

# **Motivations for persistence and completion in professional learning online modules**

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## **ABSTRACT**

The proliferation of educator professional development in online formats in recent years highlights the need for evidence-based frameworks in which to deliver meaningful online experiences that result in professional learning and growth. This article describes an examination of the application of the Professional Learning Online Module (PLOM) framework for broad-reaching online professional development to two online professional development courses. The PLOM framework synthesizes knowledge regarding characteristics of effective professional development with evidence from massive open online courses (MOOCs) and design principles for adult online learning. The mixed methods examination of the two pilot courses aimed to understand participants' experiences in the modules and to understand what implications those experiences have for large-scale online professional learning. Findings provided an initial evidence base supporting the effectiveness of the PLOM framework in the design of online professional development and indicated that the course met participants' needs for application-oriented learning and collaborative learning. Findings also indicated that there are robust opportunities for innovation and research into ways that the PLOM framework can be applied in ways that enhance participant interaction and allow for contextualization of content to diverse practice settings.

**Keywords:** educator professional development, adult education, online learning, instructional design

## Motivaciones para la perseverancia y la finalización de los módulos de aprendizaje profesional en línea

### RESUMEN

La proliferación del desarrollo profesional docente en formatos en línea en los últimos años subraya la necesidad de marcos basados en la evidencia para ofrecer experiencias en línea significativas que promuevan el aprendizaje y el crecimiento profesional. Este artículo describe un análisis de la aplicación del marco del Módulo de Aprendizaje Profesional en Línea (PLOM, por sus siglas en inglés) para el desarrollo profesional en línea de amplio alcance a dos cursos de desarrollo profesional en línea. El marco PLOM sintetiza el conocimiento sobre las características del desarrollo profesional eficaz con la evidencia de los cursos masivos abiertos en línea (MOOC) y los principios de diseño para el aprendizaje en línea de adultos. El análisis con métodos mixtos de los dos cursos piloto tuvo como objetivo comprender las experiencias de los participantes en los módulos y sus implicaciones para el aprendizaje profesional en línea a gran escala. Los hallazgos proporcionaron una base de evidencia inicial que respalda la eficacia del marco PLOM en el diseño del desarrollo profesional en línea e indicaron que el curso satisfizo las necesidades de los participantes en cuanto a aprendizaje aplicado y aprendizaje colaborativo. Los hallazgos también indicaron que existen sólidas oportunidades para la innovación y la investigación sobre cómo aplicar el marco PLOM para mejorar la interacción de los participantes y permitir la contextualización del contenido a diversos entornos de práctica.

**Palabras clave:** desarrollo profesional docente, educación de adultos, aprendizaje en línea, diseño instruccional

## 坚持完成专业在线学习模块的动机

### 摘要

近年来，在线教育工作者专业发展形式的蓬勃发展凸显了“建立基于实证的框架”的必要性，以便提供有意义的在线学习体验，从而促进专业学习和成长。本文探讨了专业学习在线模块(PLOM)框架在两个在线专业发展课程中的应用。PLOM框架融合了有效专业发展的特征知识、大型开放式网络课程(MOOC)的实证研究以及成人在线学习的设计原则。本文采用混合方法对两个试点课程进行研究，旨在了解参与者在模块

中的体验，以及这些体验对大规模在线专业学习的启示。研究结果初步证实了PLOM框架在在线专业发展设计中的有效性，并表明该课程满足了参与者对应用型学习和协作学习的需求。研究结果还表明，PLOM框架在创新和研究方面具有巨大潜力，能探究如何以“增强参与者互动和使内容适应不同实践环境”的方式应用该框架。

关键词：教师专业发展，成人教育，在线学习，教学设计

Online professional development for K-12 educators has proliferated in recent years as information technologies have enabled universities and other professional development providers to reach large numbers of geographically dispersed educators with flexible web-based programs (Means et al., 2013; Quinn et al., 2019). The explosion in the use of online platforms to deliver professional development courses and activities highlights the need to understand the effectiveness of online teaching and learning practices in impacting teacher knowledge, skills, and change in practice. Although online learning as a field of inquiry is growing, to date there is no clear consensus regarding the effectiveness of online professional development as opposed to face to face professional development activities and no clear evidence base that reflects how effective practices in the fields of adult learning, large scale online learning, and educator professional development can be synthesized and applied to educator professional learning. To address this gap, an evidence-based model for large-scale online professional learning,

the Professional Learning Online Modules (PLOM) framework, is being proposed. The PLOM framework was used to develop two educator professional development courses for PreK-8 educators. These online courses, Teaching K-8 English Learners Literacy & Academic Language (TELLAL) and Teaching Math to Young Children (TMYC), were delivered by a university with a history of providing open access to massive open online courses (MOOCs) to educators.

The current study aims to use a concurrent mixed methods approach to understand learner experiences in MOOC courses designed using the PLOM framework and what implications these experiences have for the design of online educator professional development courses. The study seeks to answer the following research questions:

1. How did courses designed using the PLOM framework meet learner needs?
2. What were barriers to participant completion of courses designed using the PLOM framework?

3. What were the strengths of the courses designed using the PLOM framework?
4. What are potential improvements to the courses designed using the PLOM framework?

This study's findings may be useful to designers of online educator professional development as well as designers of other adult online professional learning courses. In addition, the findings may be useful to researchers in the field on educator professional development by providing evidence regarding a framework for providing professional development in online settings.

## **Conceptual Framework**

The PLOM framework was developed as part of an effort to harness the strengths and mitigate the weaknesses of the MOOC model of course delivery while attending to effective teaching and learning strategies for adult professional learning for educators. The following sections provide an overview regarding the affordances of MOOC learning, theoretical underpinnings of adult learning, and effective practices in educator professional development. Evidence-based practices in each of these areas were synthesized to create the PLOM framework.

### ***MOOC Course Delivery Models***

The term "MOOC" has been used since around 2008 (García-Peñalvoa et al., 2017) to refer to large-scale online course delivery for geographically dispersed adult learners. MOOCs

may take a variety of formats, typically offer courses at no or minimal cost to participants, incorporate little peer or instructor interactivity, and use mechanized assessment (Anders, 2015; García-Peñalvoa et al., 2017; Johnston, 2014). The earliest iterations of MOOCs, called connectivist MOOCs, or cMOOCs, aimed to reach broad swaths of individuals representing various professions and demographic characteristics (García-Peñalvoa et al., 2017). These early MOOCs tended to be loosely organized, and participant driven, with self-organized collaboration and crowd-sourced resources, and often lacked design features to attend to individual contexts or needs (García-Peñalvoa et al., 2018). Low rates of completion in cMOOCs and the availability of new technology tools resulted in a new generation of MOOCs, xMOOCs, that featured more centralized delivery of content, but that were still plagued with overall completion rates as low as 6%-10% (Chiappe Laverde et al., 2015; Reich & Ruipérez-Valiente, 2019). Anders (2015) and García-Peñalvoa et al. (2018) more recently proposed new, hybrid, models of MOOCs that aim to strike a balance between centralized course organization and content and learner autonomy. These newer models of MOOCs, known as hybrid MOOCs or hMOOCs (Anders, 2015) and adaptive MOOCs (García-Peñalvoa et al., 2018), aim to leverage the strengths of MOOCs in their capacity to reach large numbers of learners at minimal cost while mitigating challenges associated with low completion rates and lack of contextual relevance and active

learning in previous MOOC models (Anders, 2015; García-Peñalvo et al., 2018).

### ***Adult Online Learning***

Researchers have questioned the appropriateness of applying traditional K-12 pedagogies and learning theories to adult instruction, particularly in terms of learning for professional purposes (Knowles et al., 2015). Andragogy—or practices associated with adult learning—draws on understanding of adult characteristics and evidence that adult learners rely on instructors as facilitators of learning and that learning is most effective when occurs within the context of their own experiences and professional settings with opportunities to apply their learning to real-life situations and problems (Knowles, 1984).

Researchers have applied a variety of theoretical lenses to the design and investigation of adult learning in online settings (e.g., Hill et al., 2009, Herrington, 2006). For example, researchers have found lenses such as social learning theory (e.g., Hill et al. 2009) and situated learning (e.g., Herrington, 2006) to be productive for examining the design of and outcomes of online educator professional development. In addition, Hill et al. (2009) found that providing opportunities for interaction and sharing, providing multiple formats for information and communication, providing choice in types of interaction, and incorporating authentic activities promoted adult learners' engagement and retention in online learning activities. Herrington

(2006) advanced an evidence-based framework for adult online learning that included critical factors of situated learning including engaging learners in activities with real-world relevance, situating learning activities in learners' own practice contexts, modeling by experts, collaboration and discussion, and authentic assessments that allowed learners to demonstrate their learning in authentic contexts.

Cognitive science research provides several insights that can guide the design of online courses in order to ensure that the technological and organizational aspects of the course design enhance rather than interfere with the user's learning (Johnson et al., 2022). Online courses design should minimize course features not directly related to learning, carefully scaffold and segment the presentation of material in order to avoid learner cognitive overload, and provide an environment in which opportunities for active learning are maximized (Mayer, 2017).

### ***Effective Professional Development***

A rich base of evidence exists regarding the key role of effective educator professional development in positive student outcomes (e.g., Carl et al., 2015; Darling-Hammond et al., 2017; Yoon et al., 2007). Teräs and Kartoglu (2017) conceptualized effective professional development activities as those which result in long term professional learning, or iterative improvement in professional practice over the course of a professional's career. As such, professional learning and the resulting improvement

of professional practice are the desired outcomes of professional development activities, defined as activities that engage professionals in learning about their practice (Knapp, 2003) and that are intended to lead to changes in educator knowledge and skills that are enacted in classroom settings (Desimone, 2009).

Desimone (2009) advanced a framework for effective professional development that describes features of professional development. Desimone's framework identified the following five features of educator professional development as critical to supporting educator's professional learning: a focus on content grounded in authentic contexts, incorporation of active learning, coherence with authentic practice settings, adequate duration (at least 20 hours), and collective participation of a cohort of professional peers. Teräs and Kartoglu (2017) found that these features of professional learning correlated with the long-term shifts in professional practice. Quinn et al. (2019) applied Desimone's framework in the Learning Design Anatomy Framework for designing and evaluating professional development activities in Australia, and Surette and Johnson (2015) used Desimone's framework as a lens with which to review literature regarding online educator professional development. Surette and Johnson (2015) found that while content focus, active learning, and adequate duration were prevalent in the described studies, fewer studies described collective participation, and none included programs with evidence of coherence to educators' practice settings.

### ***The PLOM Educator Professional Development Framework for MOOCs***

The challenges associated with MOOC learning along with evidence regarding the need to attend to principles of andragogy (Knowles, 1984), effective online course design (Herrington, 2006; Mayer, 2017), and effective professional development practices (Desimone, 2009) in educator online professional development suggested a need for a framework that synthesized principles from each of these areas. We synthesized evidence regarding effective practices in online course delivery, adult learning, and educator professional development [including Herrington (2006)] to create and deploy the PLOM framework (see Figure 1). This model for educator online professional development accounts for the way adults learn about their professional practice in online settings and aims to support participants in professional learning. The framework leverages the strengths of MOOCs in reaching large numbers of geographically diverse participants flexibly and with minimal cost (Anders, 2015; de Freitas et al., 2015; Johnston, 2014; Lantz-Andersson et al., 2018) while mitigating challenges such as low completion rates associated with MOOCs by providing expertly sourced course content and resources (García-Peñalvoa et al., 2018) and structured opportunities for learner engagement with peers and instructors (Hill et al., 2009; Laurillard, 2016). In addition, the PLOM framework draws on Herrington's (2006) design principles for online learning by incorporat-

ing a focus on content that includes authentic tasks carried out in participants’ own practice settings. These principles are grounded in a foundational struc-  
ture informed by the core principles of effective professional development (Desimone, 2009).

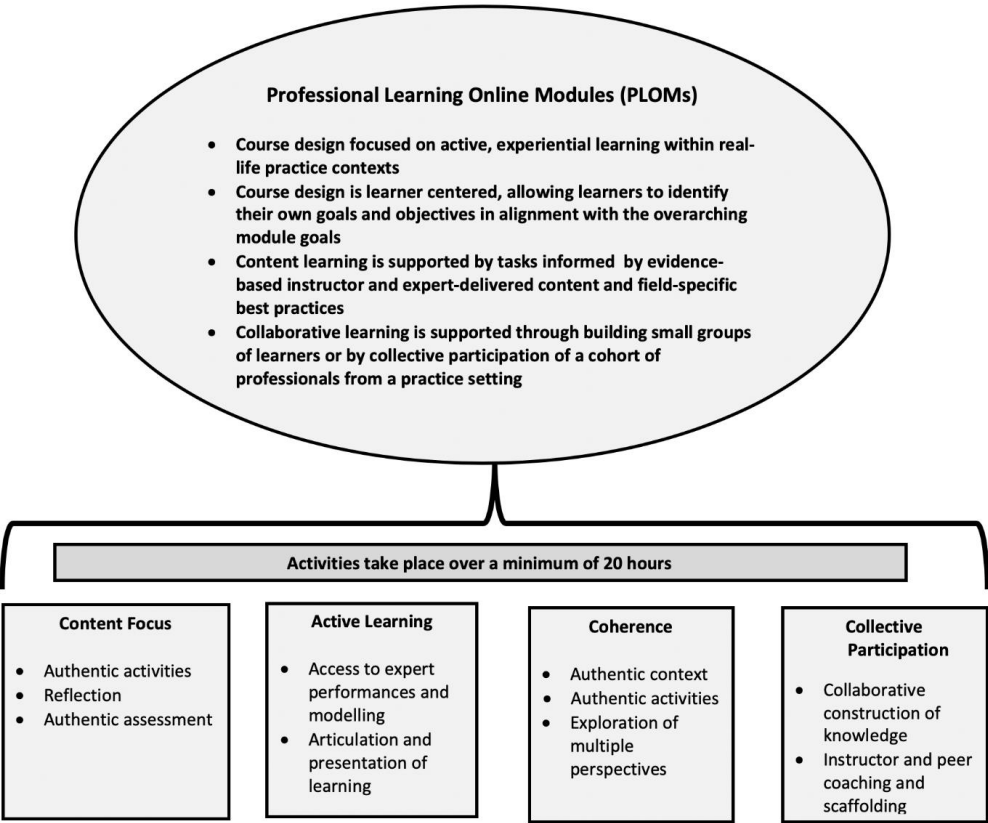


Figure 1. The Professional Learning Online Module (PLOM) framework  
Course Design Using the PLOM Framework

For this study, two MOOC courses were designed using the core PLOM principles. These two courses, TELLAL and TMYC, were designed as pilot courses to be marketed and delivered using a public university’s existing learning management system for delivering online professional development content to large and diverse populations of educators. The courses provided participants with the opportunity to earn micro-credentials at various points within each course by completing activities that demonstrated skill and content mastery. The microcredentials were issued by NC State University and participants earned these by completing additional activities and assignments throughout each module for each course.

Table 1 demonstrates how courses were designed to align with the PLOM framework by showing the

alignments between the features of effective professional development (Desimone, 2009), the core concepts of the PLOM framework that incorporate ef-

fective practices in adult online professional learning, and design features of the TELLAL and TMYC courses.

**Table 1.** *Alignment of TELLAL and TMYC Courses with PLOM Framework*

| <b>Features of Effective Professional Development (Desimone, 2009)</b> | <b>Core Concept, PLOM Framework</b>                                                                                                                                                | <b>Implementation in TELLAL and TMYC Courses</b>                                                                                                                       |
|------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Duration</b>                                                        | Active, experiential learning grounded in evidence-based effective professional development practices                                                                              | Courses designed for about 20 or more contact hours                                                                                                                    |
| <b>Content Focus</b>                                                   | Content is evidence-based, informed by field-specific best practices, and delivered by field experts who assign tasks aligned with content                                         | Course instruction by content experts; content guided by Institute for Education Science (IES) practice guides; courses incorporated modeling of strategies by experts |
|                                                                        |                                                                                                                                                                                    | Multiple means of participant engagement with content (e.g., reading, discussing, viewing experts model strategies, opportunities to enact strategies)                 |
| <b>Active Learning</b>                                                 | Learning is active and experiential and situated within real-life contexts                                                                                                         | Courses incorporate assignments challenging participants to implement and reflect on strategies in their own practice settings                                         |
|                                                                        | Collaborative learning and peer interaction is supported by the formation of small groups of learners or by the participation of a cohort of professionals from a practice setting | Opportunities to earn microcredentials based upon demonstration of skills                                                                                              |
|                                                                        |                                                                                                                                                                                    | Courses incorporate discussion forums to provide participants with opportunities to learn with and from others                                                         |

| Features of Effective Professional Development (Desimone, 2009) | Core Concept, PLOM Framework                                                                                                                              | Implementation in TELLAL and TMYC Courses                                                                                                                                                |
|-----------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Coherence</b>                                                | Course design is learner-centered, with learners identifying their own learning and practice goals and objectives aligning with the content of the course | Participants are challenged to consider how strategies can be implemented in their own settings (considering local policy and expectations) and incorporate opportunities for reflection |
| <b>Collective Participation</b>                                 | Collaborative construction of knowledge                                                                                                                   | Low cost and online format facilitate participation of multiple educators from a single school or district                                                                               |
|                                                                 |                                                                                                                                                           | Use of discussion forums for communication, reflection on practice, and sharing of ideas                                                                                                 |
|                                                                 |                                                                                                                                                           | Incorporation of expert modeling                                                                                                                                                         |

Each course was delivered in the Fall of 2020 and again in the Spring of 2021 as self-paced courses available at no charge. After beginning the coursework, participants had 90 days to complete course content. After each iteration of the two courses, course designers and instructors examined data from discussion posts and content-based pre- and post-surveys and adjusted course content and organization. These adjustments included revising the order in which content was presented, increasing emphasis on certain topics or skills, embedding additional opportunities for reflection and discussion, creating a forum for participants to share resources, and adding a social media challenge to encourage participants to share their experiences with others outside the course.

A total of 2,533 individuals enrolled in the two courses during the pilot course administrations. For the TACLEMS course, 581 individuals enrolled in Fall 2020 and 492 in Spring 2021. For the TMYC course, 850 individuals enrolled in Fall 2020 and 610 in Spring 2021.

### ***Teaching Academic Content and Literacy to Elementary and Middle School Students***

The TELLAL course was designed with the intent of sharing evidence-based principles and instructional materials to support educators in working with English Learners in U.S. elementary and middle schools. The course used the Institute for Education Science (IES) Practice Guide titled *Teaching Academic Content and Literacy to English*

*Learners in Elementary and Middle School* as the core content. IES guides are developed by panel of nationally recognized content experts and support IES efforts to disseminate effective teaching and learning practices.

The TELLAL course objectives were organized around the IES practice guide recommendations. The course was designed for the user to proceed through an introductory “Getting Started” unit that oriented the user to the IES practice guide and the design of the course and then through five content-based units. Each unit included a set of learning objectives and activities that included reading, discussion, written responses and reflections, viewing experts implementing content and skills, and application-based activities.

### *Teaching Math to Young Children*

The TMYC course was designed to support teachers in mathematical instruction for young children by introducing and supporting the implementation of the evidence-based recommendations made in the IES Practice Guide titled *Teaching Math to Young Children*. Course objectives were organized around these recommendations.

The TMYC course led the user through six content-based units as well as an introductory unit that oriented users to the practice guide, introduced the course organization and structure, and gave participants a chance to interact with each other through the discussion forum. Participants engaged in a variety of activities in each unit, including analyzing sample data, conducting

research and presenting findings, viewing experts implementing content and skills, implementing application-based activities, reflecting on their own dispositions and experiences, and participating in discussions with peers.

## Methods

This study examined participant experiences in the two courses with the aim of understanding learner experiences in courses designed using the PLOM framework and what implications those experiences have for the design of online educator professional development courses. The study sought to answer the following research questions:

1. How did courses designed using the PLOM framework meet learner needs?
2. What were barriers to participant completion of courses designed using the PLOM framework?
3. What were the strengths of the courses designed using the PLOM framework?
4. What are potential improvements to the courses designed using the PLOM framework?

In order to answer these questions, a concurrent mixed methods study design was employed. Quantitative data sources included user engagement data and participant feedback on a post-participation survey. Qualitative data were from pre- and post-participation interviews with a random sample of partici-

pants in each course (the same participants were contacted for both pre- and post-interviews) for each of the two sessions of course delivery.

Quantitative and qualitative data were collected concurrently for the purpose of gaining a broad, yet nuanced, understanding of participants' experiences in the course. Qualitative interview findings complemented and lent further insight into quantitative trends in participant engagement and feedback from the overall population of participants.

Participants

A total of 1,437 participants enrolled in the first iteration of the courses, delivered in Fall 2020 (589 in TELLAL, 848 in TMYC). Most enrolled participants were female (90%), and the majority identified themselves as White (71%). Over half of participants (55%) were classroom teachers (the next most com-

monly identified roles were “curriculum and instruction” at 10% and “other” at 10%) and over half (51%) had earned master’s degrees. Participant demographics for the 1,010 participants enrolled in the spring session of the courses were similar, with most participants identifying themselves as female (91%), White (70%), and as classroom teachers (59%), although in this session the next most commonly identified areas of responsibility were “Special Education” and “Other.” As in the previous course session, 51% held master’s degrees.

Data Sources

Table 2 provides an overview of the data sources and number of respondents/participants used for this study. Three main sources of data were used to answer the study’s research questions—pre- and post-participation interviews, user engagement analytics, and a post-participation survey.

Table 2. Data Sources, Sample Sizes, and Related Research Questions

| Data Source               | Type of Data | Sample Size   |                |                 |                  | Related Research Questions |
|---------------------------|--------------|---------------|----------------|-----------------|------------------|----------------------------|
|                           |              | Fall 2020 Pre | Fall 2020 Post | Spring 2020 Pre | Spring 2020 Post |                            |
| Interviews                | Qualitative  | 19            | 13*            | 24              | 18*              | 1, 2, 3, 4                 |
| User Engagement Analytics | Quantitative | N.A.          | 1,431          | N.A.            | 1,102            | 2, 4                       |
| Post-participation Survey | Quantitative | N.A.          | 246            | N.A.            | 242              | 1,3                        |

A total of 74 interviews were conducted, 43 at pre-participation and 31 at post-participation. Participation in the interviews (as well as other data

collection activities) was voluntary. All participants who volunteered were interviewed. There were no incentives offered for participation. There were

fewer volunteers for post-data collection across the board for this study, likely due to timing (holiday break). Interview participants were asked to respond to a series of questions during the pre-participation interviews about their reasons for enrolling in the course, challenges they experienced in their practice, and their expectations for the impact of the course on their professional development. At post-participation, interview participants who had completed the majority of the coursework were asked to comment on how the course met their needs, how they would use their new learning, how the course impacted their professional development, the strengths of the course, and how the course could be improved. Interview participants who had completed less than half of the coursework were asked about their reasons for not completing the coursework, their impression of the coursework they had completed, supports or resources that would have helped them complete the course, and suggestions for the program.

User engagement data was drawn from course platform data analytics. This data included participants' engagement in two categories of activities (those that involved reading and those that involved written responses or postings) for each course unit.

The post-participation survey consisted of seven items. Participants were asked to respond to a series of items regarding the impact of the course on their knowledge and skills, whether they were able to complete all of the desired activities in the course, how much

time they spent on course activities, and how they discussed or shared their learning with others.

### ***Data Analysis***

Quantitative data were analyzed to produce descriptive statistics (numbers of responses and percentages) and to identify trends in user engagement. Interview data were analyzed using two cycles of coding. First, data was coded thematically using the research questions as themes to code data. Next, a process of open coding was used in which subthemes were identified and coded. The researchers remained open to the possible emergence of new themes beyond those aligned with research questions during this process.

### **Findings**

**T**he purpose of this study was to understand participant experiences in courses designed using the PLOM framework. Findings for each of the four research questions will be presented in the following sections.

#### ***Research Question 1: How did courses designed using the PLOM framework meet learner needs?***

Interview participants cited as the main reasons for participating in the course the desire to gain new knowledge, skills, and resources to support student learning. Participants' reasons for enrolling strongly emphasized the desire to apply new knowledge and skills in their current practice settings. One participant said, for example, that

she hoped to gain “practical ideas” (TACLEMS Spring 2021 participant) that would help her to apply theory in the classroom and another that he wanted to be able to “explain the ‘why’ of math” (TMYC Spring 2021 participant). One preservice teacher educator and professional development provider noted that she chose to participate in the TMYC course (Fall 2020) in hopes of getting ideas for activities and resources to pass on to the pre-service and in-service educators with whom she works.

When asked during pre-participation interviews about their expectations for their professional development, participants also cited the expectation to gain new skills to apply in the classroom, but many also expressed a desire to connect with peers to create communities of practice and were eager to learn from other educators. Participants said, for example,

*I think that I will gain some knowledge and hopefully gain some different strategies to use and being able to collaborate with other teachers and maybe get some more contacts of people I can collaborate with. (TACLEMS Participant, Fall 2020)*

*I just want other ideas and maybe hearing other peoples’ stories and ideas and what they do in their classes, I can bring that into my classroom and help my kids. (TACLEMS Participant, Spring 2021)*

In addition, interview participants expressed an expectation that they would

grow their understanding of current research in their fields and build conceptual understandings of phenomena including student development and the basis for Common Core State Mathematics Standards.

Survey findings indicated that nearly all participants (86%–99%) in both courses reported experiencing gains in their knowledge and skills. Large majorities of respondents also noted that participating in the course had deepened their understanding of the content area and, when asked about their intentions to apply their learning and use resources and materials provided in their own practice, nearly all (91%–98%) agreed or strongly agreed that they would do so.

When asked in post-participation interviews whether their needs or expectations were met, all participants answered affirmatively. Many interview participants expressed enthusiasm for their learning and course experiences, noted that they had more confidence in their teaching. For example, one participant said,

*I think the program helped me be a better teacher and to think about my students’ needs. Just because you’re in a certain grade level or in a certain curriculum, it doesn’t mean you have that pre knowledge. (TMYC Spring 2021 participant)*

Participants credited their positive experiences to the course content, the hands-on experience they were able to gain during the course, the discussion

forums, and connections with a diversity of educators. Participants especially noted the value of connecting with other educators, saying, for example,

*The EL teachers can identify their need with the content teachers, as well. Sometimes, we think that we have separate needs, but we don't. Sometimes it's just communicating more and see what our common needs are.* (TACLEMS Fall 2020 participant)

*I liked reading other people's ideas and experiences in their classrooms so that I could reflect that in my teaching.* (TACLEMS Spring 2021 participant)

Some participants noted that the course was particularly useful to them as they adjusted their teaching in response to shifts in practice related to the COVID-19 pandemic. For example, one participant noted that the online format provided a useful model for her as she navigated the transition to online teaching with her own students.

These findings suggest that educators' needs for new knowledge and skills along with the ability to apply strategies and skills in practical settings were met by the content and on-line delivery of the course. Participants were pleased with the quality of the research-based IES materials and other course content. There was evidence that educators' desire to collaborate with professional colleagues and share ideas in communities of practice were accommodated by the interactions in discussion forums although some par-

ticipants desired more interaction with other participants. The course also had the unintended consequence of providing a model of effective online teaching to educators struggling to adapt to online teaching settings due to shifts in teaching in the wake of the COVID-19 pandemic.

### ***Research Question 2: What were barriers to participant completion of courses designed using the PLOM framework?***

Completion rates varied by course and by session. For the Fall 2020 courses, about 26% of enrolled participants engaged with coursework for each of the TACLEMS course units and about 14% engaged with coursework for each of the TMYC units. There was an upward trend in engagement in the Spring 2021 courses, where about half of TACLEMS and about a third of TMYC participants who began the coursework completed work in all units. This upward trend in engagement suggests that the changes made to the courses between the two iterations may have positively impacted participant retention. Engagement in coursework was highest for introductory units and trended down in subsequent course units.

It is noteworthy that many enrolled participants never engaged with any coursework. For example, of the 581 participants enrolled in the Fall 2020 TACLEMS course, only 356, or 61% of those enrolled, engaged in any coursework. This trend was observed for all courses, with 60%-62% of the enrolled participants at least beginning

the coursework by engaging in some course content.

Interviews were conducted with 15 individuals who had completed less than half of the course material in order to understand their reasons for non-completion and to understand what supports or resources the program could provide to help participants persist in the courses. Of the 15 participants who provided feedback, 12 noted that lack of time was the main reason for their non-completion. For example,

*I had overextended myself with other local classes. (TACLEMS Spring 2021 participant)*

*It wasn't anything with the format of the class. I have a lot going on in my life trying to find a job and keep up with everything. That was what held me back [from completing the course]. (TACLEMS Spring 2021 participant)*

Six interview participants directly related the time issues to unexpected changes in job responsibilities due to the COVID-19 pandemic. For example,

*It was about all I could do to do my job without adding anything else to my plate.*

*I was basically teaching live and virtually. Some of the students were at home, and then some of the students were at school ... and [I] couldn't fit anything else in. I really hadn't planned on that being the case. (TACLEMS Spring 2021 participant)*

*[My noncompletion] really had to*

*do with just my own job. With the pandemic, lots of work has been shifting and we're being asked to do things in my role that, you know, are just new and kind of demanding. [TYMC Fall 2020 participant]*

One participant was unable to participate due to a family medical crisis, and two stopped participating because the course content lacked direct relevance to their practice settings.

Participants were also asked to provide feedback in surveys regarding the time they devoted to course activities. Survey findings for course completers indicated that most participants believed that the amount of time they spent on coursework was "just right" (80%-98%). Somewhat fewer participants in the TMYC course (80%-92%) commented positively on the timing as compared to the TACLEMS course (92%-95%), with between 9% and 18% of TMYC participants indicating that they spent "too much" time on coursework.

When asked about supports or resources that the program could provide to improve retention, most interview participants responded that there was nothing the program could have done to support them. Three provided suggestions that were focused on reducing the time required for coursework (reducing the number of questions participants were required to answer or streamlining the discussion board) or aiding participants in managing expectations and time by providing a course guide with a timeline of due dates.

***Research Question 3: What were the strengths of the courses designed using the PLOM framework?***

Post-participation interview participants noted a number of strengths of the courses, and strengths were also suggested by post-participation survey findings. These strengths included phenomena related to both course content and course organization and structure.

Strengths of the courses mentioned by interview participants included the course content related to the IES practice guides, the resources provided (for example, websites and links to expanded or complementary content), the video examples, the course readings, and input from other course participants. Interview participants focused their content comments on the availability of content applicable to practice and made recommendations and provided examples of implementation of that content. Many interview participants noted that the implementation videos were particularly helpful, calling them “very practical” (TACLEMS Spring 2021 participant). As one TMYC (Fall 2020) participant noted, “I really liked watching the videos of the teachers working with the students; that was most valuable to me.” Several interview participants noted that the lesson plan design was a strength of the program and appreciated moving through progressive stages of interaction with and application of content. These participants noted that course units introduced content and then provided opportunities to read about content, engage in conversation with

other course participants, view experts implementing skills, and then have the opportunity to apply learning in participants’ own contexts. As one TMYC (Spring 2021) participant noted, “I read it, I saw it, then I saw children doing it.”

Likewise, survey findings also suggested that course content geared toward practical application was a particular strength of the courses. In particular, findings indicating that participants experienced growth in their knowledge and skills (86%-99%) and intended to apply their learning in their own practice settings (91%-98%) suggested that participants’ learning was highly correlated with the intent to apply their learning in their own practice settings.

In terms of course organization and design, interview participants appreciated the ability to self-pace and commented positively on the presentation of materials in “bite sized pieces” (TMYC Fall 2020 participant). Another design feature that was a particular focus of interview participants’ comments was the opportunity to discuss content with and interact with other program participants in discussion forums. Participants said, for example,

*I liked reading other people’s ideas and experiences in their classrooms so that I could reflect that in my teaching ... I liked getting the feedback as well ... A lot of people had a lot of good stuff to share. (TACLEMS Spring 2021 participant)*

*I have to say that I enjoyed all of*

*the comments, and I think a lot of people had a lot of great ideas. It would be something I would revisit when I need it* (TACLEMS Spring 2021 participant)

*(The course) was great. Reading first and engaging during the conversations with some other people ... then to be able to discuss more options and ways to start implementing these new recommendation [was great]. The design of the course was perfect.* (TACLEMS Fall 2020 participant)

That participants placed value on growing their communities of practice was also suggested by survey findings in which a majority of participants indicated that they would discuss or share their learning with colleagues at their schools, districts, or organizations who did not participate in the courses (51%-57%) or with colleagues in their practice settings who had participated in the course (28%-36%). The relatively large number of participants who wished to share their learning with non-participant colleagues suggests that participating educators welcomed opportunities to share knowledge and exchange ideas with colleagues.

#### ***Research Question 4: What are potential improvements to the courses designed using the PLOM framework?***

User engagement analytics showed that engagement in each course declined progressively across the courses over the course of the content units, indicat-

ing that users who began the coursework stopped participating at some point during the course. As indicated in the discussion of barriers to course completion, interview participants who did not complete the coursework identified time as a barrier to completing the courses, although most commented on barriers posed by personal or professional obligations rather than on the time required by the courses. Likewise, most participants (80%-98%) provided feedback on surveys that the amount of time they spent was “just right,” indicating that the amount or intensity of coursework is not a major focal area for improvement.

Two of the post-participation interview participants had no suggestions for improvements to the course, noting, for example, “I thought it was great the way it was” (TMYC Spring 2021 participant). Other participants who made comments focused primarily on expanding or revising components that were noted as course strengths, including providing more videos of teaching strategy implementation, more opportunities to interact with other participants, and more links to resources. Some interview participants who appreciated the opportunity to interact with others on discussion forums expressed a desire to be able to interact in real time or face-to-face, saying, for example,

*Being able to interact with the other peers would be ... something that I would like to see maybe in moving forward ... Being able to respond to them is one thing, but*

*... I don't think I actually knew anybody particularly in the class. And so... socialization ... might be a real cool thing to add to the next class. (TMYC Fall 2020 participant)*

*Part of me wanted a face to face [component and] more interaction ... I would have liked maybe one or two meetings where we all to get on at the same time and hear people speak in real time. (TACLEMS Spring 2021 participant)*

Some other interview participants' comments focused on challenges posed by large course enrollments. These participants suggested that creating smaller cohorts of participants for discussion forums could be useful since the number of participants made it difficult to establish relationships with others.

## Discussion

Overall, participants in each of the two courses designed using the PLOM framework expressed satisfaction with their learning and agreed that the course impacted their understanding of content and that they intended to use their learning in their own practice settings. Participants noted the evidence-based content, self-paced and segmented organization, expert modeling of instructional strategies, opportunities to apply learning in their own contexts, and opportunities to interact with other participants as particular strengths of the two courses.

Participants suggested few improvements to the courses other than increasing some of the elements noted as strengths, with a focus on increasing the amount of expert modeling via video and increasing opportunities to form communities of practice.

The PLOM framework sought to provide guidance to designers of online educator professional development regarding how to provide opportunities for effective online adult professional learning while attending to evidence-based effective practices for educator professional development. The study's findings lend insight into online course design using the PLOM framework and suggest some areas that merit further study in the future. The following sections discuss what insights were gained for each element of the five factors of effective professional development (Desimone, 2009) as enacted within the PLOM framework.

### Duration

Evidence suggests that in order to lead to educator change in practice, professional development activities should be of about 20 hours or more in duration (Desimone, 2009). Since the TACLEMS and TMYC courses were self-paced, there was no required time commitment for courses, however course designers aimed to provide activities that would engage educators in coursework for around 20 hours or more.

Survey data indicated that most participants were satisfied with the amount of time they spent on the courses. Most participants (around 80%)

spent between one and four hours per unit on course activities for the six units of the TACLEMS course. Most participants (70%-77%) reported spending somewhat more time – about three to six hours per unit—on the seven units of TMYC activities, indicating that participants spent, on average, more hours on TMYC. It is interesting to note, however that TMYC participants were also somewhat more likely to indicate that they had spent “too much” time on coursework. This finding, along with qualitative findings regarding time limitations, suggests that courses should balance the need for adequate duration as evidenced by professional development literature with a recognition that coursework that is too time consuming may deter participation.

### ***Content Focus***

The TACLEMS and TMYC courses were designed for experts to bring research-based effective practices to educators and to engage the educators with content in multiple ways. The use of the IES practice guides was an effective content approach to the courses, and participants appreciated the exposure to and opportunities to practice evidence-based strategies. In addition, the scaffolded approach to presenting content that permitted for multiple means of engagement with content and skills (reading, writing, discussing, viewing, and practicing) was perceived as a strength of the courses. Educators had opportunities to submit artifacts such as examples of and reflection on classroom activities to earn microcredentials throughout the course, allowing

for further personalization of content. Findings suggested that participants found the content to be relevant and applicable for their needs, suggesting that the course effectively translated the expert-produced content available in the IES guides to meet educator needs.

### ***Active Learning***

The courses designed using the PLOM framework provided participants with opportunities to engage with course content actively through writing, discussion, modeling, and practice. Participants were encouraged to translate their learning into practice through course activities. Findings suggest that the active learning strategies in the course meet participants’ expectations of learning new skills and strategies that could be implemented immediately.

The value that participants place on active learning and application for advancing professional learning is a particularly important finding for large-scale online courses that may tend to focus on learning about content through lectures and readings. The microcredential opportunity allowed users additional opportunities to apply and reflect on their learning by enacting strategies they had read about, written about, discussed, and seen modeled.

### ***Coherence***

A particular challenge of large-scale online courses is coherence of content to participants’ individual contexts. The PLOM-designed courses achieved this coherence in several ways. First, by relying on evidence-based materials pro-

duced by content experts, course designers ensured that content was based upon research that was applicable across diverse settings. Participants valued the opportunity to discuss the course content with others who worked in similar and different settings. This peer interaction gave participants opportunities to gain new ideas that could be implemented within their own practice settings, and to share ideas and solutions with others in similar practice settings. Additionally, by providing expert modeling via videos, course participants were able to experience how content and strategies could be applied in various classroom settings. By challenging educators to apply their learning within their own settings and reflect on those experiences, and by affording them opportunities to earn microcredentials based on contextual application, the courses encouraged personalization and adaptation of content to a variety of practice settings.

This coherence was particularly salient since the course took place in the context of the COVID-19 pandemic when many educators were experiencing unexpected changes in professional responsibilities and in their practice settings. The need for flexibility and adaptability of content and course delivery was highlighted by participants who felt overwhelmed by new professional responsibilities and the need to transition between online and face-to-face instruction. The courses may also have served the unintended purpose of modeling effective practices in online teaching and learning for educators with little online teaching experience.

### ***Collective Participation***

Providing cohorts of educators from similar settings the opportunity to learn together and discuss and collaborate in course work is an important factor in the effectiveness of professional development activities (Desimone, 2009). A major finding from this study was that course participants placed high value on the opportunity to interact with and learn from other professionals and believed that this interaction could be productive in an online setting. Furthermore, participants valued the opportunity to share their learning outside the course, creating opportunities to enlarge or create new communities of practice. The large number of participants in online courses can create challenges for participants who wish to form new communities of practice with others in similar practice settings. This suggests that mechanisms to form smaller learning communities within the courses, perhaps with opportunities for real-time video interaction, may be valuable to participant learning in online professional learning settings.

### **Limitations**

The current study had several characteristics that limited the generalizability of its findings. First, the study relied heavily on data from a small sample of interviews. Although themes were identified in interview participants' comments, the small sample size means that caution should be used in generalizing these themes to the entire population of course par-

ticipants. Second, the study relied on only two courses administered in two iterations. This limited sample is not representative of the multitude of ways that the PLOM framework could be productively applied. In addition, these findings may have limited applicability to traditionally delivered post-secondary educator preparation classes that incorporate formal assessments and grading, features that were not included in the courses investigated here. Finally, the COVID-19 pandemic had substantial impacts on educators and on teaching and learning settings. Course participants were experiencing these pandemic-related disruptions in both their professional and personal settings during the pilot administration of the courses. Phenomena related to these disruptions could have impacted the findings of this study.

## **Implications**

**T**his study's findings suggest that the PLOM framework has the potential to guide the design of online professional development content to effectively support educators in professional learning. Findings suggest that balancing the engagement time needed to promote professional learning with educators' time limitations is an important consideration for online course designers, particularly when educators may have school or district-imposed completion deadlines imposed by the need to earn credit for continuing education. More research in educators' needs and expectations for engagement in online professional learning

may help to elucidate how to effectively achieve this balance and provide insight about the optimum time span for course availability to maximize timely completion of courses.

The use of expert-created content based upon research that meets high standards of quality contributes to the credibility of course content and ensures that it is applicable to a variety of practice contexts. Since participants place a high value on practical application of content, course designers of large scale online professional development programs should rely on evidence-based content that is generalizable to diverse practice settings and that has been vetted by experts in the field. At the same time, however, course designers should ensure that source content for courses is translated into course content with an action orientation and with examples of implementation that illustrate various adaptations of content for diverse practice settings.

In addition, online course designers should actively leverage opportunities for participants to engage with content and with other course participants in a variety of ways and look for innovative ways to contextualize materials. The use of microcredentials to encourage educators to demonstrate their ability to apply their learning within their own contexts may be a productive tool to encourage contextualization and reflection on learning. Likewise, identifying ways to enhance participant connections and communication within large enrollment online courses may promote the formation of communities

of practice that educators value. This could include creating small communities of participants based on discipline, grade level, or geographic location; providing opportunities for enhanced interaction, including video conferencing, peer evaluation of artifacts; and establishing forums for sharing resources, examples of implementation, and questions. This suggests a need for more research into productive ways to enable educators to translate online learning into contextualized practice and to create robust communities of practice within large enrollment online courses.

## Conclusions

This study of the application of the PLOM framework to the design and delivery of online educator professional development courses described participants' experiences with courses designed using the framework and provided evidence for the useful-

ness of the framework in promoting online educator professional learning. By applying effective professional development practices in tandem with evidence-based practices for online professional learning, the courses met educator needs for application-oriented, contextualizable content that promoted their professional development and supported educators as they engaged in active learning in an environment where they could learn with and from their peers.

This study also provided an initial evidence base for the PLOM framework and suggested the usefulness of the framework for online course developers. In order to understand and provide examples of the many ways that the PLOM framework can be enacted, there is a need for further research of online professional learning courses designed using the framework.

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