions. The following sections review theories, frameworks, and practices that represent effective TPD, theories of online instruction, and design theories suitable for designing online TPD.

**Theories and Practices Related to Effective Teacher Professional Development**

Research on effective TPD practices consistently identifies certain characteristics that support necessary change in teachers’ attitudes, beliefs, knowledge, and practices (Borko et al., 2010; Darling-Hammond et al., 2017; Desimone & Garet, 2015; Guskey, 2002; Penuel et al., 2007). In addition to being content-focused and ongoing, effective TPD programs: (a)
incorporate principles of adult learning theory, (b) support collaboration in job-embedded contexts and professional communities of practice, (d) encourage inquiry and reflection, (e) model effective practices and offer expert support, and are (f) dialogic. An overview of theories and practices related to these characteristics is presented next.

**Adult Learning Theories.** Both the adult learning theory (Knowles, 1980) and the theory of transformative learning (Mezirow, 2003) provide valuable frameworks for effective TPD. The main tenets of Knowles’ adult learning theory acknowledge that adults are generally intrinsically motivated and self-directed learners that appreciate making choices about their learning, including planning and evaluation. Adults benefit from instruction that allows them to integrate their prior experiences and center on solving practical problems related to their work and personal lives (Knowles, 1980). Mezirow’s (2003) theory of transformative learning is valuable in TPD as it utilizes the concept of disorienting dilemmas identified through careful and critical self-reflection on one’s beliefs, values, and experiences to challenge and transform one’s thinking. Transformative learning often involves contrasting perspectives, participation in critical dialectical discourse, and reflective judgment that occur both independently and through group interaction (Mezirow, 2003). When prompted and encouraged to systematically examine and reflect on their practice, teachers frequently identify conflicts between their beliefs about teaching and their own classroom practices that provide a strong impetus for transformation, professional growth, and improvement in their practice making both Knowles’ and Mezirow’s theories and related practices worth consideration when designing online TPD.

**Situated Learning and Community-Based Approaches.** Situated learning (Lave & Wenger, 1991) and community-based models (Wenger et al., 2002) that view learning as practice and participation are especially conducive to TPD (Korthagen, 2010). These models recognize
that knowledge is situated and learning is embedded within activity, context, and culture. As learners interact and collaborate in communities of practice within authentic contexts, beliefs, knowledge, and behaviors are acquired through a process of legitimate peripheral participation as a novice moves from the periphery to the center of a community and becomes increasingly engaged in activities representing the community. Situated-learning and community-based models align with approaches reviewed in the previous section, promote collaborative work, allow for expert support through modeling practices and coaching, and offer opportunities for practice and feedback situated within a context meaningful to the learner, which are necessary when designing effective TPD.

**Inquiry Learning.** Wells’ dialogic inquiry is another model that may be considered as a pedagogy-oriented approach that reflects effective TPD practices. It proposes an inquiry approach as a powerful orientation for learning, teaching, and teacher education (Wells, 1999, 2002). This model is valuable for understanding how effective TPD can be enacted. It is inspired by Vygotsky’s (1986) view of the interdependence of language and learning and argues that inquiry-oriented discourse plays a central role in meaning-making. Learning is considered to be an iterative process, viewed as a progressing spiral, where understanding is developed by building on one’s personal experiences, adding new information, and transforming it through knowledge-building activities into a new understanding that could be applied to future experiences. Both individuals and the community are influenced and transformed through this process. Thus, learning is not a simple knowledge transmission but an orchestrated participation in activities where, through interactions and discourse with others and assistance from more capable community members, the learner becomes a valuable contributor to the community. See the diagram in Figure 2 for a representation of this model.
Central to this approach is building a community of inquiry where learners work together in groups on the same or related inquiries interspersed with whole-class meetings. The teacher-guided meetings are critical to ensuring that learners are progressing. Review, reflection, and planning can take place, and deeper understanding can be achieved through sharing multiple perspectives and alternative solutions as a knowledgeable teacher skillfully move learners toward achieving the instructional goal. The discourse is shaped by the instructional goals as the teacher strategically responds to learners’ contributions and when they identify a moment of difficulty, they can elicit and support desired responses from their learners. Elements within the model do not represent exact sequences of instructional events. Rather, this model is a tool for planning
instructional activities and identifying how learners could be advanced toward deeper understanding through collaborative inquiry.

**Sociocultural Theory.** Research suggests that pedagogy models grounded in sociocultural theory originally developed by Lev Vygotsky (1978, 1986) and elaborated on by many provide a solid foundation suitable for preparing teachers, particularly teachers of English learners. Sociocultural theory (SCT), also referred to as cultural-historical activity theory (CHAT), and related perspectives on learning and teaching consider learning to be inherently a social activity where individuals solve problems, construct personal understanding, and develop abilities and skills by working with others and through negotiating shared meaning in social contexts. Language and other psychological tools are considered essential in the learning process as they mediate the development of higher-order cognitive functions through appropriation and internalization of socially shared practices. Teaching is viewed as assisting learners during meaningful and productive interactions where teachers or more capable peers provide needed assistance within the zone of proximal development (ZPD) and present opportunities for guided acquisition of new knowledge and restructuring of prior understanding (John-Steiner & Mahn, 1996; Rogoff, 1990; Tharp & Gallimore, 1989; Vygotsky, 1978; Wells, 2002).

**Dialogic Learning.** Language, discourse, and dialogue play an important role in promoting learning, thinking, and understanding within participatory TPD (Hofmann, 2019; Littleton & Mercer, 2013; Wells, 2002). People learn and construct complex conceptual understanding as they interact, collaborate, and actively engage through discourse and dialogue with content, peers, and more experienced others (Littleton & Mercer, 2013; Scardamalia & Bereiter, 2014; Vygotsky, 1986; Wells, 1999). Through such dialogic exchanges, whether with others or turned inward with self, spoken or written, our knowledge and understanding are
developed (Harasim, 2017; Mercer et al., 2019; Vygotsky, 1986). It is the primary role of an educator, whether it is a teacher or an instructional designer, “to engage the learners in the specific language or vocabulary and activities associated with building the discipline” and thus help learners become active participants and members of the knowledge community (Harasim, 2017, p. 123).

Educational dialogue, a specific type of learner-oriented classroom communication, has been widely recognized for promoting learning in classroom settings and online (Littleton & Mercer, 2013; Wegerif, 2019). It is different from traditional classroom discourse characterized by the IRE/F exchange (initiation, response, evaluation/feedback) as it is more open, engaging, allows participants to become actively engaged in collaborative construction of complex conceptual and procedural knowledge, and is critical to the process of inquiry (Ferguson, 2009; Littleton & Mercer, 2013; Uzuner, 2007; Wells, 2002). Knowledge-building discourse (Harasim, 2017; Scardamalia & Bereiter, 2014; Wells, 1999), instructional conversation (Dalton & Tharp, 2002; Tharp & Gallimore, 1989), and progressive educational dialogue (Hofmann, 2019) are types of educational dialogue that may be especially relevant when designing online TPD. Progressive educational dialogue, in particular, characterized as a focused, engaged, productive, and reflective dialogue among TPD participants and between the participants and a facilitator, is central to teacher professional learning and participatory TPD (Hofmann, 2019). It advances individual and group knowledge along a flexible trajectory toward a deeper and more complex understanding of context-specific and situational issues and enhances their practical expertise (Darling-Hammond et al., 2017; Dede et al., 2009; Wells, 2002). Indeed, progressive educational dialogue may be one of the generative mechanisms that bring about teacher change as many of the effective TPD elements (i.e., intense collaboration, implicit and explicit modeling,
individualized coaching situated in practice, deep reflection on action and in action, connecting conceptual understanding with tacit practical knowledge) converge in and through such educational dialogue (Hofmann, 2019).

We know that educational dialogues need to be deliberately nurtured and supported in order to be productive and mediate joint intellectual activity (Littleton & Mercer, 2013; Wells, 1999, 2002). Research provides valuable guidelines on how the quality of these educational exchanges can be initiated and sustained, what the teacher’s role is in shaping it, and how these exchanges could be supported in technology-mediated environments (e.g., Cazden & Beck, 2003; Dalton & Tharp, 2002; Goldenberg, 1992; Littleton & Mercer, 2013; Nystrand et al., 2003; Uzuner, 2007). Facilitating educational dialogue and supporting successful engagement in such exchanges should be deliberately considered when designing online TPD. A variety of scaffolding techniques and supportive structures, such as well-designed instructional materials, instructor’s guidance, and using improvable objects to elicit knowledge-building discourse, should be considered (Ferguson, 2009; Ferguson et al., 2010; Harasim, 2017; Uzuner, 2007).

**Online Learning Theories and Frameworks**

A number of theories of online learning have evolved over the years and are represented in the literature review. Three theories grounded in social constructivism that align well with theories and practices related to effective TPD discussed previously are especially worth considering: the online learning theory (Anderson, 2008), the community of inquiry framework (Garrison & Akyol, 2013), and the online collaborative learning theory (Harasim, 2017). In contrast with typical online and distance education approaches that mainly emphasize shaping of independent learning, all three of these theories recognize the central role of dialogue, emphasize
both independence and interaction within learning communities, and honor the active role of the learner and the supportive role of the instructor in the learning process.

**The Online Learning Theory.** Anderson’s theory of online learning acknowledges that effective learning environments are learner, knowledge, community, and assessment-centered yet provide more flexible temporal and spatial access than traditional approaches to learning due to the unique affordances offered by present-day technology (2008). Anderson also recognizes other benefits afforded by technology, such as easy access to content, allowing learners to choose their own learning paths, and, most importantly, enabling interaction and communication beyond what was possible without technology. One of the critical components of Anderson’s online learning theory that is especially valuable when designing online TPD is the attention to different kinds of interaction among learners, teachers, and content. The three most common types of interactions in distance education of learner-learner, learner-teacher, and learner-content first proposed by Moore (1989) are included in Anderson’s model and expanded further by adding teacher-teacher, teacher-content, and content-content interactions (see Figure 3 for detail).

**Figure 3**

*Model of Educational Interactions Proposed by Anderson (2008)*
Another valuable contribution of Anderson’s (2008) online learning model is the conceptual framing of how these interactions play out in independent self-paced instructional models as well as community-based collaborative models (see Figure 4 for detail). The independent (right side) and community-based (left side) elements representing the instructional flow are combined into this model.

Figure 4
Model of Online Learning With Types of Interactions (Anderson, 2008)
Anderson argued that a variety of learning activities from low- to higher-order thinking could be accomplished in technology-mediated environments “using some combination of online community activities and computer-supported independent-study activities” (Anderson, 2008, p. 63). Anderson further explained that self-paced independent models are potentially much easier to scale up than community-based collaborative models due to their extensive and varied interactions, lack of predictable structure, and because they include more variables that designers must take into account.

All these considerations make Anderson’s (2008) model particularly useful when designing online TPD. A strategic mix of different types of interactions is necessary when supporting learning through collaborative work and dialogue in computer-mediated environments. This model supports teacher educators and instructional designers as they carefully consider the nature of the learning tasks (independent vs. community-based) required within a particular context, determine what type and what mix of interactions need to be provided for learners to reach specific learning outcomes in those tasks, and organize those tasks and interactions in strategic ways to support teacher learning.

**Community of Inquiry Framework.** Community of inquiry is an instructional design framework developed by Garrison and colleagues with a goal to facilitate meaningful educational experiences for learners in technology-mediated settings. It is a framework for creating and supporting an educational community where a group of individuals “collaboratively engage in purposeful critical discourse and reflection to construct personal meaning and confirm mutual understanding” (Garrison & Akyol, 2013, p. 105). As discussed previously, developing and supporting communities of practice, purposeful critical discourse, and reflection are key elements of successful TPD. Developing and supporting such communities online may be
especially challenging. Garrison’s framework provides valuable guidance about what elements and processes may be necessary when designing and enacting successful online community-based learning experiences and should be considered when designing online TPD.

The community of inquiry framework defines an effective online or blended learning environment using three major components and its elements: social presence, teaching presence, and cognitive presence. Social presence represents the learners’ ability to actively participate in the community of inquiry through emotional expression, open communication, and group cohesion. Teaching presence is defined as activities that support cognitive and social processes leading to meaningful educational experiences and include instructional management, building understanding, and direct instruction. Cognitive presence focuses on how individual participants are able to construct meaning through sustained communication and is represented by the four phases of the practical inquiry model: triggering event, exploration, integration, and resolution (Garrison & Akyol, 2013).

Garrison and Cleveland-Innes (2005) explained that although the interaction supported through social presence is essential for online learning success, it is not equivalent to interactions representing critical discourse, which is needed for deep and meaningful learning to take place. The phases within the practical inquiry support structured and cohesive discourse interactions that move discussion through the necessary inquiry phases, while the instructor moderates and shapes the direction of the discourse and facilitates high levels of thinking and knowledge construction. “Quality interaction and discourse for deep and meaningful learning must consider the confluence of social, cognitive, and teaching presence – that is, interaction among ideas, students, and the teacher” (p. 143). Higher-order learning that emerges in communities of inquiry represents both the process and its outcomes. Its quality and success are strongly influenced by
the design features (i.e., the structure, types of interactions, sequences of activities) and the teaching approach (facilitating, mentoring, and guidance to support the integration of ideas into meaningful constructs). See Figure 5 for details about the phases of the practical inquiry and notice the similarities that the practical inquiry cycle shares with the dialogic inquiry model proposed by Wells (2002) discussed earlier. These similarities in the inquiry steps, the roles of reflection and discourse, shared assumptions, and common origins potentially enable integration of these two models of inquiry when developing online TPD and supporting deep learning through progressive knowledge-building discourse.

**Figure 5**

*Practical Inquiry Model (Garrison & Akyol, 2013)*

- **Online Collaborative Learning Theory.** The main goal of the online collaborative learning theory proposed by Harasim (2017) is to support learning and knowledge creation through facilitated discourse and collaborative problem-solving in technology-mediated
environments. It is a pedagogically-oriented model rather than an instructional design framework. Online collaborative learning theory asserts that there are three phases of knowledge construction:

1. An idea-generating phase. This is where divergent thoughts on a given topic are articulated and gathered.
2. An idea-organizing phase. During this phase, ideas begin to converge and are compared, analyzed, and selected.
3. An intellectual convergence phase. During this phase, intellectual synthesis and consensus take place, representing a group’s shared understanding and contribution to solving the problem.

See Figure 6 for a visual representation of this process.

**Figure 6**

*Harasim’s Three Phases of Knowledge Construction (2017)*
As learners engage in this three-step process, they are encouraged to actively collaborate, seek solutions to a knowledge problem at hand, and use the language of the discipline. They are encouraged to share their knowledge and experiences throughout the process and plan for applications based on their solutions, which is especially valuable for teachers. The instructor plays an active role as a facilitator and a member of the knowledge community, supports learners as they engage in a discipline-specific discourse and activities, and ensures that the core concepts and practices are understood and enacted.

Just as the theory of online learning and the communities of inquiry framework, the online collaborative learning theory brings together elements and processes that support teachers as they develop a complex understanding of context-specific and situational issues and learn to apply their knowledge and skills in the context of their own classroom. The value of these three theories is that they align well with the theories, frameworks, and practices that are at the core of enacting successful technology-mediated TPD and should be employed when designing and enacting online TPD.

**Instructional Design Theories**

When seeking understanding for complex problems in rich and constantly changing environments within educational contexts, such as online TPD, traditional positivist methods of research, such as quantitative comparative research of carefully controlled experiments or quasi-experiments, may not be adequate. Even interpretivist approaches fall short of being able to generate desired solutions (Brown, 1992; Burkhardt & Schoenfeld, 2003; Gibbons, 2014; Slife, 1998). Individual components cannot be easily isolated, and the whole is often more than the sum of its parts. “The learning effects are not even simple interactions, but highly interdependent outcomes of a complex social and cognitive intervention” (Brown, 1992, p. 166). Likewise,
when developing human-oriented, flexible, and innovative instructional solutions with a goal to enhance the quality of teaching and learning in these conceptually complex and irregular domains, traditional methods of designing instruction, such as ADDIE and its many variations, are useful but may not be sufficient (Jonassen, 1997; McDonald et al., 2005). More flexible yet rigorous and robust approaches that bring together multiple elements and processes in strategic ways and offer iterative and contextually responsive procedures may be more suitable (Brown, 1992; Burkhardt & Schoenfeld, 2003; Fishman et al., 2014; McKenney & Reeves, 2018).

Design-based research methodology and the understanding by design framework are two approaches that meet such criteria and will be reviewed next as suitable instructional design approaches when designing online TPD.

**Design-Based Research.** Design-based research (DBR) is a collaborative approach that supports researchers and practitioners as they systematically engage in an iterative process of analyzing, designing, and evaluating educational interventions with a goal to solve complex and highly contextualized problems in a real-world context where many variables cannot be controlled. DBR integrates both research and design processes, is iterative, use-inspired, and contextually responsive (McKenney & Reeves, 2018). Planning for implementation and spread are encouraged from the initial stages of the design with a goal to identify reusable design and theoretical principles as part of the process (Anderson & Shattuck, 2012). Flexible and iterative cycles of analysis, prototyping, and evaluation support carrying out “formative research to test and refine educational design based on theoretical principles derived from prior research” while ensuring user orientation and contextual responsiveness (Collins et al., 2004, p. 17-18). Dede and colleagues (2009) suggest design-based research as the most suitable method for studying and designing online TPD. This approach offers a ‘best practice’ stance that has proved useful in
complex learning environments”, such as online TPD, “where formative evaluation plays a significant role, … methodology incorporates both evaluation and empirical analysis, … and mixed-method studies with both qualitative and quantitative analyses are important for understanding both whether an [online] TPD program is effective and why” (p. 14).

**Understanding by Design.** When designing online TPD, frameworks for curriculum design also need to be considered. Wiggins and McTighe’s understanding by design framework (2005) is an effective framework for designing classroom instruction and curriculum in K-12 settings and can be successfully applied to both higher education and online learning curriculum development. Sometimes referred to as the backward design framework, it supports the design and development of a rigorous and engaging curriculum focusing on developing a deep understanding and improved student performance. This framework supports designing powerful learning experiences ‘backward’ by aligning desired results with assessments and instructional activities. It is based on theoretical research in cognitive psychology and evidence-based research in student achievement and is conducted in three stages:

1. Desired results are identified.
2. Acceptable assessment evidence is determined.
3. Learning activities and instruction are planned.

Utilizing the understanding by design framework is valuable when designing online TPD courses as the focus is on *uncovering* critical ideas rather than on *covering* all the content. Additionally, the alignment of learning outcomes, instructional content, learning activities, and assessment encourages the principle of continuity (Dewey, 1938), which is especially important when teachers need to connect their prior and future experiences with the instruction.
Applying a variety of theories in concrete instances of our practice, whether it is teaching, developing curriculum, or designing instruction, is important (McDonald et al., 2005) and particularly relevant for online TPD designs. Both the design-based research approach and the understanding by design framework guide design thinking and curriculum development in ways that enable careful integration of theories and practices related to effective TPD and online learning theories as part of the design process. Using these approaches as we seek instructional solutions leads to generating reusable design and theoretical principles contributing to increased practical and theoretical understanding.

**Theoretical Orientation Supporting Successful Online Teacher Professional Development**

Careful examination of theories, frameworks, and practices that could inform online TPD design revealed that certain theoretical orientations and principles are necessary in order to align the design and instructional elements in cohesive and coherent ways and support successful progressive educational discourse, which is central to teacher change (Hofmann, 2019). Carefully examining applicable theories and practices and determining how to integrate them helps designers consider how to create new types of learning experiences utilizing affordances of available technological tools (Ertmer & Newby, 2016). When working with multiple theories and frameworks, it is important to examine their theoretical orientation and underlying assumptions to be able to apply and integrate them in a commensurate and conceptually coherent way (Kimmons & Johnston, 2019; West et al., 2020; Yanchar & Gabbitas, 2011). Such examination is valuable when utilizing multiple theories and frameworks as it enables designers to attend to the critical flexibility principle keeping their design sense open-ended and focused on the theoretical tools fulfilling the design requirements rather than rigidly adhering to one single view (Yanchar & Gabbitas, 2011). Our examination revealed that conceptual tools that inform the
design of online TPD leading to teacher change in attitudes, believes, knowledge, and practices are agentive and participatory, dialogic and collaborative, situated and embedded in meaningful contexts, and recognize and support the critical role of more-knowledgeable others in dynamically supporting learning processes.

Utilizing theories that honor learners’ agency and autonomy is essential in adult learning and TPD in particular (Darling-Hammond et al., 2017), allowing the learners to become active co-designers of their learning experiences, being motivated by solving personally meaningful problems, and integrating learning with their own practical experiences (Matthews & Yanchar, 2018). These learner-centered and responsive approaches for online learning stand in contrast to the traditional mechanistic approaches to designing instruction, which are insufficient and do not bring about the transformation of beliefs, knowledge, and practices necessary for effective TPD. Prioritization of learner agency over collaborative scripting and other mechanistic solutions is essential for online collaborative learning (Wise & Schwarz, 2017). Approaches with a participatory orientation to learning and knowledge building, rather than an orientation toward learning as depositing and retrieving knowledge and manipulating the learner into desired behaviors, are typically open and agentive and more suitable for adult learning and integrating knowledge into practice (Sfard, 1998). Participatory approaches provide multiple opportunities for bringing people together, where learners are exposed to varied perspectives, work together in meaningful ways, observe practices, and support each other in doing and learning (Matthews & Yanchar, 2018). Participatory approaches generally lean toward solving context-relevant practice-oriented problems, representing typical collaborative practices with a community of practitioners. Dialogue plays a central role in these collaborative efforts as participants share
their understanding and variety of perspectives and negotiate viable solutions representing both individual and group knowledge construction.

Because these approaches are embedded in real-life contexts or closely resemble real-life practices, they are especially valuable for developing a deep understanding and practical application in the conceptually complex and irregular domain of TPD. Integrating learners’ prior and current lived experiences as part of the instruction needs to be considered as an important source of context, encouraging flexibility in learning activities and assignments. Finally, the value of a more-knowledgeable other must be considered as an essential part of effective online TPD instructional solutions. Although certain aspects of online TPD can be independent, involving a more-knowledgeable other in a variety of ways in the learning process, whether it is a peer, the instructor, or the designer, provides opportunities for dynamic support for individual learners and their needs and creates conditions for effective learning within the zone of proximal development. An experienced teacher plays a particularly critical role in shaping progressive educational discourse and assisting individual learners in successfully reaching course objectives.

Conclusion

The purpose of this integrative literature review was to bring together theories, frameworks, and practices that could be utilized as a tool while designing online professional development instruction across varied contexts. One of the challenges of this task was that the studies and the guidance on the topic come from teacher education, learning sciences, educational technology, and instructional design, each with its own terminologies, assumptions, and theoretical and methodological preferences and practices. It was necessary to analyze, examine, and combine existing knowledge related to designing online TPD in a way that would
As it was necessary to integrate multiple theories, frameworks, practices that come from different disciplines in a coherent and commensurate way, we needed to recognize key principles to guide these efforts and identify how this could be carried out. The literature clearly suggested three guiding principles to support the design and development of successful innovative online TPD solutions. First, careful attention needs to be paid to how teachers learn and transform their practice (e.g., Borko et al., 2010; Darling-Hammond et al., 2017; Dede et al., 2009). Second, we need to consider how to align our choices of technology and related affordances with the underlying pedagogies and instructional strategies (Graham et al., 2014; Fishman et al., 2013, 2014). Third, it is necessary to engage a variety of theories in a coherent and strategic way (Ertmer & Newby, 2016; West et al., 2020; Yanchar et al., 2010). The literature also provided guidance on how to engage multiple theories as part of the design process (Burkhardt & Schoenfeld, 2003; Ertmer & Newby, 2016; Gibbons, 2014; McDonald et al., 2005; West et al., 2020; Yanchar & Gabbitas, 2011). This can be done as we (a) recognize the types of theories that guide instructional design practice, (b) identify applicable theories and practices based on design specifications, (c) carefully examine underlying assumptions guiding selected theories, and (d) apply selected theories in a conceptually coherent and commensurate manner.

These guiding principles and processes supported our inquiry and enabled us to examine and synthesize studies and related conceptual tools in a way that could guide our own design practice. This integrative review of literature enabled us to examine theories, frameworks, and practices together with corresponding assumptions, recognize which conceptual tools would best support the design of successful online TPD, and articulate a theory-based rationale for those
choices. Facilitating progressive educational dialogue within a professional community of practice was found to be a central feature connecting and supporting effective TPD characteristics (Hofmann, 2019). Participating in progressive educational dialogue while collaboratively solving real problems related to their own practice assists teachers as they develop a more complex understanding of context-specific and situational issues, potentially leading to changes in attitudes, beliefs, knowledge, and practices. This literature review contributes to our understanding of both instructional and design principles that need to be considered in supporting progressive educational dialogue while designing online TPD. It proposes ways pedagogical purposes can be attended to and aligned with technological affordances. It also recognizes that the principles of sociocultural theory are compatible with theories of online instruction and can be used in conceptually coherent yet flexible ways to bring about specific design solutions.

Findings from this literature review can be used to guide decision-making during the design, development, implementation, and evaluation of online TPD and other professional development design solutions. This review contributes new ideas “by providing original synthesis, applications to practice, … [and] wholly new conceptual understanding about the variables and influences related to [designing] teaching and learning” (West et al., 2020, p. 594). This integrative literature review further contributes by suggesting ways how we could engage multiple theories in design practice. At the same time, this work reveals a gap in understanding how to generate more practice-oriented and context-specific literature reviews.

Limitations of This Literature Research

This literature review is not comprehensive as the goal was to identify broad patterns and integrate theories from multiple disciplinary fields. Another limitation of this work is that it is
highly contextual, trying to identify conceptual resources that would guide the design of participatory online TPD with already existing design specifications in mind. Yet, the findings may be applicable and useful for designing instruction and professional development solutions across a variety of contexts that require the development of conceptual complexity and enhanced ability to use gained knowledge in novel situations.

Additionally, choices in this literature review were made from a teacher education perspective, which is not typical for instructional design reviews. This perspective guided the researcher’s ontological orientation as well as the selection of theories. Other orientations and theories could have been selected for a different solution (e.g., cognitive constructivism and 4C-ID – complex learning instructional design approach).

**Directions for Future Research**

This integrative literature review was only an initial survey of the literature with a goal to provide guidance for our own online TPD design efforts. More comprehensive analysis and synthesis of literature relevant to designing online TPD within and across different disciplines need to be carried out. Such efforts demand the knowledge, expertise, and theories of professionals from these disciplines, as well as intense collaboration “to develop common understanding at these intersections of knowledge” and bring about effective design solutions (West et al., 2020, p. 593).
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ARTICLE 2

Facilitating Progressive Instructional Conversation Online

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Abstract

Quality teacher professional development is critical for improving 21st-century education. Effective teacher professional development is participatory in nature, i.e., situated, inquiry-based, dialogic, and collaborative. Current collaborative technologies make involvement in online participatory learning experiences increasingly possible. This design case study presents the Progressive Instructional Conversation (PIC), a pedagogy-based template that guided the redesign of existing teacher professional development courses grounded in sociocultural practices into an online modality. Although the template was valuable in the course redesign by providing a cohesive structure and integrating key pedagogical elements, its main contribution is facilitating instruction and learning. The PIC template links different types of learning activities within each module, intentionally creating coherence and continuity of instruction, supporting both facilitators and learners as they engage in an ongoing dialogue and collaboration. The template elements and their role in facilitating the process of inquiry and collaborative construction of complex conceptual and procedural knowledge in online teacher professional development courses are presented and discussed. Utilizing a template that facilitates the development of conceptual complexity and the ability to use gained knowledge in novel situations creates powerful opportunities for building and implementing more accessible and flexible professional development for teachers and other professionals.

Keywords: online learning, teacher professional development, knowledge building, discourse, design case
Introduction

Varied successes with emergency technology-mediated teaching during 2020 (Whittle et al., 2020) underscored the importance of grounding our instructional designs and practices in our best understanding of how people learn and what types of knowledge the learner needs to develop within a particular domain. This is especially imperative in the area of teacher professional development (TPD) as teachers tend to perpetuate practices that they experienced themselves and consider effective. Quality TPD is unquestionably one of the critical elements for improving 21st-century education.

Research has consistently identified effective TPD practices associated with increased teacher knowledge and change in practices as content-focused, situated, inquiry-based, incorporating principles of active learning and adult learning theory, providing opportunities for reflection, modeling effective practices, and offering coaching and expert support (Borko et al., 2010; Darling-Hammond et al., 2017; Desimone, 2009; B. J. Fishman et al., 2014; Guskey, 2002; Penuel et al., 2007). Attending to these guidelines within sociocultural perspectives on learning and teaching (Rogoff, 1990; Tharp & Gallimore, 1989; Vygotsky, 1978) and related pedagogy models (e.g., Dalton & Tharp, 2002) provide a research-based foundation especially suitable for TPD that educates teachers of English learners (ELs). These approaches create environments where deep knowledge and complex understanding emerge through dialogue and collaborative participation in carefully designed contextualized activities supported by experienced instructors. Such TPD approaches are characterized as participatory and stand in contrast with more prevalent content-driven and objectivist-oriented instructional approaches (Sfard, 1998).

Participatory TPD has been typically enacted in in-person instructional environments. However, online and blended modalities offer significant access and economic advantages and
potentially other benefits. Among others, flexibility in synchronicity, pace, and interactions, access to more democratic discourse, space for meaningful reflection, a potential for situating instruction in teachers’ practice, and embedded coaching and skills development are attractive features as teachers engage in ongoing professional development efforts (Dede et al., 2009; Parsons et al., 2019; Powell & Bodur, 2019; Uzuner Smith, 2014). Current and emerging collaborative online technologies make involvement in participatory learning experiences online an increasingly viable option and afford new and unique ways of interacting within communities of practice (B. Fishman et al., 2014; Harasim, 2017; Hrastinski, 2009; Swan & Shea, 2005).

Such educationally valuable learning experiences can be designed when underlying pedagogy strategies and structures guide our technology choices and decisions about how the technological tools are used (Allman & Pinnegar, 2020; Ertmer & Newby, 2016; Graham et al., 2014; Wegerif, 2015). When technology and collaborative tools are used as tools for learning, they enable learners to more freely access, analyze, interpret, and represent knowledge to others, transforming the learning process into a more agentive, learner-centered endeavor (Jonassen, 1999). Furthermore, technology as a medium for collaborative thinking opens up a dialogic space and enables learners to connect, communicate, collaborate, and participate with others in a knowledge-building and reflective discourse without time and space restrictions, and offer the possibilities of electronic apprenticeship, coaching, and mentorship. Such dialogic spaces are conducive to building and fostering virtual communities of practice (B. J. Fishman et al., 2014; Harasim, 2017; Swan & Shea, 2005; Uzuner Smith, 2014; Wegerif, 2015).

Learning is not a simple transmission of knowledge but an orchestrated participation in activities where through discourse and interactions with peers and assistance from more-experienced others, the learner becomes a valuable contributor in the community. It is the
primary role of an educator, whether it is a teacher or an instructional designer, “to engage the learners in the specific language or vocabulary and activities associated with building the discipline” and thus help them become active participants in the knowledge community (Harasim, 2017, p. 123). Educational dialogue, a specific type of open, learner-centered classroom communication, has been widely recognized for promoting such learning in classroom settings and online (Mercer et al., 2019). The quality of educational dialogue is considered critical to the process of inquiry, promoting active engagement in the collaborative construction of complex conceptual and procedural knowledge. Dialogical engagements need to be deliberately designed, initiated, nurtured, and supported to be productive and mediate joint intellectual activity (Bereiter & Scardamalia, 2016; Ferguson, 2009; Littleton & Mercer, 2013; Tharp & Gallimore, 1991; Uzuner, 2007; Wells, 2002).

Instructional conversation and knowledge-building discourse are two types of educational dialogue that are particularly relevant to this study. An instructional conversation allows the learners to deeply engage in learning with the assistance of a facilitator. It fulfills both instructional and assessment functions and is especially valuable for teachers of ELs (Dalton & Tharp, 2002; Tharp & Gallimore, 1991). Knowledge building discourse is associated with problem-based learning that engages learners in collaborative knowledge creation and occurs frequently in technology-mediated environments (Scardamalia & Bereiter, 2014). These types of educational dialogue encourage progression towards a specific goal, typically associated with a joint product, enabling the learners to build on their prior knowledge and experiences, and consider multiple perspectives as they examine and apply new concepts. In the process of developing new understanding and generating solutions, higher rates of student talk are
encouraged, and both structured and spontaneous assistance is provided to support completion of the task and foster critical thinking, reflection, and meta-dialogue.

Designing opportunities for a sustained educational dialogue with these characteristics is at the core of enacting successful technology-mediated TPD. Additionally, connecting different learning activity types within each module, weaving individual and group work, and intentionally creating coherence and continuity of instruction further supports teachers as they develop a complex understanding of context-specific and situational issues and learn to apply their knowledge and skills in the context of their own classroom. Our current understanding of effective online TPD learning experiences, instructional methods, and related design practices is still limited. More research is needed to identify what works in online TPD and why it works to bring about research-based principles to guide practitioners and researchers in the design, development, implementation, and evaluation of these practices (Dede et al., 2009; Moon et al., 2014).

**Purpose of the Study**

This design case contributes to the understanding of online TPD instructional and design practices by presenting the Progressive Instructional Conversation (PIC) template, a framework that was created to facilitate the process of inquiry and collaborative construction of complex conceptual and procedural knowledge in online TPD courses. This design case’s main purpose is to explain the structure and intended functionality of the PIC template.

Generally, the reader rather than the writer determines the utility of a design case (Howard, 2011). However, we propose that this design case may be especially valuable to those designing technology-mediated professional development for ill-structured domains that promote theory-to-practice connection within professional communities of practice, require mastery of
conceptual complexity, and enhanced participants’ ability to use gained knowledge in novel situations (Spiro et al., 1991). Such fields have traditionally relied on case-based instruction and include teaching, counseling, medicine and nursing, law, business, management, and more.

**Context of the Design**

This study was part of a larger design-based research project (McKenney & Reeves, 2018) at a large private university in the western United States. The project’s overall goal was to redesign six participatory TPD courses, an existing Teaching English Language Learners endorsement program, into fully online instructor-led courses to improve instructional access and flexibility. Seeing rapidly changing trends in English learners (ELs) populations across the nation and recognizing the positive effects of this program on teachers, their classroom practices, and potentially their students affirmed the urgency to offer the program to more teachers and reach especially those with limited access to quality TPD, such as teachers in rural districts (Hussar et al., 2020). Online TPD with its potential for flexible access, better matching teachers’ demanding schedules, utilizing valuable resources that may not be available locally, and having significant cost benefits to states, districts, and individual teachers (Dede et al., 2009; Parsons et al., 2019; Uzuner Smith, 2014) appeared to be a promising solution.

Even with the potential benefits and incentives afforded by online education, some stakeholders with extensive teacher education experiences were concerned about the online modality not being able to offer learning experiences beyond content transmission. They also worried that courses in an online modality might not facilitate the development of intricate knowledge and skills that integrate theory with practical application within communities of practice grounded in sociocultural perspectives. Therefore, maintaining the participatory character of instruction while taking full advantage of available online resources and affordances
became the project’s fundamental design specifications. We hoped that carefully attending to the principles of effective TPD during the design and enacting and actively modeling targeted instructional practices would facilitate comparable learning experiences and lead to similar changes in teachers’ attitudes, knowledge, and practices independently of modality as suggested by B. Fishman et al. (2013). The PIC template was created to maintain the participatory character of instruction, systematically guide the redesign and development processes across the program, and support effective facilitation of the completed courses. The process of designing the PIC template coincided with redesigning the Understanding Language Acquisition program course.

**Design Team and Theoretical Perspectives**

The design team included the program instructional designer, a collaborating instructional designer, and the program director, who is a senior teacher education faculty member. The team represented extensive collective expertise in instructional design, curriculum development, K-18 teaching, EL instruction, and TPD grounded in sociocultural practices. Sociocultural views of learning and teaching (John-Steiner & Mahn, 1996; Rogoff, 1990; Tharp & Gallimore, 1989; Vygotsky, 1978; Wells, 2002) and theoretical perspectives of online learning informed by social constructivist theories guided our design. A theory of online learning (Anderson, 2008), the dialogic inquiry model (Wells, 1999), the communities of inquiry’s practical inquiry model (Garrison & Akyol, 2013), and the online collaborative learning theory (Harasim, 2017) were especially informative in our design process. All of these models were attended to in the design.

Theories and models are conceptual resources that enable designers to be more flexible and creative as they solve design problems and make decisions (Yanchar et al., 2010). Carefully examining applicable theories and practices and determining how to integrate them helps
designers carefully consider how to create new types of learning experiences utilizing affordances of available technological tools, which in turn lead to the development of transformative pedagogies and innovative instructional solutions (Ertmer & Newby, 2016). A challenge often arises that more than one theory may be needed in addressing the problem “because specific situations often demand flexible and nuanced tailoring of process, and no single theory or perspective offers all of the ideas and techniques needed” (Yanchar et al., 2010, p. 51). Furthermore, it is often difficult to utilize multiple theories coherently. Research suggests that instructional designers select applicable theories for their design, carefully examine their underlying assumptions, and ensure that they are applied in a conceptually coherent and commensurate manner (Burkhardt & Schoenfeld, 2003; Ertmer & Newby, 2016; McDonald et al., 2005; Yanchar & Gabbitas, 2011). We followed these steps in our design process and considered applicable theories and models based on design specifications and requirements. We carefully examined our own theoretical orientation, as well as, the underlying assumptions of selected theories and models and recognized similarities and differences. Wherever possible, we treated these perspectives as commensurate and conceptually coherent. In an instance, when these theoretical views did not align, we attended to the critical flexibility principle proposed by Yanchar and Gabbitas (2011), keeping our design sense open-ended and focused on the theoretical tools fulfilling the design requirements rather than rigidly adhering to one single view.

The overall design approach was guided by the design-based research principles of being iterative, integrating research and design processes, and being use-inspired and contextually responsive (McKenney & Reeves, 2018). This approach is considered rigorous and appropriate, yet sufficiently flexible for seeking solutions for complex problems in educational contexts.
Research Design

This investigation and related findings are presented as a design case study, a rich “description of a real artifact or experience that has been intentionally designed” (Boling, 2010, p. 2). Design cases present precedent, a particularly valuable form of design knowledge, allowing the reader to grasp the design as it was envisioned and intended by the designers. They are instrumental in disclosing localized design practice details, related experiences and understanding, and innovative solutions to complex challenges (Boling & Smith, 2012). The rigor of design cases is measured by the naturalistic inquiry standard of trustworthiness (Boling, 2010). This study’s trustworthiness was established through prolonged engagement with the phenomenon under investigation, detailed and transparent descriptions, peer debriefing, member checks, and negative case analysis (Lincoln & Guba, 1985).

Design Description

This design case describes the PIC template structure and explains the intended functionality associated with facilitating progressive knowledge-building discourse in the online TPD courses. Design experiences related to the template development and the analysis of the process of aligning the choice of technology with underlying pedagogical structures is presented elsewhere (Allman & Leary, 2021; Allman & Pinnegar, 2020).

While online modality offers many advantages, the pressures to develop courses quickly and at low cost may sometime lead to online instructional designers fitting content into predetermined templates without attending to underlying pedagogy resulting in courses focused on delivering content rather than supporting content learning, transfer to real-life situations, and meaning-making within communities of practice (McDonald et al., 2005). Indeed, designing courses by inputting content into predetermined templates may limit attention to the underlying
pedagogical requirements and attending to learners’ needs. It may not allow designers to fully consider and apply the methodologies required to effectively teach given content within specific contexts. Lack of attention to the underlying pedagogy, which directly influences the achievement of learning outcomes, may be particularly problematic in designing online TPD courses. This is so because modeling effective practices, incorporating principles of active learning and collaboration, coaching, and expert support require frequent and highly-responsive learner-learner and learner-facilitator interactions are necessary features of successful TPD (Borko et al., 2010; Darling-Hammond et al., 2017; Desimone, 2009; B. J. Fishman et al., 2014; Penuel et al., 2007). Developing a template that promotes coherence and continuity of instruction while taking into account pedagogical requirements and being contextually-responsive provides the needed support for designing effective online TPD.

The title Progressive Instructional Conversation (PIC) reflects the template’s pedagogy-centered purpose of promoting and advancing instructional conversation and knowledge-building discourse within each module. It creates an environment for the course participants to become actively involved in the learning process, collaborate within communities of practice with assistance from the facilitator, and advance from theoretical understanding to practical application.

The PIC template represents the structure of each course module. The predictable pattern supports both the learners and the facilitator by lowering cognitive demands, focusing their attention on the learning experiences rather than course organization, yet advancing them along the spiral of knowing. This program’s course design typically involves ten thematically-focused modules in each course. Each module supports the development of a section of the practicum-based portfolio course assessment. Content within each module is organized into four topics,
assisting learners in progressing horizontally from theory toward practical application and vertically from independent and collaborative work toward assisted learning, reflection, and performance. These progressions are discussed in detail below, presenting the structure, intended functionality, and examples from the Understanding Language Acquisition course. Refer to Figure 1 as the template is described in subsequent sections.

**Figure 1**

*The Progressive Instructional Conversation Template Structure*
The Horizontal Progression

The PIC template’s horizontal progression supports the learners as they move across the four topics in each module from theoretical focus to practical application (see Figure 1). This theory-to-practice progression is an essential element of effective TPD as it provides a way for teachers to reflectively transcend the theory-practice divide and become comfortable with operating from a principle-based practice stance while flexibly responding to the messy yet, the most important practical problems within their classrooms (Craig & Orland-Barak, 2015).

Explicitly attending to this horizontal theory-to-practice progression around module topics creates a pattern of the unfolding of complex theoretical concepts in familiar and learner-friendly terms, assisting learners as they interpret their prior practical experiences through a theoretical lens, and supporting the learners as they practice grounding their future classroom practices in a solid theoretical understanding. Teachers need to develop such mastery to effectively and flexibly use their theoretical understanding in their everyday practice as they work in various situations with a variety of learners (Darling-Hammond et al., 2017).

The horizontal theory-to-practice progression is actualized in each module by the content pages and related learning activities, first attending to key theories and principles related to the module theme. Next, the content and learning activities present sound pedagogical practices grounded in those theories. At the end of the module, the content pages and learning activities feature examples of specific classroom applications and tools related to the module theme. For example, the module 5 theme is the role of meaningful interaction in language learning. See figure 2 for an illustration of the horizontal progression in module 5. Segment 5.1 introduces the concept of interaction, connects it to the course theoretical framework, and presents two theories related to interaction in second language acquisition, Long’s interaction hypothesis and Swain’s
theory of comprehensible output (for an overview of both theories, see Gass & Selinker, 2008, pp. 325-328 and pp. 349-355 correspondingly). Segment 5.2 builds on segment 5.1 by introducing specific theory-based principles that could be applied by both students and teachers, such as taking risks and communicating, maintaining a safe environment, providing a variety of opportunities for interaction, and teaching communication strategies and strategies for negotiating interaction. Segment 5.3 focuses on identifying various classroom interactional patterns and introduces a simple analytic tool helping teachers identify and analyze these patterns within their own classroom. Segment 5.4 brings together ideas from previous modules and guides the teachers as they plan for a variety of interactions among students in their classroom and minimize existing constraints by employing the standards for effective pedagogy framework (Dalton & Tharp, 2002).

Figure 2
An Example of the Template’s Horizontal Progression

<table>
<thead>
<tr>
<th>Segment 5.1</th>
<th>Segment 5.2</th>
<th>Segment 5.3</th>
<th>Segment 5.4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Understanding Interaction</td>
<td>Student Work and Teacher Work in Interaction</td>
<td>International Patterns in Classrooms</td>
<td>Questioning Supports and Constraints</td>
</tr>
<tr>
<td>Learning Activity 5.1</td>
<td>Learning Activity 5.2</td>
<td>Learning Activity 5.3</td>
<td>Learning Activity 5.4</td>
</tr>
<tr>
<td>Negotiating Meaning</td>
<td>Work in Interaction</td>
<td>Classroom Interaction Analysis</td>
<td>Facilitating Interaction</td>
</tr>
</tbody>
</table>

Unit 5: Instructional Conversation

Unit 5: Reflection

PA 5: Interaction – How Can I Increase Opportunities for Meaningful Interaction?
The Vertical Progression

The PIC template’s vertical progression describes each module’s learning process advancing from individual and small group learning toward assisted instruction, reflection, and performance assessment (see Figure 1). This progression is based on a well-known notion of the zone of proximal development (Vygotsky, 1978), where individuals are supported in their learning by peers and the facilitator (a more-experienced other) who safely challenge thinking and help develop understanding beyond what can be done independently by each individual. Over time, learners develop more complex understanding and participate in dialogue and other community activities more fully.

Learners begin each module by studying content independently, preparing them to work in small groups on a collaborative assignment related to the content studied independently. As groups complete their collaboration, a facilitator who has monitored their progress assists individual learners to make deeper connections across topics within the module. The facilitator also further challenges thinking, highlights and shares notable examples of practical application across groups in preparation for the assessment, which is completed individually by each learner. All instructional elements, i.e., learning, assisted instruction, assessment, are always present, but the emphasis changes with the progression. For example, the individual and small group work focus on learning content but a level of instructional assistance and an ongoing assessment element are also present. On the other hand, the practicum’s primary focus is on assessing individual learners’ content knowledge and application in classroom contexts. It also involves some instructional elements and allows opportunities for peer feedback, individualized instruction, and coaching.
Each learning phase within the PIC template’s vertical progression is described below. Its intended functionality and pedagogical purpose are characterized by two key theory-related factors: the *type of interactions* as informed by the theory of online learning (Anderson, 2008) and the *phase within the inquiry cycle* informed by the dialogic inquiry model (Wells, 2002), the practical inquiry model (Garrison et al., 2001), and the online collaborative learning model (Harasim, 2017).

**Independent Learning of Content**

Each module’s theme is presented through key questions and related practical problems to be solved. This represents the initial stages of the inquiry process (Garrison et al., 2001; Harasim, 2017; Wells, 2002), triggering the independent learning phase when learners become familiar with the content of the module. This phase is characterized by the learner-content type of interactions (Anderson, 2008) and represents the research phase of Well’s dialogic inquiry model (2002) and the exploration phase of the practical inquiry model (Garrison et al., 2001). Here learners independently interact with content, grasp the nature of the problem at hand, explore issues and possible solutions presented by experts, and connect these ideas to their prior practical experiences. Independent learning is a critical step for the idea-generating phase (Harasim, 2017), therefore the designer needs to attend to preparing the learners to share valid ideas with others. This phase of the PIC template is intended to ready the learners for active participation in small group work providing common conceptual ground, situating the content in learners’ lives and practice, and initiating the process of reflection. Learners are held accountable for learning during this stage through production of an individual product representing their learning, which becomes a starting point in the next learning phase, collaboration in small groups.
Typically, the content is presented through a mix of teacher-oriented textual narratives, short video segments of experts explaining key concepts, classroom practice examples, and occasional selected readings. Specific questions to consider highlight important concepts in each segment and guide the learners’ inquiry throughout the independent learning phase. This structural support in the form of open-ended questions encourages learners to think beyond the content being introduced and connect the concepts to prior experiences and knowledge, as well as, their teaching practice. See Figure 3 for an example of content organization and the use of the questions from the course.

**Figure 3**

*An Example of Independent Learning Content Organization*

## Collaboration

**Questions to Consider**

- Why should teachers collaborate?
- How can collaborating with other people in different disciplines and classrooms within your school setting support English language learners?

We are encouraged to collaborate as we use the inclusive Pedagogy framework to learn about our students and investigate our practices and our curriculum. Listen to Jana Echevarria from California State University, Long Beach, and Margarita Calderon from John Hopkins University speak about collaboration’s role in the teaching profession.

The individual products produced by learners at the end of each content segment are deceptively simple yet tangible extensions of the learners’ independent learning, ranging from notes responding to questions to consider, the articulation of new questions, or application to more complex tasks and practice-based outcomes, such as drafting an argument, applying a
classroom tool, or analyzing student work. Grading these simple assignments for completion motivates learners to complete their content study on time and be prepared to actively participate during group collaboration. Having tangible evidence of learning also enables the instructor to monitor learners’ progress as needed.

*Small Group Collaborative Activities*

Learners build on their individual learning by engaging in group work with a cohort of two or three colleagues, which ensures that all equally participate. Collaborative work is valuable in teacher education as it provides a trusting environment and opportunities to review, reflect on, and attend to potential dilemmas in one’s practice, negotiate complex context-specific solutions, and take risks in exploring new possibilities (Darling-Hammond et al., 2017). The small group collaborative activities phase represents the learner-learner type of interaction described by Anderson (2008). Although implementing this type of online interaction may have been limited in the past, current and emerging collaborative technologies enable a wide variety of synchronous and asynchronous group interactions beyond traditional threaded discussions. Small group collaborative activities are an important step in building communities of inquiry representing the interpreting phase of Well’s inquiry-oriented curriculum model, serving as a bridge between the research and presentation phases (2002).

Likewise, small group work represents the end of the practical inquiry exploration phase and the beginning of the integration phase (Garrison et al., 2001), where participants “shift between the private, reflective worlds of the individual and the social exploration of ideas” (p. 10). During this idea-generating phase, learners practice divergent thinking as they brainstorm, consider multiple perspectives, and organically explore possible solutions to the problem at hand. Somewhere in the middle of collaboratively working with peers, possibly due to the opportunity
to articulate what they know, the learners demonstrate intellectual progress in their discourse and begin the process of conceptual change and intellectual convergence. They clarify understanding, organize ideas, and seek and negotiate acceptable solutions for a common task that expands both individual and group understanding (Harasim, 2017). In the process, the group discourse becomes exploratory rather than cumulative or disputational and potentially becomes a part of a progressive discourse associated with sustained development of ideas (Ferguson et al., 2010; Littleton & Mercer, 2013), which the structure of the PIC template promotes. Supporting progress in the group discourse toward deeper understanding and social application during collaborative activities is central to building a community of inquiry. It is also the means for collaborative knowledge building and generating individual understanding through language (Harasim, 2017; Scardamalia & Bereiter, 2014; Wells, 1999).

Progression in discourse and collaborative work can be encouraged through various scaffolds, such as clearly written instructions, strategic prompts, and a common goal in the form of an improvable object. An *improvable object* is typically a collaboratively-constructed artifact developed by a group solving a practical problem. As learners engage in collaborative work with a common goal, a space and a purpose for developing new and more complex understanding are provided. Improvable objects focus the group’s dialogue and knowledge-building efforts and, at the same time, embody the progress made (Ferguson et al., 2010; Scardamalia & Bereiter, 2014; Wells, 2002). In our courses, the improvable object is a group work product, usually a summary of the group’s proposed solution to the task.

An example of a small group collaborative activity is found in module 5 segment 3 of the Understanding Language Acquisition course. As part of this learning activity sequence, the learners are asked to observe and analyze classroom interaction patterns in a video featuring the
course case study student. Each learner is encouraged to use a simple tool to record, analyze, and visually represent key interactions. The small group work builds on this individual learning activity encouraging the learners to review and compare each other’s interaction analyses and discuss the details of their investigation related to the case student, her strengths, and needs. The group is asked to notice differences in their analyses, consider ideas reviewed during their individual study of related content, and discuss how their understanding of the case student situation changed as multiple perspectives were introduced. The group’s task is to suggest improvements to the classroom structures and interactions to better support the case student’s content and language learning (see Figure 4 for detail).

The group work product (the improvable object) is a summary of group suggestions to be presented during the conference with the facilitator. Clear expectations and quality criteria are revealed to the learners using a simple rubric to ensure a quality outcome from this independent group activity. The prompts and questions provided in the instruction are intended to encourage progressive discourse that facilitates sustained development of ideas and deeper understanding. The course facilitator reviews and grades group products, enabling them to monitor learners’ progress, provide feedback, and prepare for the conference.

When working with adult learners, allowing flexibility in how groups choose to collaborate should be considered. In our course, most small group collaborative activities are designed to be completed either synchronously in person where applicable, synchronously using conferencing and collaborative technology tools, or asynchronously using discussion board and collaborative tools. The determination of which of these options is preferable for a given task is guided by pedagogical intent. To facilitate their use, they are introduced and practiced early in the course, and clear expectations are set. It is also useful to model desired behavior, closely
monitor group work early in the course, and provide support as needed. As learners become comfortable with different ways of collaborating, support fades, and each group decides what works best for their needs. Notice the option given to the group on how they meet and collaborate in the instructions section in Figure 4.

**Figure 4**

*An Example of Individual Work Leading to Small Group Collaboration*

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**Classroom Interaction Analysis**

**Learning Outcomes**
- Create a visual representation of interactions in Makoto’s classroom using the Interaction Inventory. [Conceptual/Analysis]
- Suggest improvements to Makoto’s classroom’s structure and interactions to better support her content and language learning. [Conceptual/Create]

**Instructions**
Complete the Individual Work portion of this assignment before you move onto the next segment. Individual Work should be completed during days 1 and 2 of the unit. Complete the Group Work portion of this assignment collaboratively with your small group during days 3 and 4 of the unit.

This group work could be done in person, synchronously from remote locations, or asynchronously. However, all group members must agree on how the collaboration will be done and be able to actively participate.

**Individual Work**
1. In Unit 3 Segment 3, you examined practices in Makoto’s classroom. View the video segment of Makoto’s classroom again. This time, pay careful attention to types of interactions in her classroom.
2. As you observe, create a visual representation of interactions within that classroom. Use the Classroom Interaction Inventory to guide your analysis.
3. In preparation for group work, reflect on the questions to guide your group discussion provided below.
4. Share your visual representation of interactions in Makoto’s classroom with your group.

**Evidence of Learning**
- Visual representation of interactions in Makoto’s classroom

**Group Work**
1. Review your colleagues’ visual representations of interactions in Makoto’s classrooms with your group.
2. Discuss the following questions and any other ideas to help you identify changes that may need to happen in Makoto’s classroom to better support her content and language learning:
   - Does this classroom structure support frequent interactions? Why or why not?
   - Do interactions in this classroom support content and language learning? Why or why not?
   - How is Makoto supported in this classroom? How are her cognitive, linguistic, and social/emotional needs supported?
   - Reflecting on ideas you have learned in this segment about cultural ways of being, what are some things you may need to consider about Makoto and her cultural ways?
   - How would you help Makoto become more familiar with and participate in your classroom culture?
3. As a group, present your suggestions in a brief summary.

**Evidence of Group Learning**
- Summary of suggestions for improving interactions in Makoto’s classroom
Conference With the Facilitator

The next phase of the PIC template is a conference with the facilitator, which is critical for moving the inquiry process into more advanced stages. In this meeting, groups present products from the module’s four collaborative activities, share highlights from their learning experiences, and make deeper connections across the module content. Both learner-learner and learner-teacher interactions (Anderson, 2008) are present during this learning stage. The conference with the facilitator represents elements from both the interpretation and the presentation phases of Well’s inquiry model (2002) and a transition from the integration into the resolution phase of the practical inquiry model (Garrison et al., 2001). The group meeting with the facilitator is central for completing the intellectual convergence phase of collaborative work (Harasim, 2017). As individuals articulate their conceptual knowledge, share gained understanding, and are exposed to different ideas and solutions from other collaborative groups, their understanding further develops.

In this advanced community of inquiry stage, the facilitator uses the instructional conversation format to informally assess knowledge, reteach and adjust misunderstandings as necessary, and review and connect key concepts and application to practice. At strategic moments the facilitator questions and challenges to find alternatives, deep problem solutions, and rationale for the choices made to advance the complexity of understanding, higher-order thinking habits, and mastery of content language use that is difficult for the learners to achieve on their own (Dalton & Tharp, 2002; Tharp & Gallimore, 1991). These meetings encourage iterative shifts between private reflective thinking and discourse of the shared world, allowing the learners to reflect on their conceptual understanding and consider applying these ideas in their practice. The facilitator can also invite the learners to take a meta stance with respect to their collaborative
process and reflect on strategies that did or did not enhance learning and successful collaboration.

In the course, the conferences with the facilitator are planned toward the end of each module after learners complete all their individual and group work and before the module practicum assignment is due. Group meetings are generally done synchronously with the facilitator meeting with up to ten individuals from different collaborative groups at a time. Each group meeting lasts about an hour and has a clear instructional goal with a set of suggested prompts tied to the module theme. However, the conversation remains flexible and responsive to individual learners and their needs (Dalton & Tharp, 2002; Tharp & Gallimore, 1991). See Figure 5 for an example of the instructional goal and prompts for module 7 conference.

**Figure 5**

*Instructional Goals and Prompts for Conference With the Facilitator*

**Goals for Unit 7 Instructional Conversation**

The course facilitator will direct this instructional conversation using the Standards for Effective Pedagogy guidelines and the Instructional Conversation indicators, along with the following instructional goals. As you participate in the instructional conversation, keep these instructional goals in mind:

- Help course participants recognize that language errors in student work are generally patterned and that error patterns reveal where the student is developmentally and what steps they should take next.
- Help course participants recognize that systematically evaluating student work and keeping track of records enables teachers to see the patterns of progression, or potentially identify missing progression. It allows them to plan their instruction and further their students’ learning based on that information.
- Help course participants understand that providing effective feedback enhances learning for all students. However, teachers need to be aware that ELs have unique needs and challenges related to feedback, which could be attended to through balanced, differentiated, and supportive feedback.

**Suggested IC Prompts:**

- What roles do errors and feedback play in language learning?
- What roles do errors and feedback play in classroom practices (planning/teaching/assessment)?
- What is the value of systematically assessing student’s language development (using an inventory, having multiple and variety of samples of work, overtone, etc.)?
- What is the value of collaborating with a colleague while assessing your student’s language development and preparing feedback?

**Evidence of Learning:**

- Group discussion

Facilitators in our courses are typically master-level trained professionals with extensive experience teaching English learners. Their role is very active as they model effective practices,
scaffold materials as needed, assist the learners and groups in their learning process, and provide feedback and individualized coaching. Learners are graded based on their participation in the conference using a simple rubric.

**Reflection**

Reflection, the next learning phase in the Progressive Instructional Conversation (PIC) template, naturally emerges from the group meeting with the facilitator. Intentionally creating opportunities and allocating time for sustained reflection about the content and one’s practice is identified as another important element of a high-quality professional development design (Darling-Hammond et al., 2017). Reflection enables teachers to thoughtfully analyze their current practice, consider changes that may need to be done, and identify specific strategies that could positively impact their students’ learning and development.

The type of interaction that is represented in this phase of the template is not represented by Anderson (2008). It is a unique type of learner-self interaction that allows the learner reflexively and reflectively engage with their attitudes, beliefs, understanding, and practice and identify and resolve potential dilemmas. Sustained and recursive reflection is identified as a critical element of the knowledge building process by both Wells (2002) and Garrison et al. (2001), although it is not presented as a distinct phase. Whole-class reflective discussions are especially valuable for developing and fostering a community of inquiry collaborative spirit and further deepening understanding and meaning-making based on individual learner’s experiences (Wells, 1999).

Reflection is always complemented by learning through action (Wells, 1999) as a strong theory-to-practice connection is critical for effective teacher professional development. In our courses, teachers are encouraged to regularly reflect as they work individually, in small groups,
with their facilitator, and produce a product that represents their learning. In this course, these ongoing reflections are condensed and materialized into a simple reflective plan for action presented in a virtual gallery using Google Slides. Learners are encouraged to reflect on their learning in the module and prepare a slide displaying one big idea representing their learning during the module, evidence of the path that led to the big idea, and suggest an immediate incremental change in their classroom. See figure 6 for an example of a reflection slide. Learners are also encouraged to review and briefly comment on any three reflections posted by their colleagues. Since this is a virtual gallery, learners can quickly browse and be exposed to different insights and a variety of plans for action. During the following week’s conference with the facilitator, time is set apart for informal reports on experiences related to applying the incremental changes in the classroom, further supporting applying the principles learned in one’s practice. Reflection assignments are graded for quality and responses to others using a simple rubric.

Figure 6

A Reflection Slide Example

**Unit 3 Reflection – Mary Jane Smith**

**Big Idea: CONCEPTUAL MAPS**
Using conceptual maps really helps solidify student’s understanding of concepts and how these concepts are related. Having them work on it together is a great way for students to talk about the concepts in a meaningful way and practice their language and content knowledge.

**EVIDENCE OF MY PATH**
LA 2.4 and LA 3.4 helped me see how I can have my students interact and talk more by intentionally reorganizing activities and classroom structures. I loved content in segments 3.2 and 3.3 as it helped me visualize how that can be done using the Standards for Effective Pedagogy.

**MY PLAN**
I want to use conceptual maps more intentionally as a tool to encourage discussion.

In one of my centers, instead of my students working independently, I will have them work together (IPA) to create a map of concepts from the Photosynthesis unit. I will ask/ have them go through specific questions helping them discuss (LLD) how the ideas and concepts are connected and have them justify their answers (CTX and CA).
**Practicum Assignment**

A practicum assignment is the culminating experience in each module where learners reveal their ability to apply their theoretical understanding in the context of their classroom practice. Successful professional development models often integrate professional learning with one’s practice, provide individualized feedback, and offer practice-oriented coaching (Borko et al., 2010; Darling-Hammond et al., 2017). Penuel et al. (2007) argue that this application to practice is vital for professional development to occur.

This assignment forms an integral part of the PIC template as it brings together all learning experiences within each module and represents the module’s assessment. The assignment is completed individually and represents learner-content interaction (Anderson, 2008). However, the richness of previous, current, and even future interactions that the learner has to draw on to complete this assignment successfully can be represented as an interplay between the learner and their context. Learner-context interaction encompasses all previous interactions with the content, peers, and the instructor and allows the learner to integrate it with their previous, current, and future experiences with their own students as they plan how to apply their new knowledge with students in the complexity of their classroom. Although Wells (2002) does not explicitly include practical application in his inquiry model, integration with situated context is encouraged throughout the cycle of inquiry. It is especially valuable as teachers themselves plan for change to their practice based on their new understanding. The practical inquiry model involves as much practical application as the educational setting allows (Garrison et al. 2001).

Practicum assignments in our courses are intended to be both assessment-oriented and instructional. They provide learners with structured opportunities to demonstrate their ability to
apply principles of language acquisition and effective classroom practices with one of their English learners. They also offer opportunities for feedback and individualized coaching from an experienced facilitator. Content in each module, individual and group work, conferences with the facilitator, and reflections prepare the learners to complete their practicum assignment. Learners are encouraged to build on their incremental plan for action from their module reflections and include ideas suggested by colleagues. See figure 7 for an example of a practicum assignment from module 4.

**Figure 7**

*An Example of a Practicum Assignment*

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**Input - How Can I Improve My Student's Access to Input?**

**Learning Outcomes**

- Identify types of input available to your English learner in your classroom. Discover ways this access could be improved through the use of SLA strategies and effective pedagogy practices. [Conceptual/Create & Procedural/Apply]
- Continue to work on your EL’s Individual Language Development Plan by recommending SLA and effective pedagogy practices that would improve your student’s access to oral and written input. [Conceptual/Create & Procedural/Apply]

**Instructions**

1. In this practicum, you are going to assess input available to your student in your classroom and begin to plan ways to improve your student’s access to content.

2. Review the Supports/Constraints Analysis from PA 3. Consider the following questions:
   - What type of oral input is available to my student in my classroom?
   - What type of written input is available to my student in my classroom?
   - What role does contextualization play in my instruction? How rich is the language context in my classroom?
   - What kind of vocabulary instruction do I provide in my classroom? How do I support academic language development and content learning?

3. Complete the Input supportive evidence page by presenting relevant information from your Input Analysis. Use the first page in the [FD Supportive Evidence Pages](#) document as you complete the following:
   - Consider your student’s strengths, needs, and specific interactional patterns observed.
   - Select three to four specific Teacher Work/Student Work strategies related to Input that would benefit your student and discuss how you would integrate Standards for Effective Pedagogy to improve your student’s access to oral and written input. For each strategy mention explicitly the following:
     - **Strategy:** Name of the strategy you would use.
     - **Enactment:** Briefly explain how you would enact it.
     - **Rationale:** Provide a rationale for your plan.
     - **Pedagogy:** Name applicable Standards for Effective Pedagogy and explain how they are evident in your plan.

4. Turn in your Input supportive evidence page.

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Across the ten practicum assignments in the course, learners are guided to work with an English learner, identify their strengths and needs, analyze their work. Based on this information,
they develop an individual language development plan (see figure 8 for practicum assignment topics). This plan is aligned with the updated ESSA recommendations for systematically collecting discipline-specific classroom-based evidence of EL students’ language use (Molle et al., 2016) and supports teachers as they attend to individual EL learners and their needs while planning instruction. The individual language development plan, together with supplemental materials, becomes a foundation for each learners’ Final Display of Professional Development, a portfolio-based course assessment.

**Figure 8**

*Practicum Assignment Topics*

| PA 1 | My Educational Philosophy |
| PA 2 | Who is My English Learner? |
| PA 3 | How Can I Use Effective Pedagogy to Support My Student? |
| PA 4 | Input: How Can I Improve My Student's Access to Input? |
| PA 5 | Interaction: How Can I Increase Opportunities for Meaningful Interaction? |
| PA 6 | Stages of Development: How Can I Assess My Student's Language and Literacy Skills? |
| PA 7 | Errors & Feedback: How Can I Use Feedback to Further My Student's Language Learning? |
| PA 8 | Types of Proficiencies: How Can I Increase My Student's Knowledge of Language? |
| PA 9 | Types of Performances: How Can I Expand My Student's Use of Language? |
| PA 10 | Reflection on Final Display of Professional Development |

Practicum assignments are graded using a rubric focusing on the quality of work. Learners are encouraged to make changes to their final version of the plan based on the facilitator’s feedback. Portfolios are graded with a rubric for completion and quality and include self-assessment, peer-assessment, and facilitator evaluation.
Contextually Responsive Use

Using a template that is grounded in both general and local theories, is contextually responsive, and allows for flexible adjustments based on pedagogical needs contributes to the overall success of the design (Boling et al., 2017; Burkhardt & Schoenfeld, 2003; McDonald et al., 2005; Yanchar & Gabbitas, 2011). The template structure provides supports for designers and the users (learners and instructors) of the instructional materials. However, a rigid use of predetermined sequences may limit the learning experience and the use of materials, tools, and methods (McDonald et al., 2005). It is the function or pedagogical purposes of individual learning experiences that should guide the form, in this case the structure of the template, that allow for flexibility and contextual responsiveness. This requires designers to use less programmed and mechanistic approaches and necessitates a more purposeful, user-oriented creative spirit of design through exercising tacit core judgments and critical flexibility (Boling et al., 2017; McDonald, 2011; Yanchar & Gabbitas, 2011). Such rigorous yet fluid attitude is also described by Wells (1999) when he proposes using his model in designing learning for teachers and refers to it only as “a ‘tool’ to be used for thinking and planning, not a prescription to be followed on every – or even any – particular occasion” (p. 160).

The PIC template’s purpose-driven flexibility and contextual responsiveness to unique pedagogical demands can be illustrated by two examples of the template implementation in the Understanding Language Acquisition course. The first example illustrates modification along the template’s horizontal progression and the second example shows adjustments to the vertical progression.

The adjustment to the horizontal progression can be seen in module 7, themed Errors and Feedback. It was necessary to introduce the two main concepts separately and adjust the
horizontal theory-to-practice progression for this module to support the learners’ understanding of each concept, its practical applications, and how they are connected. The PIC template was adjusted to introduce the concept of Errors and related theory in segment 1, followed by reviewing practical issues in connection to Errors in segment 2. The concept of Feedback with the theory are discussed in segment 3, and segment 4 focuses on practical applications related to Feedback. Individual and small group work was aligned to support learning based on the content of individual segments. The rest of the activities, specifically, meeting with the facilitator, reflection, and practicum, did not require further changes. See figure 9 to see adjustments to the template’s horizontal progression in module 7.

**Figure 9**

*Adjustments to the Template’s Horizontal Progression*

<table>
<thead>
<tr>
<th>Topic 1 Theory</th>
<th>Topic 1 Practice</th>
<th>Topic 2 Theory</th>
<th>Topic 2 Practice</th>
</tr>
</thead>
<tbody>
<tr>
<td>Segment 7.1</td>
<td>Segment 7.2</td>
<td>Segment 7.3</td>
<td>Segment 7.4</td>
</tr>
<tr>
<td>Learning about Errors</td>
<td>Error Analysis of Student Work</td>
<td>Appropriate Feedback for Language Learners</td>
<td>Providing Appropriate Feedback for My Students</td>
</tr>
<tr>
<td>Learning Activity 7.1</td>
<td>Learning Activity 7.2</td>
<td>Learning Activity 7.3</td>
<td>Learning Activity 7.4</td>
</tr>
<tr>
<td>Using Errors to Promote Development</td>
<td>Error Analysis of Makoto’s Work</td>
<td>Perspectives on Appropriate Feedback</td>
<td>Feedback on Makoto’s Work</td>
</tr>
</tbody>
</table>

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**Unit 7: Instructional Conversation**

**Unit 7: Reflection**

**PA 7: Errors and Feedback - How Can I Use Feedback to Further My Student’s Language Learning?**
The second example of the template’s flexible use in the context of the course comes from module 10. In order to accommodate for pedagogical purposes within this final module, all template segments were included, but their sequence was strategically rearranged. This illustrates adjustments to the vertical progression, which is always guided by pedagogical intent. The purpose of module 10 is to review and highlight connections across key course concepts, allows the learners to present their portfolios to others, and provides time for individual and group reflection on learning in the course. The description of changes is presented in the paragraph below. Refer to Figure 10 for a visual representation of these adjustments to the template’s vertical progression in module 10.

**Figure 10**

*Adjustments to the Template’s Vertical Progression*
Segment 1 with related individual and small group work remained unchanged, presenting new content (Classroom Practice as Advocacy). Segment 2 transformed into the module conference with the facilitator carried out asynchronously through a discussion board helps the learners review and further connect concepts across course frameworks. This asynchronous discussion moderated by the facilitator affords the learners more time to reflect on presented ideas and prepare their responses. It also allows the facilitator to probe individual thinking and elicit more elaborate responses. Segment 3 serves as the module’s practicum assignment, allocating time for preparing a 5-minute recorded ignite presentation featuring the Final Display, a portfolio-based assessment. As part of collaborative work within this segment, learners view and respond to several of their colleagues’ presentations. Finally, the whole class meets synchronously in segment 4, where they reflect on the learning that took place in the course and complete individual reflections that become a part of their course portfolio.

**Evaluation and Refining the Template**

Because the template design process was iterative, formative evaluation occurred repeatedly throughout the design, development, and implementation phases. Initially, the team used rapid prototyping and other evaluative techniques to identify how to adjust the template and ensure the design’s soundness. As part of migrating the first course content into the LMS, the course instructional designer reflectively evaluated how well the template represented required design specifications and fidelity. The evaluation of the template’s feasibility, intended instructional functionality, and usability was carried out by two experienced course facilitators, a pre-service teacher, and undergraduate student testers. The trustworthiness of evaluations was ensured through transparency, collaborative analysis, and careful reflection. These evaluations had positive outcomes that further informed the refinement of the template design. Evaluation of
instructional functionality determined that the PIC template provided a clear and supportive structure for both facilitators and the learners and encouraged the progression of knowledge-building discourse involving theory-to-practice connections. Important changes to the template prompted by the evaluation were adjusting the template structure based on pedagogical needs in two modules, simplifying the template view in the LMS, and using embedded hyperlinks for template elements to make it more user-friendly.

Conclusion

The purpose of this design case was to explain the structure and intended functionality of the Progressive Instructional Conversation (PIC) template, a framework to facilitate the process of inquiry and collaborative construction of complex conceptual and procedural knowledge in online TPD courses. Although the template was valuable in the course redesign processes by providing a cohesive structure and integrating key pedagogical elements, its main contribution is facilitating instruction and learning. The PIC template links different types of learning activities within each module, intentionally creating coherence and continuity of instruction, supporting both facilitators and learners as they engage in an ongoing dialogue and collaboration. The template structure clearly suggests the level of facilitator’s involvement in the learning process, yet offers variety of opportunities for monitoring the learning process, adjusting misunderstandings, providing assistance, fading support, and offering individualized coaching based on the practicum work. The sequence individual work -- group work -- facilitator assistance suggested in the template is a way sociocultural theory can be enacted online.

At the same time, the template provides a certain level of epistemic agency for the learner, allowing them to become active co-designers of their learning experiences, being motivated by solving personally meaningful problems, and integrating learning with their own
practical experiences. Honoring learner’s agency and autonomy is especially valuable in adult learning and professional training enabling the learners to shape knowledge production and practices within their community (Darling-Hammond et al., 2017; Matthews & Yanchar, 2018; Sfard, 1998).

In addition to offering a design precedent for supporting participatory learning in the context of online TPD, this design case carries important implications for design practice and research. The unique way that the PIC template merges pedagogy, technology, and content-area requirements indicates that it is not only possible but imperative to consider underlying pedagogy, learner needs, and content-specific methods as part of instructional designs. In fact, the underlying pedagogical structures and needs should guide our design, selection of technology tools, and how we use them as pedagogy strongly influences achievement of desired outcomes (Ertmer & Newby, 2016; Graham et al., 2014). Furthermore, the template design process enabled the design team to identify how technology can be aligned with pedagogical requirements within the context of designing online TPD (Allman & Leary, 2021). This insight of pedagogy driving the choice and use of technological tools was further supported by connecting this principle to a well-known form follows function principle, which originated in other design fields but applies in significant ways as we strive to improve practices in the field of instructional design. The process of combining multiple theories in a conceptually coherent and commensurate way that informed this design also contributes to our understanding of processes leading to functional design of online learning experiences.

The template’s layered structure lends itself to iterative adjustments and refinement responding to specific contexts and types of learners. This design case suggests that it is feasible
to be contextually responsive and flexible while using templates and existing structures to fulfill underlying pedagogical needs and other situational requirements.

Finally, this pedagogy-oriented template carries valuable implications for research. When utilized as an educational intervention to be studied in the context of a classroom, the PIC template provides a framework for systematic research examining the process of construction of complex conceptual and procedural knowledge in online or blended environments. The template could also help identify connections between TPD characteristics, which are deliberately built into the design, and desired learning outcomes. This may be particularly valuable as we try to determine effectiveness of the overall instructional design and its elements.

The next step for this project is to evaluate the PIC template’s local viability, fidelity, and effectiveness during the pilot of the online Understanding Language Acquisition course. Once the template is adjusted and finalized, both the template and the related process will be used in redesigning the five remaining program courses into an online modality. We also plan to investigate the PIC template’s utility to support blended and face-to-face TPD. Using and adapting this template for instruction in other content-areas and adjusting it to meet specific contexts’ needs would also be worth further investigation.
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ARTICLE 3

Pedagogical Intent: Aligning Technology With Pedagogy in Online Course Design

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Abstract

The effectiveness of technology in instructional design is, in part, determined by matching the technology with underlying pedagogical purposes. Strategic orchestration of the desired results, related assessment evidence, and corresponding instructional methods with intentional use of technology is increasingly essential especially when designing online and blended learning experiences. The actual instructional potential of such learning experiences may be limited by choice of a specific technology tool if the tool’s affordances do not match the intended pedagogical purposes or if pedagogy is overlooked. This study examined the process of aligning technology with pedagogical purposes during the design and development of an online instructor-facilitated teacher professional development course. The study’s main purpose was to uncover elements, processes, and principles that guide the alignment of physical and pedagogical layers. Nineteen collaborative conversations and related artifacts were analyzed using process tracing and continuous comparative techniques within the self-study methodology. The analysis revealed interconnected themes and uncovered a pattern within the theme relationships representing the alignment process integral to our online course design process. Pedagogical intent is proposed as a useful conceptual pattern to guide the process of aligning technology with pedagogical purposes. Attending to pedagogical intent, rather than just focusing on learning objectives and outcomes, provided means for developing a more pedagogically driven and learner-oriented design and allowed the design team to purposefully utilize available technology tools to meet identified pedagogical demands.

Keywords: pedagogy, technology, design, alignment, teacher professional development
Introduction

Pedagogy, the method and practice of teaching, directly influences the quality of students’ learning and is becoming increasingly important while designing technology-mediated learning experiences. “Technology integration is no longer an isolated goal to be achieved separately from pedagogical goals, but simply the means by which students engage in relevant and meaningful interdisciplinary work” (Ertmer & Ottenbreit-Leftwich, 2013, p. 176). Various technology tools can be employed more effectively when technology is used for clear pedagogical purposes. If the intended pedagogical purposes are not aligned with the affordances of available technological tools or if the underlying pedagogy is overlooked, our technology choices may limit the actual instructional potential of the learning experiences.

This study examined the process of aligning technology choices with pedagogical purposes during the design and development of a fully-online instructor-facilitated teacher professional development course. The primary purpose was to uncover elements, processes, and principles that guide the alignment and propose a more pedagogically-driven and learner-oriented design approach.

Background Literature and Conceptual Framework

Teacher professional development (TPD) is a critical element for improving the quality of education. Quality TPD can enhance teachers' motivation, confidence, knowledge, and practices, supporting them as they assist individual students in acquiring increasingly complex 21st-century skills. In response to pressures for more flexible and cost-effective solutions, teacher educators across the world are bringing about a variety of innovative technology-mediated online and blended approaches where teachers can actively engage in learning on demand and at their pace (Lay et al., 2020). A set of TPD characteristics has been associated
with facilitating an enduring change in teacher knowledge and skills, improving their practice, and enhancing student achievement. Effective TPD is typically content-focused, situated in practice, and of sustained duration. It is participatory in nature, based on constructivist learning theories, and built on principles of professional learning communities. High-quality TPD also incorporates active learning and collaboration, models effective practices, offers coaching and expert support, and provides opportunities for feedback and reflection (Borko et al., 2010; Darling-Hammond et al., 2017; Dede et al., 2009; Desimone, 2009; Penuel et al., 2007). These characteristics appear to be independent of the delivery mode, i.e., face-to-face, fully online, or blended approach (Dede et al., 2009; Fishman et al., 2013).

Designing TPD courses grounded in these principles, where deep knowledge and complex understanding emerge through dialogue and collaborative participation in carefully designed contextualized activities supported by experienced instructors demand distinct classroom activity patterns and pedagogies, such as participatory practices within sustained communities of practice. In response to pressures for more flexible and cost-effective solutions, teacher educators across the world are bringing about a variety of innovative technology-mediated online and blended approaches where teachers can actively engage in learning on demand and at their pace. Current information and communication technologies and collaborative technologies in particular, make involvement in online participatory TPD learning experiences increasingly possible. Collaborative technologies offer pedagogically intriguing electronic apprenticeship tools that allow for a variety of learning interactions and supports. New meanings and insights can be co-constructed as part of virtual instructional conversations (Dede et al., 2009; Harasim, 2017; Hrastinski, 2009).
However, many online designs do not reach their full potential due to the lack of attention to pedagogy. The surface features of presentation and delivery are typically the main focus of the design and development process. Only limited attention is paid to the underlying pedagogical structures and strategies that enable the achievement of learning outcomes (Graham et al., 2014). Instructional designers typically identify learning outcomes, connect them with performance-based assessments, and develop learning activities using available technology tools. However, they may underestimate the need for overall strategic orchestration of desired results, assessment evidence, and instructional methods with intentional use of technology to facilitate a deeper understanding of the content and support transfer of knowledge and practices. Such orchestration is in the field of education referred to as pedagogy or andragogy and in the field of instructional design as instructional strategy. In this paper, we use the term pedagogy and define it as a set of theoretical principles and related practices that guide teacher/instructional designer actions, judgments, and strategies as they orchestrate goals, time, space, tools, artifacts, activities, and social structures with a goal to positively influence student learning.

Researchers are articulating instructional models for online and blended learning that are based in our understanding of how people learn with technology attending to pedagogical principles in a variety of ways based on their philosophical and theoretical stance (e.g., Anderson, 2008; Garrison & Vaughan, 2008; Harasim, 2017; Picciano, 2017; van Merriënboer & Kirschner, 2017). However, as proposed by Graham et al. (2014), online and blended designs will become more effective when designers identify and attend to the “core attributes in the pedagogical layer of the design that lead to the learning outcomes of interest” (p. 28). This, therefore, suggests that pedagogy and technology need to be aligned. If attention is not paid to matching the tools’ affordances to the intended pedagogical purposes or if the underlying
pedagogy is overlooked, selection of technology tools may limit the actual instructional potential of the learning experience.

Others also point out the importance of a more explicit and systematic alignment while designing technology-mediated learning experiences. Bower (2008) proposed the alignment of affordances of available technologies with required affordances of learning tasks, related to the underlying pedagogical requirements. Antonenko et al. (2017) suggested a similar process for systematically aligning functional affordances of selected technological tools with the needs of learners and educators in specific educational contexts. They contribute to understanding how to deliberately employ technology as a tool by conceptualizing technological affordances as action possibilities that are both actual (utility) and perceived (usability). This agentive view of affordances with the related alignment process allows the agent, whether it is the designer or the user, to more purposefully use educational technology tools as they notice and are aware of their actionable characteristics for meeting identified needs. This, in turn, leads to more meaningful designs and ultimately improves learning and teaching. Using technology as a tool and deliberately aligning pedagogy with affordances should be considered an important guideline for designing effective technology-mediated learning experiences. When attention is paid to pedagogy during designing technology-mediated instruction, a well-known principle of form following function from other design fields is observed. Although the choices of technological resources are also important, it is the pedagogical purposes that should drive the form of instructional design solutions.

The Purpose of the Study

This self-study of practice closely examined the process of designing and developing a fully-online instructor-facilitated TPD course grounded in sociocultural practices. In this study
we explored the process of creating a course template and uncovered the dynamics of aligning technology with pedagogy with the goal to better understand and improve our practices. Two strands of inquiry were pursued. First, the goal was to identify the elements, steps, and principles guiding the aligning of technology with pedagogy in designing online TPD courses. The second aim of the study was to understand and improve our practices revealed in the design process through self-study. The findings of the first inquiry are reported here. A discussion of the self-study assertions for understanding are presented elsewhere (Allman & Pinnegar, 2020).

**Method**

The study was carried out during the design phase of a larger project guided by the principles of the design-based research (McKenney & Reeves, 2018). The iterative design process was examined using the self-study of teaching and teacher education practices (S-STTEP) methodology (LaBoskey, 2004; Pinnegar & Hamilton, 2009). Specifically, researchers examined decision making during the template design and implementation, focusing on how underlying pedagogical purposes guided selection of technology. Attention was paid to the particulars of the design, the context of decisions, and uncovering hidden assumptions and knowledge. Enacted design processes were retrospectively reviewed to identify decision-making patterns.

The self-study methodology was selected as suitable research methodology to guide the self-initiated disciplined inquiry into situated practice as it is systematic, iterative, and improvement-aimed (LaBoskey, 2004). It paired well with the design-based research framework of the larger project, which is iterative, contextually responsive, use-inspired, and integrates research with generating practical solutions (McKenney & Reeves, 2018). Additionally, the S-STTEP relational ontology character positioned the investigators simultaneously as the
researchers and as the researched, affording a unique insight into patterns within the data that may have not been visible otherwise. Rigorous cycles of dialogue with extant literature and critical friends, who are researchers, professionals, and/or practitioners, introduced multiple perspectives into the meaning-making process and enabled scrutinizing diverse strands of inquiry and emerging tensions, as well as exploring viable solutions (Hamilton & Pinnegar, 2017).

Process tracing (Bennett & Checkel, 2015) and constant comparative qualitative analysis techniques (Corbin & Strauss, 2008; Ryan & Bernard, 2003) were used to analyze the data.

**Participants and Data Sources**

Participants in this study were the researcher/instructional designer, an instructional designer, and a senior teacher education faculty member. The researcher/instructional designer, a doctoral student in instructional design, has a background in applied linguistics and experience in design, teaching, and research in the area of TPD for teachers of English learners. The collaborating instructional designer with a Ph.D. in instructional design has broad K-12 teaching experience and online design experience. The senior faculty member is a teacher educator with extensive experience in teaching teachers of English learners, designing curriculum and pedagogies representing sociocultural theory in practice, and a scholar in narrative research and self-study of practice qualitative methodologies.

Data consisted of 19 audio-recorded collaborative conversations and artifacts related to developing the template and related course materials discussed during meetings. Collaborative conversations took place regularly over a six-month period, and their average length was 60 minutes. The analysis of recorded collaborative meetings and related artifacts was conducted by the researcher/instructional designer working with the senior faculty member as the critical friend.
Procedures and Data Analysis

Collaborative discussions and related artifacts were recorded, transcribed, and analyzed using process tracing and continuous comparative techniques within the self-study methodology. Steps of standard qualitative analysis were attended to and are described below. However, the described processes were often difficult to distinctly separate and did not occur in a linear fashion but rather as an iterative activity as data was continuously collected, analyzed, and interpreted. This recursive quality is valuable as it “enlivens the research process and pushes toward the evolution of ideas” where new insights and oversights could be uncovered, additional questions generated, and further directions explored (Pinnegar & Hamilton, 2009, p. 149).

Once the accuracy of the transcription of the collaborative conversations was verified, and artifacts representing successive iterations of the developing template and course materials were connected to the conversations, initial codes and conceptual categories were identified from the raw data (Corbin & Strauss, 2008). The axial coding technique (Corbin & Strauss, 2008) was used to look beyond the initial codes for themes, patterns, and their relationships to the core phenomenon of aligning physical and pedagogical layers during the design of a template guiding the development of the online TPD course. Attention was paid to what causes the phenomenon to occur, its context, how it is carried out, and what the related consequences are (Corbin & Strauss, 2008).

Although qualitative researchers commonly create conceptualizations based on similarity, both similarity-based and contiguity-based relationships were explored as part of this conceptual analysis. These relationships are fundamentally different yet complementary and mutually support and improve the quality of qualitative data analysis (Maxwell & Miller, 2012). Similarity guided the researcher to identify themes based on the resemblance of common features.
Attention to contiguity allowed the juxtaposition of data in time and space, identifying ‘actual’ connections rather than ‘virtual’ connections of similarities and differences. This is required to identify relationships among data within its actual context and to pay attention to data’s temporal and spatial proximity and sequences, allowing the researcher to uncover additional overarching patterns in the design process (Maxwell & Miller, 2012).

**Trustworthiness**

Trustworthiness in this study was established with multiple investigators, member checks, and reflexivity increasing the credibility, dependability, and confirmability of the account (Lincoln & Guba, 1985). Audit trail and negative case analysis were also used to increase the confirmability of the findings and reduce potential bias. Additionally, attending to contiguity and similarity during exploring patterns in data guarded the researchers against overgeneralizing by aggregating data and losing diverse contextual connections potentially relevant to the analysis, further supporting the credibility of the findings and trustworthiness of the overall study (Maxwell & Miller, 2012).

**Results**

Several types of results are presented in this section. First, core attributes identified as part of the design process are reviewed. Second, themes identified in the analysis of data through axial coding are described. Third, patterns revealed by looking beyond themes for contiguity relationships are explained. The fourth section provides an exemplar from the data illustrating the alignment process.

**Design Core Attributes**

In the initial design stages of the inquiry, researchers identified a set of design core attributes related to pedagogy that were anticipated to lead to a successful completion of the
desired learning goals in the online course and program as suggested by Graham and colleagues (2014). See Figure 1 for details. Attending to the design core attributes was believed to enable the researchers to retain the participatory character of the course in the online modality and to maintain the quality and effectiveness of the instruction while redesigning the courses in the program.

**Figure 1**

*Identified Pedagogical Core Attributes*

![Core Attributes of the Pedagogical Layer](image)

The core attributes in the context of this study were determined based on the institutional and department specifications, extant literature related to both general and content-specific effective TPD practices, and researchers’ prior experiences with developing and implementing related endorsement program. Other relevant design specifications, such as current state and
federal requirements and recommendations for English language learner (ELL) endorsement also guided the choice of the core attributes. Selected design core attributes that would contribute to a successful completion of the desired learning goals were: (a) learner-centered, dialogic, and inquiry-based instruction grounded in principles of sociocultural theory and communities of practice, which is enacted through a design that (b) promotes active and collaborative participation, encourages a variety of quality interactions, models participatory and ELL-effective practices, facilitates theory-to-practice connection, and fosters deep engagement through reflection.

Themes Identified Through Axial Coding

We identified 20 elements/categories organized into six themes during the analysis of data through axial coding. Refer to Table 1 for the identified elements and themes presented in this section.

Analysis revealed repeated attention to tasks and placed this theme at the center of the alignment process. Attention to tasks was represented in the collaborative discussions as talking about one or more of the following: (a) the desired results of the instruction (e.g., overall goals, instructional objectives, learning outcomes), (b) acceptable evidence of learning (e.g., summative and formative assessments), and (c) learning activities and associated instructional components. All three of these elements of a task were considered as fundamentally interrelated. When the researchers considered this theme as part of the larger pattern, at least some or more elements were always present.
Table 1

**Themes and Elements Identified Through Axial Coding**

<table>
<thead>
<tr>
<th>Theme</th>
<th>Elements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Theme 1: Attention to Tasks</td>
<td>• Desired results</td>
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<tr>
<td></td>
<td>• Evidence of learning</td>
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<tr>
<td></td>
<td>• Learning activities</td>
</tr>
<tr>
<td>Theme 2: Dimensions</td>
<td>• Pedagogy</td>
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<tr>
<td></td>
<td>• Technology</td>
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<tr>
<td>Theme 3a: Core Components</td>
<td>• Anticipated response to instruction</td>
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<tr>
<td></td>
<td>• Learners’ needs</td>
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<tr>
<td></td>
<td>• Instructors’ needs</td>
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<td></td>
<td>• Task context</td>
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<tr>
<td>Theme 3b: Core Methods</td>
<td>• Collaboration</td>
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<td></td>
<td>• Interaction</td>
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<td></td>
<td>• Dialogic learning</td>
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<td>Theme 3c: Core Strategies</td>
<td>• Modeling</td>
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<td></td>
<td>• Scaffolding</td>
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<td></td>
<td>• Coaching &amp; mentoring</td>
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<td></td>
<td>• Theory-to-practice connection</td>
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<td>• Reflection</td>
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<tr>
<td>Theme 4: Quality and Effectiveness</td>
<td>• Instructor support</td>
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<td></td>
<td>• Course feedback</td>
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<td></td>
<td>• Course evaluation</td>
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</table>

Two contexts or *dimensions* emerged from the collaborative discussion data: pedagogy and technology. When tasks were discussed, it was generally done within either one or both of these dimensions. Within the dimension of pedagogy, ideas were related to identifying parts or
processes associated with a task that contributed to meeting the instructional objectives and were tied to pedagogical thinking with a goal to successfully ‘translate’ these parts or processes into an online modality. The dimension of technology represented similar ideas as the dimension of pedagogy. However, attention was paid to how the task could emerge in the online design, considering available technology tools and their affordances in order to fulfill identified pedagogical purposes.

Analyzed data from collaborative discussions further suggested that the alignment between the pedagogical and physical layers occurred as participants paid attention to the core components of instruction (Theme 3a), strategically utilized core methods to carry out the instruction (Theme 3b) and intentionally applied core strategies to support the instruction (Theme 3c). The theme of core components (Theme 3a) included ideas related to considering learners’ anticipated response to the instruction, attending to the learner and their needs, attending to the instructor and their needs, and paying attention to the context of the task. The core methods theme (Theme 3b) was represented in the conversations as encouraging active collaboration, planning for a variety of interactions with content, peers, and the instructor, and facilitating learning through dialogue. The core strategies theme was represented in the data as paying attention to modeling effective sociocultural and EL practices, scaffolding instruction, connecting theory to practice, and supporting regular and meaningful reflection. Finally, the theme of quality and effectiveness of the design with its elements represented topics related to instructor support, course feedback, and course evaluation.

Patterns of Contiguity-Based Relationships

Axial coding was further explored by looking beyond similarity for contiguity-based relationships, specifically temporal and spatial relationships within the collaborative
conversations (Maxwell & Miller, 2012). When the coding themes were reexamined with attention to the process (temporal relationship), a clear cyclical pattern appeared confirming the existence of these themes in relation to each other. Examining tasks (Theme 1) was at the center of the process, progressively attending to the core components (Theme 3a), making strategic choices using core methods (Theme 3b) and strategies (Theme 3c), followed by an intentional selection of technological tools to successfully enact specific tasks in an online modality (Theme 2).

See Figure 2 for a visual representation of the observed process of alignment. The process typically began with the focus on a learning task (1) represented by any or all of its elements (desired outcomes, evidence of learning, learning activities). Then the core components of instruction were examined (2): the learners’ needs in specific contexts were considered, learner responses to instruction were anticipated, and the needs of the instructor were considered. This was typically followed by attending to the core methods (3), such as planning for a variety of quality interactions, active collaboration, and ways to promote dialogue. Next, the core strategies that would support desired learning experiences were examined (4), such as modeling, scaffolding, coaching and mentoring, theory-to-practice connections, and reflection. This initial cycle of attending to pedagogy was followed by intentionally selecting technology tools that would enhance identified pedagogical purposes, attending to the tools’ availability and affordances (5). Next, participants examined how the task would emerge as a learning experience for a learner using the selected technology, which involved attending to any or all of the core components (6), reexamining and adjusting types of interactions, collaborations, dialogue required and enabled by affordances of the selected tool (7), and finalizing and adjusting
strategies as needed (8). If necessary, more cycles were explored until a satisfactory alignment of the pedagogical purposes with the affordances of selected technological tools was reached.

**Figure 2**

*A Visual Representation of the Alignment Process*

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**An Exemplar of the Alignment Process**

Fragments of one collaborative conversation illustrate this process. It begins with the focus on a self and peer evaluation task that will be recurrent and is intended to evaluate preparation for and participation in group activities. The goal was to adjust the original task to the online format and take advantage of the affordances of available technology tools. It begins with a discussion of the actual task (**bold**), surrounded by attention to the learner, their needs (**italics**), anticipated response (**italics bold**), and task context (**underline**). An example of paying attention to learner and context is represented through the following exchange:
A: We had about three questions that we asked, and you had to answer that for everybody and that’s what takes a little while. But we’re only going to have three or four people in the group, so it’s not like eight.

B: Yes. Yes.

A: So it’ll go fast.

B: The only concern is that there are usually four activities in each unit, and I’ve tried to create that there would be individual work, and then group work would build on the individual activity.

A: Yeah.

B: I mean, it would be just too redundant to do it after each of them. SOME OF THESE ACTIVITIES CAN BE DONE WITHIN THEIR GROUP, AND SOME OF THOSE CAN BE DONE ACROSS GROUPS.

A: No, what I’m thinking is at the unit level.

B: Unit level?

A: Yeah, and maybe whatever the major project is for that unit, you know?

Attention to strategically chosen types of interactions begins to appear early in previous exchange (CAPITAL) and continues to weave in together with recurring attention to the learner (italics), their anticipated response (italics bold), and context (underline) as participants begin to discuss the intentional selection of tools (gray) and related issues, which is represented in the next segment:

A: But I don’t think we want it to be more than that. We’ve got to be careful that it’s not too long. Because they need to do a series about themselves. We just had a little chart, but we can do that with Qualtrics, and they’d just have to RATE EACH PERSON. Mostly, what
was their contribution, you know? Were there contributions? How much did they contribute? How prepared were they? How important were they to the completion of the assignment? Something like that, it’s just questions like that. And I think that when you do that, *it relieves a lot of pressure on people who feel like they are doing all of the work in the group.*

B: I agree. Yeah. I think that is important. I think we can figure something out.

A: And it should just be a little ‘Qualtrics thing’ that they could do.

B: Yeah. I think the only issue there might be, how do you do it with the names? Do you input the names of the other members? Do you know what I mean?

C: Yeah, that’s the only thing about technology; it is a little bit hard. Like, *we tried this in Canvas before, and then we ended up changing it because it was hard to compile it.*

The exchange continues with participants attempting to resolve issues arising from the technology tool not being able to do what can be done quickly in a face-to-face classroom. Specifically, the problem is identifying individuals within the automated process of assessing the participation of each group member. The participants identify solutions but repeatedly return to the task, attend to the learner and context, and the ways the task can be carried out. They utilize core methods and strategies, meeting the intended pedagogical goal, while effectively utilizing affordances of the tool selected.

**Discussion**

The purpose of this study was to explore the process of creating a course template and uncover the dynamics of aligning technology with pedagogic needs during the design of a fully-online instructor-facilitated TPD course grounded in sociocultural practices with the goal to better understand and improve our practices. Closely examining decisions made during the
design and development process and identifying patterns within the data led us to reflectively evaluate assumptions and knowledge underlying those decisions. We recognized that the emerging design, as well as the structures and processes we saw in the data, manifested our collective knowledge, assumptions, and overall theoretical orientation. Our collaborative conversations pushed our individual understanding beyond what we would ordinarily see in isolation. They enabled us to examine a variety of multiple perspectives and theories outside our typical comfort range in a safe circle of critical friends. It was the cross-disciplinary expertise of each individual within the unique coming-to-know process of self-study that allowed us to negotiate robust solutions and gain a deeper understanding of the processes involved in aligning pedagogy with technology while designing online TPD courses grounded in sociocultural theory.

The analysis of collaborative conversations revealed relevant interrelationships of main themes and uncovered a consistent pattern of alignment of pedagogy with technology within the context of this study. Attention to tasks was identified as a central theme of the alignment process. Tasks were represented by any or all of the three elements of desired results, evidence of learning, and instructional activities, which were considered fundamentally interrelated. The presence of these elements reflected the use of backward design principles (Wiggins & McTighe, 2005) as part of the course design. Tasks, methods, and strategies were always discussed either with attention to identify underlying pedagogical intents (pedagogy) or with a goal to enact these pedagogical intents related to a task in an online setting, taking advantage of affordances of available technological tools (technology). This finding is clearly linked to our goal to align pedagogical and physical design layers as suggested by Graham et al. (2014) and to the iterative process of matching learning task affordance requirements and learner/teacher needs with the affordances of available tools (Antonenko et al., 2017; Bower, 2008).
Themes related to how the alignment is carried out highlighted the importance of pedagogical thinking as part of the design process under study. When reviewed, the core components elements (theme 3a) paralleled Schwab’s four commonplaces of curriculum making (1970) in the following ways: considering an anticipated response to instruction being related to the subject matter/curriculum/task, attending to learners’ needs to students, attending to instructor’s needs to teachers, and attending to the task context to the milieu or setting. This indicates that it may be essential to consider all four core components not just when designing an extended curriculum, as suggested by Schwab but also as part of designing online courses and individual tasks. Identifying core methods (theme 3b) and core strategies (theme 3c) as key themes related to how the alignment occurs highlights the importance of identifying design core attributes as an essential step in aligning physical and pedagogical layers while designing technology-mediated instruction (Graham et al., 2014). When we examined the themes and related elements from our conversations, it became evident that they resembled the design core attributes identified in the early stages of the design (see Figure 1). Our repeated attention to these attributes throughout the design process suggested that these attributes implicitly guided our design. Although the physical layer features related to presentation and delivery of instruction (i.e., available technological tools and related affordances) are important, the findings from this study indicate that it was attending to the design core attributes of the pedagogical layer and related structures (core methods and strategies) that enabled the alignment and purposeful use of available technologies. This further indicates the possibility to match the pedagogical layer to the content-area and contextual requirements, revealing a flexible design principle.

As part of the analysis, we identified a conceptual pattern of pedagogical intent as the driving element guiding the process of aligning pedagogical and physical design layers. The
concept of pedagogical intent elaborates on Graham et al. (2014) idea of core attributes. We define it as careful consideration of how intended learning experiences emerge in a specific learning task through making strategic choices to facilitate learning for a specific learner in a specific context, which then guides the intentional selection of content, activities, and tools.

Identifying the pattern of pedagogical intent allowed us to more purposefully attend to its individual elements and attend to the underlying pedagogy when we were deciding on how we want certain learning experiences and tasks to turn out in a technology-mediated environment. Attending to pedagogical intent, rather than just focusing on learning objectives and outcomes, provided means for developing a more pedagogically-driven and learner-oriented design and allowed us to purposefully utilize available technology tools to meet identified pedagogical needs. It is yet to be determined whether this process of identifying design core attributes and aligning physical and pedagogical layers during design actually supports the achievement of learning outcomes, as suggested by Graham et al. (2014) as the course design is implemented.

The initial pilot of the course design brought about promising results, indicating the importance of some design elements being fixed - under the control of the instructional designer, and the necessity of some design elements being designed yet remaining more fluid - leaving a certain level of control over the instructional path to the instructor.

**Conclusion and Implications**

In the light of the literature reviewed, the findings indicate that the process of aligning pedagogical and technological layers is possible, feasible, and potentially beneficial in increasing the quality and effectiveness of the online course instructional design. Indeed, it seems that attending to the underlying pedagogical principles and carefully employing content and context-dependent practices (methods and strategies), not just using innovative technological tools, make
effective instruction and learning online possible. Varied technology tools can be effectively employed to improve instruction in face-to-face, blended, and online modality when used for clear pedagogical purposes.

The concept of pedagogical intent is proposed as a potentially valuable guiding principle that would enable instructional designers to align physical and pedagogical layers while attending to pedagogical purposes as they design and develop online learning experiences. Greater focus on underlying pedagogy and alignment of pedagogy with affordances of available technological tools may improve the instructional quality and effectiveness of online course designs, as suggested by Graham et al. (2014). It is also possible that attending to the underlying pedagogy and engaging in a more purposeful design will boost the development of high-quality online collaborative and participatory learning designs, as proposed by Harasim (2017) and Hrastinski (2009).

Furthermore, this study has important implications for qualitative research. The analysis revealed the importance of attending to contiguity-based as well as similarity-based relationships when exploring patterns and relationships among categories and identifying their relationships to the phenomenon under study as recommended by Maxwell and Miller (2012). If we ignored the temporal flow of the data in this study and looked only for patterns based on similarity, we might have missed the overall underlying pattern of repeated attention to pedagogical intent, the construct that connected the elements of individual categories emerging from the data into a cohesive pattern. The study also established the usefulness of self-study methodology in studying design practices, which are complex and sophisticated processes. Self-study offered a powerful means of collaborative inquiry into one’s situated practice with the aim to improve that practice. It allowed the co-investigating participants to engage as critical friends in a dialogue generating
the data as well as in a dialogue about the data, the analysis, and the interpretation of the results as they systematically attended to the context of knowledge construction. Reflexive insights and attention to selected details from the researching practitioner’s perspective further add to our understanding of design processes and related practice.

The scope of this study is limited as the context of each course design is highly specific, and processes that are applicable in one context may not apply or transfer to another course design context. Future work may seek to explore the alignment process in other settings, different content-area courses, and by a different group of practitioners. Additionally, the efficacy of using pedagogical intent in guiding the design process in varied contexts could be investigated.
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In response to global economic and social trends, there is an increased need for investing in human capital by supporting reskilling and upskilling of employees, promoting future-oriented development of expertise and lifelong learning, and adopting a culture of high-quality yet flexible learning. Well-designed professional development provides benefits to the individual, their profession, and the public by ensuring that they maintain and enhance up-to-date knowledge and skills and effectively apply them in their practice. Such competencies are not just technical, but there is an ever-increasing need for soft skills such as problem-solving, critical thinking, innovation, creativity, the ability to deal with complexity and ambiguity, as well as the ability to effectively communicate and collaborate with others across disciplines. Fields that benefit from this type of professional development include but are not limited to teaching, counseling, medicine and nursing, law, business, and management.

Trends in teacher education increasingly emphasize the need for quality ongoing teacher professional development (TPD) that is accessible and flexible yet fosters advanced skillset development, has the power to change teachers’ practice, and potentially positively impacts student learning. Participatory approaches to learning that are situated, collaborative, discourse-based, and inquiry-oriented promote the development of such knowledge, skills, and practices within professional communities of practice and provide a foundation for quality TPD (e.g., Borko et al., 2010; Darling-Hammond et al., 2017; Dede et al., 2009; Lay et al., 2020). Current online and collaborative technologies offer significant access, flexibility, and economic advantages and afford individuals ways to connect, communicate, collaborate with others without time and space restrictions (Harasim, 2017), making an online TPD an increasingly viable option.
Online learning environments where deep knowledge and complex understanding emerge through dialogue and collaboration within communities of practice must be carefully designed and guided by the most current theoretical understanding (Fishman et al., 2014; Ermter & Newby, 2016; West et al., 2020). These learning environments are typically context-dependent, and the design solutions and their implementation may vary substantially (Borko et al., 2010; Fishman et al., 2014; Opfer & Pedder, 2011). Research in this dissertation attempted to add to our understanding of effective online TPD design, development, and implementation practices by responding to a local problem of redesigning existing TPD courses into an online modality while retaining their instructional character.

The first article, *Engaging Multiple Theories in the Design of Online Professional Development: An Integrative Literature Review*, contributes by bringing together theories, frameworks, and practices from several different disciplines and could be utilized while designing online TPD. It identifies promoting participation in facilitated progressive educational dialogue within a professional community of practice as a fundamental feature connecting and supporting effective TPD characteristics (Hofmann, 2019). It also highlights the importance of attending to how teachers learn and transform their practice, aligning choices of technology with underlying pedagogical strategies, and engaging a variety of theories in a coherent and strategic way when designing successful online TPD solutions.

The second article, *Facilitating Progressive Instructional Conversation Online*, builds upon the literature review findings. It offers a design case featuring a template designed to support and facilitate progressive knowledge-building discourse in an online TPD course. This article contributes by describing individual elements, their intended functionality, and a theory-based rationale for how the structure and the flow within the template could support deep
learning through discourse and collaboration online. This design case could inform other
designers about the particulars of our pedagogy-driven design solution and offer ideas for their
own practice.

The main contribution of the third article, *Pedagogical Intent: Aligning Technology With Pedagogy in Online Course Design*, is in providing an insight into the decision-making during
purposefully employing technology to meet pedagogical needs. Attending to the underlying
pedagogy is particularly important in online TPD designs. The instructional potential of online
learning experiences may be limited if the tool’s affordances do not match the intended
pedagogical purposes or if pedagogy is overlooked (Graham et al., 2014). This study contributes
by demonstrating that the process of aligning technology and pedagogy is feasible. The concept
of pedagogical intent is proposed as a potentially valuable guiding principle that could enable
such alignment while designing online instruction.

Designing high-quality online TPD is possible and important. The articles presented in
this dissertation offer valuable information about theoretical grounding, ways to support
productive dialogue and collaboration online, and the importance of aligning technology with
pedagogy during the design process. We are only beginning to understand what works in online
TPD and why it works. More research is needed to identify principles, theoretical frameworks,
and processes that could guide both practitioners and researchers in the design, development,
implementation, and evaluation of online professional development across diverse contexts
(Dede et al., 2009).


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https://doi.org/10.1016/j.jbusres.2019.07.039

APPENDIX

Institutional Review Board Approval Letter

Memorandum

To: Bohdana Allman
Department: IP&T
College: EDUC
From: Sandee Aina, MPA, IRB Administrator
       Bob Ridge, PhD, IRB Chair
Date: September 14, 2018
IRB#: E18384
Title: “Pedagogical Intent: Aligning Pedagogy with Technology in Online Course Design”

Brigham Young University’s IRB has approved the research study referenced in the subject heading as exempt level, categories 1 and 4. The approval period is from **September 14, 2018 to September 13, 2019**. Please reference your assigned IRB identification number in any correspondence with the IRB. Continued approval is conditional upon your compliance with the following requirements:

1. A copy of the informed consent statement is attached. No other consent statement should be used. Each research subject must be provided with a copy or a way to access the consent statement.
2. Any modifications to the approved protocol must be submitted, reviewed, and approved by the IRB before modifications are incorporated in the study.
3. All recruiting tools must be submitted and approved by the IRB prior to use.
4. In addition, serious adverse events must be reported to the IRB immediately, with a written report by the PI within 24 hours of the PI's becoming aware of the event. Serious adverse events are (1) death of a research participant; or (2) serious injury to a research participant.
5. All other non-serious unanticipated problems should be reported to the IRB within 2 weeks of the first awareness of the problem by the PI. Prompt reporting is important, as unanticipated problems often require some modification of study procedures, protocols, and/or informed consent processes. Such modifications require the review and approval of the IRB.
6. A few months before the expiration date, you will receive a continuing review form. There will be two reminders. Please complete the form in a timely manner to ensure that there is no lapse in the study approval.

IRB Secretary
A 285 ASB
Brigham Young University
(801)422-3606