Chapter 13
Self-Directed/Community-Supported Learning:
Design Principles to Support Learner Engagement at Scale

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ABSTRACT

MOOC designers seeking to address evolving ambitions of MOOCs to support workforce development confront a fundamental design dilemma: on the one hand, the self-paced nature of online learning is efficient for busy learners working alone to acquire new knowledge and capabilities; on the other hand, the self-paced, often-isolated nature of online learning complicates designing MOOCs that motivate and sustain the type of engagement necessary to support learners in mobilizing new knowledge and capabilities in practice contexts and in collaboration with other professionals. The authors offer an account of their efforts to create opportunities for deep learning in large-scale, open-access learning environments through the creation and instantiation of a new instructional model called self-directed/community-supported learning. This model aims to draw diverse learners around the world into a community of discourse and practice through coordinated video content presentations, web-based enrichment activities, scenario-based team practice exercises, and community-wide discussion.

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INTRODUCTION

In this chapter, we explore dilemmas concerning the design of Massive Open Online Courses (MOOCs). These dilemmas have roots in the evolving aspirations for the utility of MOOCs. Where MOOCs were initially conceptualized as providing open access to disciplinary knowledge, they quickly evolved to include a keen focus on workforce development in rapidly evolving labor markets. This shift to workforce development, in turn, has been matched with the increasing use of MOOCs for competency-based professional certification and micro-credentialing. These shifts toward workforce development and micro-credentialing are playing out in both (a) the technical sectors in which the knowledge and skills are comparatively determined and (b) the social sectors in which knowledge and skills are more contextualized and contingent (Palvia, Aeron, Gupta, Mahapatra, Parida, Rosner, & Sindhi, 2018).

Evolving aspirations are driving a need to design MOOCs both to develop learners' knowledge and capabilities for the sort of work they aspire to do and to provide future employers with reasonable assurance that they will be able to do it. That, in turn, places new demands on MOOC developers to create opportunities for social engagement and learning that parallel those that they will likely experience in authentic practice contexts and, with that, to move beyond the comparatively straightforward threaded discussions that often structure learners' social engagement in MOOCs (Conole, 2014).

In this chapter, we examine one MOOC development initiative that seeks to create opportunities for deep learning in large-scale, open-access learning environments through the creation and instantiation of a new instructional model called Self-Directed/Community Supported Learning (SD/CSL). This model aims to draw diverse learners around the world into a community of discourse and practice through coordinated video content presentations, web-based enrichment activities, scenario-based team practice exercises, and community-wide discussion.

Our analysis will show that the SD/CSL instructional model supported high levels of socially engaged learning among a cohort of students that took these courses throughout a winter semester, but that realizing these levels of social engagement required: 1) complementing the core instructional model with an active instructor presence; 2) concerted efforts to maintain coordinated pacing among a critical mass of learners; 3) overcoming limitations for social engagement in the learning management systems; and 4) leveraging cohort diversity in positive ways. These findings provide a provisional framework for MOOC developers as they design for socially engaged learning and rich social interactions in online learning environments. We show how the SD/CSL instructional model allows us to think differently about the kind of interactions that can be supported on MOOC platforms that are designed to support transmission-based models of instruction.

MAIN FOCUS OF THE CHAPTER

Issues, Controversies, Problems

We begin by reviewing evolving ambitions for MOOCs that place a priority on moving beyond discussion on online discussion boards as a primary context for social engagement to supporting learners in collaborating to develop and use new knowledge in practice contexts. We continue by examining dilemmas that arise in designing MOOCs that both support large-scale knowledge dissemination and collabora-

tive, socially-engaged learning. We then provide an overview of one MOOC development initiative that advances an innovative instructional approach that aims to address these dilemmas.

Evolving Ambitions

Efforts to leverage the Internet as a resource to provide higher education at a large scale are in their infancy, with MOOCs emerging as an early (and, thus far, dominant) approach to responding to ambitions for increased, open access to academic content and instruction (Daniel, 2012; Liyanagunawardena et al., 2013; Loizzo & Ertmer, 2016). What is often cited as the first massive open online course (*Connectivism and Connective Knowledge*, or CCK08, at the University of Manitoba) was first offered in 2008 (Daniel, 2012). In the United States, such elite institutions as Harvard University, Stanford University, and the Massachusetts Institute of Technology began offering MOOCs in earnest in the early 2010s, with collaborators like Coursera, Udacity, and edX established the technical, instructional, administrative, and funding infrastructures needed to support tens of thousands of learners in engaging university-level courses at little or no cost.

Since then, ambitions for leveraging the Internet as a resource to provide higher education at scale have rapidly evolved. For example, a vast, diverse array of universities and other organizations in the United States and around the world are now providing large-scale online learning opportunities, with edX alone reporting over 120 partners (edX, 2019). The number of online MOOC platforms has also expanded concurrently, with one review identifying 35 different platforms in operation in the United States and around the world (Shah & Pickard, 2019). Finally, in addition to individual courses, these universities, organizations, and platforms are now providing collections of MOOCs bundled into course series and, still further, fully online degrees (Palvia et al., 2018).

These evolving ambitions have gone further. Beyond providing academic instruction to individual students at a large scale, MOOCs are now being leveraged as a resource for workforce development, especially in countries with rapidly developing economies, rapidly evolving labor markets, and comparatively under-developed brick-and-mortar university infrastructures (Garrido, Koepke, & Anderson, 2016). This shift to workforce development, in turn, has been matched with the increasing use of MOOCs for competency-based professional certification, including the introduction of digital badges and other micro-credentials (Ifenthaler, Bellin-Mularski, & Mah, 2016).

Design Dilemmas

The expanding mission of MOOCs–especially new ambitions for workforce development–are driving a need to design MOOCs that can support large numbers of learners in developing knowledge and capabilities to do new and uncertain work in evolving and uncertain environments. It is also driving a need to provide prospective employers with reasonable assurance that learners will be able to mobilize their new knowledge and capabilities in professional contexts in collaboration with others who are also engaging in new and uncertain work.

MOOC designers seeking to support these evolving ambitions confront a fundamental design dilemma. On the one hand, the self-paced nature of online learning is efficient for busy learners working alone to acquire new knowledge and capabilities (Alario-Hoyos, Estévez-Ayres, Pérez-Sanagustín, Kloos, & Fernández-Panadero, 2017). While on the other hand, the self-paced, often-isolated nature of online learning complicates designing MOOCs that motivate and sustain the type of engagement necessary to

support learners in mobilizing new knowledge and capabilities in practice contexts in collaboration with other professionals (Margaryan, Bianco, & Littlejohn, 2015).

The former, self-directed acquisition of new knowledge and skills is amenable to the more transfer-oriented pedagogies characteristic of xMOOCs (Blackmon & Major, 2017). xMOOC instructional models are more content-focused, instructor-driven, and tailored to individualized, personalized, self-paced learning (Eisenberg & Fischer, 2014). xMOOC instructional designs are hyper-centralized (Margaryan et al., 2015), built primarily for information transmission (Daniel, 2012), and mimic traditional lecture-based university courses (Admiraal et al., 2015). Behaviorism and its stimulus-response focus undergird the pedagogical approach and platform design that define xMOOCs, including the use of assessment approaches that place an emphasis on the objective correctness (in contrast to the quality of reasoning and argument) in learners' responses (Daniel 2012; Margaryan et al., 2015).

The latter, collaborative learning for deep comprehension and practical application draws instructors and developers into the more socially-oriented pedagogies of cMOOCs (Siemens, 2005). cMOOCs promote cooperative and collaborative online learning environments, with a particular emphasis on creation, autonomy, and socially engaged learning (Daniel, 2012; Downes, 2009; Mackness, Mak, & Williams, 2010; Margaryan et al., 2015). Connectivist, social network, and distributed learning theories drive the pedagogical approach and technological approaches that define cMOOCs, including assessments that emphasize context-sensitive argumentation and reasoning (more so than objective correctness) in learners' responses (Admiraal et al., 2015; Daniels, 2012; Siemens, 2005, 2012).

The xMOOC and cMOOC models have emerged largely as alternative (often mutually exclusive) instructional approaches concurrent with the broader evolution of MOOCs sketched in the preceding section. Interestingly, the cMOOC model emerged first, with the initial advent of MOOCs. The xMOOC model emerged later, in interaction with the popularization of MOOCs as a resource to provide access to a new form of higher education at a large scale. Although the xMOOC model has largely eclipsed that of the cMOOC model in terms of prominence and pervasiveness, a review of the origins of cMOOCs provides context for this case study, where course designers sought to infuse the responsive and interactive qualities of cMOOCs into the more linear and fixed format of the xMOOC.

The launch of the first MOOC, CCK08, in 2008 incorporated an instructional design and pedagogical approach rooted in connectivist principles. Connectivism, according to Siemens (2005) presumed that learning occurs at the intersection of the networked connections between people and artifacts in a nebulous space. Cultivating and nurturing modes of virtual interactivity, then, was key to the learning process, as amplification of learning, knowledge and understanding through the extension of a personal network is the epitome of connectivism" (Siemens, 2005, para. 31). cMOOC platform pedagogies, therefore, capitalize on the social network capabilities of the online space.

xMOOC pedagogies, by contrast, are more institutional in nature. They aim to reduce content into discrete components through a heavy reliance on video lectures (Admiraal et al., 2015) and present material in a more traditional, linear fashion (Margaryan et al., 2015). MOOCs anchored in xMOOC instructional designs entered the digital landscape in early 2012, when platforms such as Coursera, Udacity, and edX began to partner with elite educational institutions to make content-specific expertise more accessible to a diverse, geographically distributed population of learners (Argawal, 2013; Daniel 2012; Margaryan et al., 2015). Consequently, xMOOC platforms developed in response to the goal of supporting individualized, self-paced learning at scale. xMOOCs have therefore perpetuated a transmission model of instruction in higher education (Eisenberg & Fischer, 2014).

Instructional Innovations

A fundamental dilemma in responding to new ambitions for developing open courses at scale has MOOC designers working at the nexus of two approaches to instructional designs—xMOOCs and cMOOCs—that are often pursued as mutually exclusive alternatives. There is evidence that developers are struggling to manage the affordances, vulnerabilities, and trade-offs among these two instructional designs. For example, in a study of 76 randomly selected MOOCs, Margaryan et al. (2015) found that the quality of the overall instruction designs of most MOOCs was quite low, and, more specifically, that it was lower for xMOOCs than cMOOCs. Using Merrill's (2002) *First Principles of Instruction* to guide their evaluation, they found that xMOOCs tended to lack activities that (1) were authentic, (2) required the application of new knowledge and skills, and (3) resulted in collaboration with others.

We continue, then, by analyzing efforts to manage this dilemma in the context of developing the University of Michigan's *Leading Educational Innovation and Improvement* (*LeadEd*) MicroMasters program. *LeadEd* was launched on edX beginning in January of 2017, as one of 19 micromasters programs that constituted one of the earliest efforts to coordinate online micro-credentialing with campus-based degree programs. *LeadEd* introduces learners to the theory and practice of large-scale, network-based educational improvement, a reform strategy that has quickly gained formidable philanthropic and policy support in the United States (Peurach, Glazer, & Lenhoff, 2016). That, in turn, is driving precisely the type of workforce development needs introduced above, with practicing professional educators faced with developing the knowledge and capabilities needed to advance the strategy.

LeadEd was developed by the University of Michigan School of Education and the University of Michigan Center for Academic Innovation in collaboration with the Ross School of Business and the Carnegie Foundation for the Advancement of Teaching, with contributions from over 40 leading educational professionals, researchers, and reformers across the United States. As detailed in Table 1, *LeadEd* is a series of five massive open online courses: a general introduction to the overall instructional reform agenda; three core courses focused on developing knowledge and capabilities to lead large-scale, network-based educational improvement; and a capstone assessment of learners' knowledge and capabilities.

All courses in the series remain open for continuous, ongoing enrollment as a self-paced learning experience. Learners who successfully complete all five courses in the series are eligible to apply to the School of Education's "Blended Master of Arts in Educational Studies" program, which complements the online learning experience in *LeadEd* with 18 credit hours of campus-based courses. To date, *LeadEd* has had over 50,000 course enrollments, with roughly 20% from the United States and 80% from across the rest of the world.

The three core courses in the program (*LeadEd502x*, *LeadEd503x*, and *LeadEd504x*) are an experiment in using a novel instructional design that integrates the strengths of both cMOOC and xMOOC instructional approaches to create opportunities for socially-engaged, practice-based learning in a large-scale, open-access, self-paced learning environment. The instructional approach—which we call Self-Directed/Community Supported Learning (SD/CSL)—aims to draw diverse learners around the world into a community of discourse and practice through coordinated video content presentations, web-based enrichment activities, scenario-based team practice exercises, and community-wide discussion. The instructional approach was informed by our research on the large-scale enactment of cooperative learning models in K-12 public schools (Peurach, 2011), as well as by research on project-based learning (Krajcik & Blumenfeld, 2006) and problem-based learning (Merrill, 2002; Savery & Duffy, 1995).

Table 1. Leading educational innovation and improvement

Course	Description
LeadEd501x – Leading Ambitious Teaching and Learning	An introduction to a) principles of instruction focused on high levels of socio-cognitive activity, b) characteristics of educational systems that support such instruction, and c) the knowledge and capabilities of educational leaders needed to organize and manage these systems.
LeadED502x – Designing and Leading Learning Systems	An introduction to leading theory underlying a) systemic school improvement and b) the organization and management of new network-based organizational forms used to create, scale up, and refine educational systems.
LeadEd503x – Improvement Science in Education	An introduction to the practice of collaborative, continuous learning and improvement in the context of networked improvement communities, including the application of new capabilities in specific use contexts.
LeadEd504x – Case Studies in Educational Improvement	An examination of different categories of improvement problems and their relationship to three leading approaches to collaborative, continuous learning and improvement: design-based implementation research, implementation science, and improvement science.
LeadEd505x – Leading Educational Innovation and Improvement Capstone	A combination of portfolio-based and performance based assessments for evaluating the development and use of new knowledge and capabilities in collaboration with colleagues in authentic practice contexts.

Each lesson in *LeadEd502x*, *LeadEd503x*, and *LeadEd504x* includes standard components that, as detailed in Figure 1, scaffold learners from individual learning to community-wide learning:

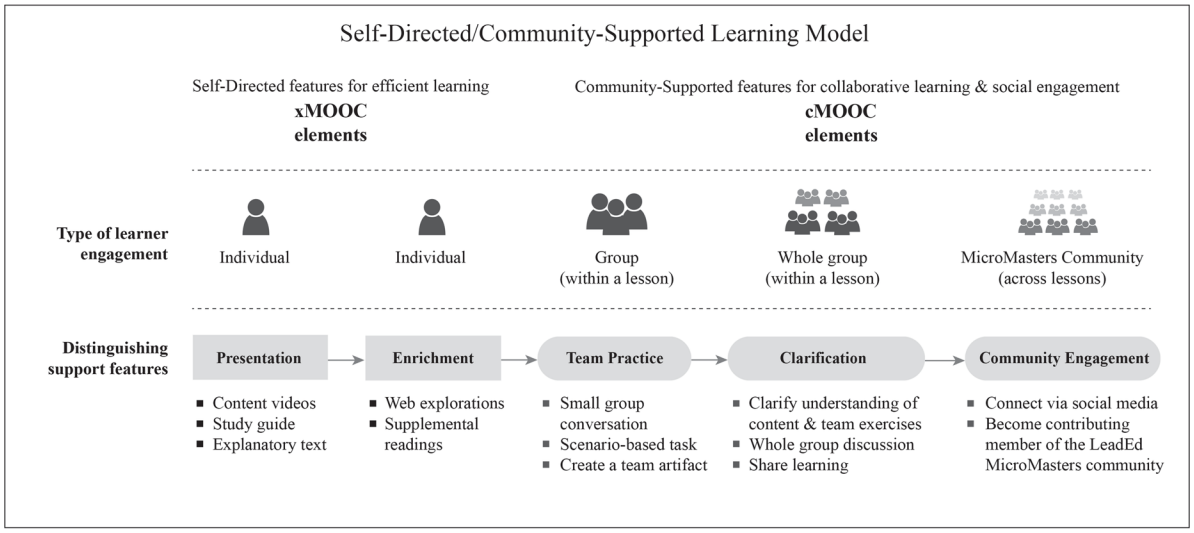
- Presentation
- Enrichment
- Team Practice
- Clarification
- Learning Check
- Celebrate Success
- Community Engagement

The **Presentation** component is a series of videos presenting the content for the lesson in the form of short lectures and interviews with leading experts in the field. In this respect, the Presentation component supports the type of individualized, independent learning characteristic of xMOOCs. To ensure active engagement, these videos are accompanied by study guides that direct students to define key terms and concepts, create representations of essential content, pause-and-reflect on their own understandings, and raise questions for team discussion.

The **Enrichment** component is designed to enhance learning in the courses, to identify resources that students can use in their own practice, and to support different levels of interest and engagement among learners. The Enrichment component again supports the type of individualized, independent learning characteristic of xMOOCs. It includes guided web explorations that direct learners to publicly available resources. It also includes a detailed reference list that directs learners to academic resources that (a) are typically available through public or university libraries, or (b) can occasionally be found by searching the web.

The **Team Practice** component features a scenario-based teaching case in which learners collaborate as a leadership team to address an authentic educational leadership task. With that, the Team Practice

Figure 1. Self-directed/community supported learning course lesson instructional design



component introduces the type of connectivist learning that characterizes cMOOCs. In each lesson, Team Practice begins with joining a group of colleagues who are actively working on that lesson at the same time. As a self-directed learner, Team Practice serves as the first point for clarifying content and resolving questions through discussion and community support from teammates. It requires that teams apply content from the lesson to address problems, needs, and opportunities that they are likely to encounter as practicing educational leaders. Each Team Practice activity yields products that learners can use (a) as resources in their own practice and (b) to represent what they are learning in this course to colleagues and to current or potential employers.

The **Clarification** component provides learners an opportunity to use conventional threaded discussion to seek additional support from the full community of learners in the course on lesson content (and on the use of the edX platform) that were not addressed during Team Practice, as well as to help other learners clarify their understandings. With that, the Clarification component coordinates the connectivist learning of cMOOCs with threaded discussions that often support independent learning in xMOOCs. Clarification serves as a second point for probing content and resolving questions through discussion with colleagues beyond individual teams and across the entire community of learners engaged in the course. By examining common issues and questions, learners are given the opportunity for deeper engagement with the course community. Clarification is the space where course instructors are most "present" in monitoring, engaging, and providing support, as this is where patterns of misunderstandings across teams becomes most evident.

The **Learning Check** component is a reciprocal learning opportunity designed to support both students' learning and the design team's learning. The Learning Check component guides learners in reviewing their study guides, enrichment materials, and Team Practice artifacts to ensure that they have accomplished the aims of the lesson. It includes open-ended questions about understandings they have developed over the lesson, along with open-ended questions asking them to identify strengths and weaknesses in their experiences in the lesson. Student responses in the Learning Check serve as a primary resource for continuously improving each lesson over time.

The **Celebrate Success** component guides learners in taking stock of their many accomplishments. It also encourages learners to engage socially beyond the confines of the lesson and, with that to appreciate the richness of the world-wide community of learners engaged in these courses. Towards that end, each lesson has the design team sharing some of their favorite things to see and do after a hard day's work, with the design team then guiding learners in sharing ways that they unwind, relax, and enjoy life in different parts of the world.

The **Community Engagement** component provides an opportunity to become a contributing member of the *Leading Educational Innovation and Improvement MicroMasters* community. To do so, Community Engagement provides guidance and encouragement for using Twitter, LinkedIn, and other social media to further support dialogue and exchange among members of the community.

Building on these components, our design for SD/CSL is anchored in the premise that the development and application of professional knowledge and capabilities require moving beyond transfer-focused learning opportunities to include collaborative learning and application in authentic practice contexts. Such learning opportunities are characterized by frequent peer interaction, rich dialogue, and an opportunity to apply course concepts within authentic tasks. One conjecture is that our design for SD/CSL (especially the Team Practice component) will produce greater and deeper participation of precisely this type, given the intimate, collaborative nature of teams. A second conjecture is that SD/CSL will provide learners an opportunity to experience and enact leadership as teamwork within the confines of a virtual platform. The third conjecture is this combination of individual and team learning will catalyze a community of learners engaged and invested in leading the work of educational innovation and improvement in practice contexts.

STUDY DESIGN: EXPLORING LEARNERS' EXPERIENCES WITH SD/CSL

This case study focuses on a specific run of the *LeadEd* MicroMasters series—the implementation of a cohort-based version of two courses within the *LeadEd* series, running consecutively with the 2018 Winter Semester at the University of Michigan, which we are calling the "Winter Cohort". Learners in the Winter Cohort completed *LeadEd502x*, *Leading Ambitious Teaching and Learning*, and *LeadEd503x*, *Designing and Leading Learning Systems,* following a set fifteen-week schedule: Learners completed *LeadEd502x* during the first seven weeks of the semester and, then, completed *LeadEd503x* during weeks eight to fifteen of the semester.

This cohort-based experience was designed as an inquiry into the SD/CSL instructional model by putting course leaders into closer engagement with learners as they made their way through these two courses. We also include data from self-paced learners who were enrolled in these two courses at the same time as the Winter Cohort but who chose to progress through the course asynchronously and independently. In our analysis, these learners are referred to as "self-paced" learners. Data from the self-paced group offers a comparison case for learners completing the same *LeadEd* courses in the absence of additional resources and elevated levels of support made available to members of the Winter Cohort.

The Winter Cohort consisted of two groups of learners: 1) a graduate class of 25 students at the School of Education who took the two courses for course credit, and 2) a group of approximately 100 fully-online MOOC learners from across the globe who received a course announcement through the platform and had elected to join. The residential graduate-level class was listed as *EDUC 639: Engaging Educational Innovation and Improvement*. It followed the format of a discussion-based seminar, augmented with

online learning elements. The residential and online learners interacted with each other through small group activity structures, and they received high levels of support from a faculty instructor and course staff. Unlike the non-cohort version of the course that runs continuously and where learners complete the course at their own pace, the Winter Cohort proceeded on a weekly schedule, with predefined milestones and synchronized deadlines. Concurrently with the Winter Cohort, there were 4,249 learners enrolled in the self-paced versions of *LeadEd502x*, *Leading Ambitious Teaching and Learning*, and *LeadEd503x*, *Designing and Leading Learning Systems*.

The Winter Cohort was led by the *LeadEd* team, consisting of the faculty member who led the development of the course and two graduate students. This structure allowed the *LeadEd* team to support learners in forming and maintaining productive teams that moved through these courses together and completed content collaboratively. In addition to online resources that already existed within the courses, Winter Cohort participants had access to supplemental instructional guidance, online office hours, guest webinars, and blogging opportunities, all aimed at enriching the experiences of the learners.

Research Approach

The *LeadEd* team convened a research group of faculty, graduate students, and staff from the University of Michigan's School of Education and the Center for Academic Innovation to study the 2018 Winter Cohort during its run. The research group set out to understand learner engagement and behavior within an online learning experience that includes a strong instructor presence and centers around collaborative work. The group's core questions centered on how to foster meaningful discussion that facilitates deeper learning and collaboration among learners. The research group used the data and knowledge generated by the group to 1) drive week-by-week refinements to the course design, 2) inform longer-term improvements to the course design, and 3) contribute to the wider research landscape. Several members of this research group are represented in the authorship of this chapter; the third co-author was the professor, the third and fourth co-authors developed the instructional model, and that the first and second co-authors led the research effort.

A case study methodology (Yin, 2018) was appropriate for this work because we sought to understand the outcomes associated with a highly-facilitated, faculty-supported online learning experience, where a university graduate class and group of MOOC learners progressed in tandem through two courses throughout a Winter semester (i.e., 16 weeks). The case study methodology allowed us to explore the impact of operationalizing the SD/CSL instructional model in a context with elevated levels of support and presence from the instructor and where course staff provided augmented levels of facilitation for learner to learner interaction. A case study methodology is also appropriate because our goal is to expand the SD/CSL instructional model, rather than generalizing to other populations. Nevertheless, the lessons learned from this case study could be applicable to contexts that are similar to the original case, where course leaders in online learning environments seek to advance a model of instruction that embody principles of connectivism, problem-based learning, and practice-based professional learning.

We drew on multiple data sources to understand our phenomena of interest, including six "learning checks" completed by learners (self-paced and Winter Cohort) at the end of each week of each course (totaling twelve), an end-of-course survey completed by learners (self-paced and Winter Cohort), and interviews conducted with course leaders and learners (Winter Cohort). Learning checks followed the same structure every week, with learners asked to comment on salient aspects of course content, difficulties they may have encountered with course content, team and collegial support, unresolved questions,

as well as "warm" and "cool" feedback for course leaders. Additionally, learners completed post-course surveys, which elicited their education level, employment status, and their evaluation of course components and the course overall. Interviews with three course leaders and two Winter Cohort learners followed semi-structured protocols, the goals of which were to learn more about their perspectives of the Winter Cohort offering. A member of the research group interviewed three course leaders: the lead faculty member, a graduate student, and a member of the course support staff. Taken together, a review of these multiple data sources allowed us to compose a rich picture of the experience of our Winter Cohort learners and to examine our design conjectures in light against evidence drawn from the data.

We used an inductive qualitative coding approach to analyze the interview and survey data (Creswell, 2015). We identified excerpts from each data source that related to our phenomena of interest (the Winter Cohort), with a focus on the learners' experience of elevated levels of support from the instructional team, team dynamics, and their perceptions of the usefulness of course materials and platform features. We then grouped together excerpts that were held together by similar sentiments, settling on an initial set of categories. In order to confirm and refine our categories, we conducted coder debriefings and consistency checks. Next, we named our categories and constructed a written description for each category.

Using the aforementioned data sources, our research group focused on four key topics that, together, provided a full and nuanced picture of the design and implementation of the Winter Cohort and of *LeadEd*:

- Learners' experiences in *Leading Educational Innovation and Improvement*, comparing and contrasting the experience of learners within both the self-paced group and the Winter Cohort.
- Ways that learners valued and leveraged the rich array of resources within the program. We study how learners utilized instructional materials made available through the course platform, such as study guides, videos, and directions to additional resources.
- Learners' experiences engaging in socially-intensive, team-based learning. We focus on the way that learners responded to the elevated levels of support that were offered through the Winter Cohort.
- Learner heterogeneity as a resource for social learning a MOOC context. We examine the experiences of learners who worked in teams with other learners who may have had a professional background or geographic location that was different from their own.

SOLUTIONS AND RECOMMENDATIONS

We draw from our analysis of the experiences of the learners to create a set of propositions that other MOOC developers can take as a starting point (and that they can further scrutinize and refine) when designing and facilitating similar online and blended courses.

Proposition 1: The active presence of course leaders can be vital to learner persistence and success in a collaborative, online learning setting. Elevated levels of support and increased presence of the instructor and course staff lead to higher levels of behavioral engagement. Course leaders can help facilitate sustained, meaningful collaborative learning through actions such as supporting team formation and persistence, offering supplemental resources and opportunities, or providing responsive feedback to work artifacts.

The Winter Cohort course leaders believed that an elevated level of instructor presence would contribute toward more meaningful learner engagement in course content and team-based activities. Course leaders stressed three key elements of instructor presence: an empathetic approach to learner engagement; a commitment to providing additional enrichment opportunities to learners; active collection, analysis, and response to learner data.

Course leaders employed a generous, empathetic approach to interacting with learners in the winter cohort, understanding that: (1) online learning is new to many people, (2) this specific course design was highly experimental, and (3) that online learners are often juggling their studies alongside professional or family commitments (Evans, 2009). Underpinning this decision was a belief that a learner would be more likely to persist with their work if they believed that they would not face negative consequences for falling behind. As a course leader explained:

For all our learners, including our … solely online learners, when people were starting to fall behind or find certain aspects of the demands challenging, we approach that with a very kind of understanding and empathetic, it was sort of 'oh we'd love to keep you on board, what can we do to support you? and as opposed to kind of, sort of treating it like a failing on their half, kind of approach like well, this is an experiment on our part, and so what can we do to support the learners to persist. So, I think we tried quite hard not to be punitive. (Course Leader)

As outlined above, course leaders designed a set of "enrichment" opportunities that extended beyond the scope of the self-paced versions of the MicroMasters courses. It was only possible to extend these opportunities because of the increased staff and instructor presence for the Winter Cohort. Enrichment opportunities included weekly video messages, online office hours, webinars, and group blog-writing sessions. These opportunities provided meaningful ways for learners to connect with course leaders and other learners. Course leaders believed that the enrichment opportunities would (1) allow learners to extend and deepen their learning, and (2) build on a sense of personal connection with course staff and other learners.

One further affordance of the strong instructor presence in the 2018 Winter Cohort was that the course leaders had the capacity to analyze learner data collected in weekly learner surveys and in-class focus groups, using this data to inform week-by-week tweaks to the course design, and to respond to common learner comments and concerns in weekly video messages.

The Winter Cohort participants discussed the ways in which an elevated instructor presence supported their learning experience. Learners described course leaders as accessible and supportive: responding quickly to email messages, providing useful information, and helping support their engagement in the online learning community. For example, learners noted how course leaders connected them with supplemental readings and helped them to establish and join effective teams with other learners.

Learners who engaged with enrichment opportunities such as webinars and online office hours described engaging with these materials as enjoyable and useful. For instance, learners valued the opportunity to learn from a guest lecturer, appreciating his perspective as a professional engaged in the sort of work they were studying. Other learners described how the enrichment opportunities led by Professor Peurach, such as the online office hours, provided meaningful opportunities for them to interact with a course leader.

The research team's observations from the Winter Cohort can be compared with contemporaneous data collected from the self-paced learners in the same LeadEd courses. The self-paced versions of the LeadEd MicroMasters courses are designed to run asynchronously with little need for staff engagement or

presence. As such, one part-time staff member, known as a Course Advocate, has an overview of course discussion boards and team spaces. This staff member is not expected to interact with learners unless specifically responding to learner queries that are directed at staff. Learners enrolled in the self-paced versions of the courses described how this limited presence of course staff helped support their learning. It appears that staff presence was especially important during times when there were low numbers of students enrolled in the courses. Learners described receiving feedback from staff on their work in the absence of active team members, and described the ways in which staff members and some other learners went out of their way to connect with them. Nonetheless, many learners described moving through the course as a self-paced learner as a relatively solitary experience, where there was little interaction between learners, or between staff and learners.

Proposition 2: When aiming for meaningful discussion-based learning, course designers should work to encourage **large, active groups of learners** to engage with the same materials at the same time. This can encourage learners to engage with and support one-another, improving levels of engagement and perseverance in addition to supporting learning and extending engagement with course content.

The Winter Cohort course leaders believed that attaining a "critical mass" of learners completing MicroMasters content on the same schedule would help address challenges in team formation and interaction.

> The problem that we are seeing online is that there are students that are all spread out there with varying levels of commitment, and that the social part of the course that we thought was so important and was our primary goal became really secondary to our learners, and so it was hard to learn whether our ideas about building social engagement work unless we got a lot of people to do it all at once (Course Leader).

As such, course leaders ensured that all the Winter Cohort learners were aware that they would be proceeding on a set weekly schedule. Course leaders also offered support to learners in posting on discussion boards and in forming teams. In addition to this, the Winter Cohort staff team encouraged residential learners participating in the University of Michigan graduate seminar to serve as informal "ambassadors" for the program. The expectation was that these ambassadors would serve as leaders in the learning community, looking out for discussion board posts to respond to, and ensuring that roles and tasks were assigned within teams.

The research team recorded high levels of behavioral engagement from the Winter Cohort learners both on the course discussion boards and within teams. Learners shared how other learners provided answers to their questions, and helped them to stay engaged and motivated as they progressed through the course. One learner noted that every question posed by a learner on a discussion or team board had been answered by a staff member of another learner. Another spoke to the importance of weekly video calls with their team members in maintaining the motivation to complete the course.

Some learners described the ways in which different team members assumed distinct roles within their teams, and discussed how this facilitated and supported learning. For instance, one learner described how their team created a rotating system of distributed leadership. Each week, a new team member would become the team leader. This team member would guide collaborative activities, set deadlines, and hold teammates accountable. Another team member would attend the weekly office hours with the lead faculty member. This team member would ensure that the team's questions were answered, and feed the professor's advice and suggestions back to their colleagues.

The Winter Cohort learners discussed the ways in which their interaction with others in the course helped deepen and extend their engagement with the course materials. Learners described how interact-

ing with team members and receiving feedback on their work helped them develop their understanding of key concepts; answer unresolved questions; develop theoretical frameworks; amend definitions for terms; and articulate their understandings more clearly.

In addition to supporting and deepening their learning, the Winter Cohort participants consistently described how team membership helped build a sense of accountability. Learners described how working in a collaborative group with others meant that they felt a responsibility to keep pace with the course and to contribute to their team's shared work products. This is borne out in analytic data from the edX platform, which indicates elevated levels of course persistence for the Winter Cohort. Learners described the ways in which shared team deadlines helped bolster their sense of accountability. One learner described how she felt motivated by her relationships with the other learners to ensure that she completed her work in advance of her team's deadlines.

These observations from the Winter Cohort stand in contrast with data collected from self-paced learners completing the same LeadEd courses contemporaneously. In the self-paced versions of the MicroMasters courses, learners complete their work asynchronously. Learners may start the course at any time, and although units are presented in terms of "weeks", there is no obligation for learners to complete courses a week-at-a-time. This structure offers flexibility for learners to tailor their learning to their own schedules and priorities. However, self-paced learners reported challenges with discussion-board and team-based elements of the course. Factors that limited collaboration for self-paced learners included: working at different paces from learners who they were attempting to collaborate with; not being available to collaborate on the same days or at the same times as others; and not having enough active learners present at a given time in a given part of the course in which to collaborate.

Proposition 3: Course leaders should anticipate potential capacities and limitations with the learning management system that is chosen for a learning experience, consider how they will address these potential limitations, and anticipate the need for additional tools to support interactions that are desired. Course leaders should consider whether the learning management system that they are using has built-in technologies that are capable of facilitating effective, responsive communication. If not, they should consider how else they could facilitate discussion-based learning through other means.

Leading Educational Innovation and Improvement is hosted on the edX platform, a MOOC provider. They were aware that MOOC platforms such as edX and Coursera are adept at supporting knowledge transmission pedagogies but are less successful at supporting rich social interactions of the kind that course leaders sought to foster and support. Nevertheless, course leaders wanted to push on existing MOOC platform affordances to create opportunities for learners to co-construct understandings and to authentically discuss practice in context. While it would be unreasonable to expect that activity on discussion forums would flourish on its own, course leaders believed that by providing learners with elevated levels of support, learners would be able to engage in meaningful discussion with team members and to successfully complete team assignments. Thus, the Winter cohort provided course leaders with an opportunity to test out their assumptions and to discover whether other tools or modalities would be needed.

Like self-paced learners, members of the Winter Cohort accessed LeadEd courses on the edX platform. Therefore, the same technical limitations, which challenged the sort of rich interaction that the course was designed to facilitate, persisted for the Winter Cohort learners. In part, due to the inefficiencies of the platform's discussion forum and mobile app, learners opted to find and use supplementary technologies in order to overcome the limitations of the platform, to improve their ability to communicate

with one another and in order to make progress on their team projects. This practice was supported and encouraged by course leadership. For example, one issue with the edX discussion boards was that they did not alert learners to replies to comments or new activity in the forum. A learner remarked, "The [edX] platform didn't really update you to say, "see, they posted something new," or "somebody replied to your comment." So, it wasn't very practical for that." It was necessary to find a tool that would allow for more immediate forms of interaction. Google Hangouts and BlueJeans allowed learners to interact with each other synchronously, instead of experiencing lags in communications (as they would on the edX discussion boards). Further, "Google Hangouts and email were more useful than the platform. With the other team, we used BlueJeans. I think it was just a method of rapid communication and another method for meeting in an online space" noted the learner. Additionally, learners used online collaborative document tools such as Google Docs to engage in and complete project work. The flexibility that Google Docs afforded proved useful for a learner who had an unexpected medical situation: "By using Google Docs, I was able to see the document creation and chime in, even from the hospital."

The limitations of the MOOC platform for engendering fluent discussion had been previously identified by self-paced learners through their weekly learning checks. Self-paced learners described how edX discussion forum features limited their ability to communicate cogently and coherently. Learners described the difficulty that they encountered in posting messages. They also explained that navigation was a challenge and that they found it difficult to find their way around the discussion forums. Because the forum layout was not intuitive, learners posted their ideas in multiple threads. This practice disrupted the continuity and flow of the discussion, creating a slipshod and "haphazard" feel to the communication. Other learners commented on the lack of activity in the forums, with a lot of content available for review (i.e., comments posted previously by learners), but little evidence of active learner presence within the course. It was clear that the edX discussion forums on their own would be inadequate to meet learners needs within the course. Although learners in the Winter Cohort continued to experience challenges with platform layout and usability, with encouragement from course leaders they integrated external communication and collaboration tools into their workflow and practice, which allowed them to overcome some of the original limitations.

Another usability challenge that learners experienced related to the edX mobile application, which was used by some learners as an alternative modality for accessing and contributing to the course. Several of these learners remarked that they struggled to interact with the material efficiently. They stated that the edX mobile app needed improvement, because, "it was clunky [and I could not] access all of the parts [of the course] in a reliable way." Learners also referred to the frustration they encountered in finding the "Team" area of the course, eventually giving up and finding other things to do for the week. Although this issue could not be addressed by using alternative tools, it is worth noting that this was a point of frustration for learners in both the self-paced and Winter Cohort versions of the course. While course leaders could not mitigate usability, challenges associated with the edX motile application, having confirmation of the issue from learners across multiple cohorts should incentivize course leaders in future iterations to alert learners to issues that they might encounter with the mobile application.

Proposition 4: Designers of courses oriented toward workforce-development should seek out and seize opportunities to bring together diverse groups of learners, for instance: individuals with a variety of years' professional experience; individuals who have worked in different specialisms or contexts within their profession; or individuals who have practiced their professional role in a range of cultural or national settings.

Course leaders were aware that diversity was already extant in the fully online versions of the courses (e.g., the self-paced version), so a primary goal was to understand how course leaders could foster exchanges and interactions that would allow learners to more easily surface their own perspectives and experiences in a way that would lead to mutually deeper engagement with course themes and concepts. Through this case study we also sought to understand how learners perceived the value of diversity within their team. In this context, we characterize diversity as difference in professional backgrounds and levels of work experience, as well as diversity of learners who are operating from different geographical regions. We focus on these aspects of diversity because these were the aspects of diversity that learners surfaced in their learning checks and survey responses. While diversity manifested itself in a variety of ways in the Winter Cohort, it ultimately amounted to a richness of thought and perspective that would have proved difficult to replicate in a fully residential environment.

Learners described ways in which the diversity of professional backgrounds and experience represented in the cohort and in their small teams helped them to shape their understanding of the course content. They described the experience of partnering with others from across the globe and how this opportunity provided an international comparative perspective, one that encouraged them to consider how concepts and techniques described in the course could be applied or adapted in specific contexts. The Winter Cohort learners valued working in a team that constituted a diverse membership. One learner commented, "I really enjoyed working with a diverse team, both geographically and in our professional experiences. Everyone contributed their expertise and it made the end product a strong one." One learner revealed that interacting with diverse team members strengthened their own contributions to the course: "Their different point of view made me give stronger arguments for my choices." Another learner stated that interacting with learners who had viewpoints that were different from their own was a productive experience: "Engaging with a broad variety of perspectives was very helpful in challenging some of my own assumptions about innovations and the contexts in which they occur."

Learners also reported that some of the benefits of diversity among team members included: opportunities to deepen understanding of course content, useful peer feedback, and overall improved work products. Some learners commented on how having a diversity of stakeholders represented within their team meetings contributed to their ability to solve problems effectively. "It surprised me that each person interpreted the problem a little differently in the assignment; it made me think of the importance of hearing other perspectives in practice, as other stakeholders may see a problem quite differently." With respect to differences in professional backgrounds, one learner remarked how helpful it was to work with team members who had more professional experience than they did: "My colleagues from different levels and years of expertise really gave me positive feedback as far as what employers and potential administrations look for on a good cover letter in our team practice." Because team membership also consisted of a mix of "professional" learners and full-time graduate students, some of the feedback focused on this dimension of team diversity. Graduate students with fewer years of professional experiences may have felt that their experiences were not as relevant to team discussions. Learners with professional experience were able to provide practice-based examples and perspectives that were of benefit to emerging professionals.

Although learners generally expressed positive sentiments with respect to the diversity they experienced within their teams, some learners did identify challenges associated with meeting with learners from a range of geographical regions. Learners commented on the difficulty they had in coordinating schedules, with one learner stating that to make schedules work, they had to meet with their team at 3 am in the morning! This is a practical challenge, but one that should not be disregarded, particularly if diversity within team membership is deemed valuable and desirable.

Some learners commented on how they valued perspectives that challenged their Western-centric view of schools and school improvement. At the same time, other learners raised the issue that course resources seemed to assume a familiarity with United States school systems. These learners suggested that course leaders could provide supplementary resources to provide background information. This issue is something that course leaders grappled with in their creation of the course: on the one hand, they recognized that this type of an experience had the potential to foster a community of practice for team members who feel isolated in their professional and geographical context. On the other hand, they acknowledged that there is still work to be done to realize a balance between surfacing US-based assumptions and finding the best way to contrast these assumptions with the experiences that the diverse student body brings to the course.

FUTURE RESEARCH DIRECTIONS

We began with the observation that the ambitions for MOOCs have expanded beyond providing open access stand-alone courses to bundling courses into micro-credentialing programs that support workforce development in both established and emerging economies. That, in turn, places new demands on MOOC developers to create learning opportunities that parallel the type of social engagement found in authentic practice contexts. The result is a dilemma, with "scale" aspirations encouraging the use of xMOOC instructional models that favor knowledge transmission and low-level social engagement and with "professional practice" aspirations encouraging the use of cMOOC instructional models that favor collaborative learning and high-level social engagement in authentic practice contexts.

We continued by examining efforts to manage this dilemma within one micro-credentialing program that integrated xMOOC and cMOOC design principles into a novel approach for Self-Directed/Community-Supported Learning. One experience constructed to provide program developers with a keen perspective on the student engagement in this micro-credentialing program that provided evidence of success motivating and coordinating individual and social learning at a large scale and, subsequently, reinforced the design principles underlying SD/CSL.

This experience also surfaced a new set of considerations that require attention in administering and enacting MOOCs anchored in SD/CSL in order to realize such success. One chief consideration is constructing a cohorted learning experience that ensures a critical mass of learners are progressing through a MOOC at a given time and on the same pace. Within such a cohort model, we advanced four additional considerations in the form of "design propositions" that direct attention toward the need for: a strong instructor presence in the course; careful management of course pacing within a cohort design; deliberate efforts to overcome limitations to social engagement inherent in the learning management system; and deliberate efforts to surface and to leverage cohort diversity as a resource for social engagement.

All of the preceding suggests that xMOOC and cMOOC instructional approaches need not be viewed as antithetical and mutually exclusive but, possibly, as complementary dimensions of integrated, coordinated instructional designs that combine individual learning and knowledge transfer with social learning, knowledge construction, and practical application. While that holds promise for the use of MOOCs as a resource for large-scale workforce development, all of the preceding also suggests that course series designed around such principles are unlikely to succeed absent careful attention to their implementation and to the many exigencies that arise in the context of implementation.

With that, this analysis does not suggest that MOOCs are a resource ready-and-waiting to be leveraged as a solution to various problems of workforce development—just the opposite, in fact. This analysis suggests that leveraging MOOCs as resources for workforce development creates an essential context within which to experiment with and address fundamental issues of instructional design, platform development, and course management. That, in turn, suggests a need to carefully calibrate expanding enthusiasm for MOOCs in relation to the current state of the knowledge base and technical infrastructures supporting their popularization.

We offer the following principles for course developers and tie them to components of the SD/CSL model that these principles illuminate. Course developers who are creating courses oriented toward workforce-development should consider the role of instructor presence when designing the learning experience. Instructor presence can help to enrich the learning environment and ensure that learners feel supported in their learning. For instance, during the Enrichment component of the SD/CSL, a high instructor presence in both whole group and team discussion boards facilitated higher student retention and encouraged greater student engagement in collaborative, discussion-based learning. The Winter Cohort participants described the ways in which the active presence of course leaders enriched their learning experiences. The accessibility and friendly demeanor of course leaders helped to keep learners engaged with their learning. Course leaders took on roles that were akin to instructors in a cMOOC, where they worked within the strengths of the xMOOC model, providing a course structure and narrative, without appearing to be overly dominant (Ross, Sinclair, Knox, & McLeod, 2014). By the course team embodying instructor presence that resembled that of facilitator or co-participant, they became a role-model to be followed and a fellow "node" in the connectivist web (Anderson & Dron, 2011). The un-authoritarian presence of the course leaders created an implicit invitation for learners to participate, by offering an open and non-hierarchical participation structure (McAuley, Stewart, & Siemens, 2010). The active presence of course leaders also provided learners access to a richer landscape of supplemental learning opportunities and course resources (Ross et al., 2014); learners felt that these opportunities were both useful and enjoyable. It is also important to acknowledge that elevated levels of instructional support from faculty and course staff has a cost in time and money, which needs to be anticipated and planned for in advance.

Developers of workforce-development oriented courses should also be cognizant of the ways in which the presence of other learners impacts the overall learning experience. The active presence of other learners can enhance learner motivation and can help provide a deeper learning experience. In the Team Practice component, the instructional team facilitated discussion-based learning through means such as the establishment of routines and norms, finding communication technologies that worked for team needs, and the delegation of tasks and roles among team members. Participants in the Winter Cohort described the ways in which the active presence of other learners provided an additional motivation to persist with the course, and to extend their engagement with course content. Examples of ways in which learner-to-learner interaction enriched the learning experiences included: the delegation and rotation of roles within teams, and giving and receiving feedback on assignments. Learners also described the ways in which being accountable to others bolstered their motivation to complete course milestones on time. It is also important to acknowledge the challenges that creating synchronous environments with many active learners can engender, such as the need for recruitment efforts and the loss of some flexibility for learners (i.e., course is no longer self-paced).

Course developers should also consider whether the platform that they are using is capable of supporting rich social interactions between learners. Traditional MOOC platforms may limit the possibilities

for collaboration between learners. Therefore, where appropriate, course leaders can encourage learners to consider other software and platforms that can enrich the social dimensions of a course. The Winter Cohort learners described how they leveraged software outside of the edX MOOC platform to enrich and extend their learning experiences in the Team Practice component. Alternative venues for discussion-based learning included Google's instant messaging and conference call software: Hangouts, and BlueJeans, a video conferencing software supported by the University of Michigan. While these methods can make communication and collaboration easier for learners, encouraging the use of off-platform communications technologies means that course leaders and researchers lose data points that quantify and describe learners' interactions within the course.

Course leaders who design courses oriented toward workforce-development should seek out and seize opportunities to bring together diverse groups of learners for instance: individuals with a variety of years' professional experience; individuals who have worked in different specialisms or contexts within their profession; or individuals who have practiced their professional role in a range of cultural or national settings. We observed that learners reported a benefit from participating in teams where composition was heterogeneous in nature. Our findings suggest that instructors should view learner diversity as an asset, despite the fact that diversity can bring up challenges of cultural differences and difficulties working across time zones. We hope that this study encourages researchers to conduct further explorations of learner diversity, and encourages instructional teams to actively foster collaboration between learners from diverse backgrounds.

CONCLUSION

In sum, the Winter Cohort exhibited three distinct features that set it apart from the self-paced version of these courses: 1) interaction among residential students and MOOC learners through coordinated team activities and discussion; 2) elevated levels of support and interaction by the *LeadEd* team, and 3) opportunities for augmented enrichment. The inclusion of these three elements became a focus of inquiry, allowing us to observe a unique instance of SD/CSL in practice.

Our examination of this unique instance of SD/CSL in practice has in turn influenced our thinking about ways in which the model might be supported, extended, and enriched. An instructor engaging in SD/CSL will grapple with the unique opportunities and challenges of this model. As such, we have identified the need for instructor preparation. This could include training on: the specific roles and responsibilities of an instructor in a SD/CSL course; bridging cultural, linguistic, and logistical challenges to facilitate the formation of diverse teams; and techniques for promoting learner persistence and active participation. Our experience also underscores the importance of identifying learning platforms and tools that are well adapted to facilitate a rich social learning environment. We therefore stress the necessity for open lines of communication between designers of SD/CSL courses and learning platform developers to ensure that developers are aware of the ways in which platforms could better support the facilitation of these types of socially-engaged course designs.

Through this case study, we have presented the outcomes of our efforts to balance the dilemmas that arise in designing MOOCs that are a response to new aspirations for workforce development and micro-credentialing. Our findings can help address the central dilemmas that we identified from the outset, namely that self-paced online learning experiences are efficient for acquiring new content knowledge, but do not necessarily support the kinds of interactions that support collaborative learning. While it may

not always be feasible for course leaders to offer this elevated level of support in MOOCs, our case study offers a vision and direction for those who desire to offer an elevated level of support to learners, even if only for a limited duration of time. Our case study demonstrates that the SD/CSL model works as an effective foundation on which to build elevated levels of support, creating opportunities for deep collaboration, productive discourse, goal-oriented team artifacts, and meaningful interactions with diverse groups of learners.

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