HOW TECH CAN BUILD TEAMS

WHEN LEARNING MOVES ONLINE, THE RIGHT COMBINATION OF TOOLS CAN BUILD COLLABORATION

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"Technology is rapidly enhancing and extending opportunities for professional learning," Learning Forward wrote in 2011 (p. 41). As educators grapple with a global pandemic nearly 10 years later, those words have never been truer or more relevant.

Online professional learning can accommodate social distancing protocols as well as the ongoing benefits of accommodating teachers' busy schedules, connecting educators to expert resources, providing job-embedded support, and increasing access by reducing barriers of location (Dede et al., 2009, Francis & Jacobsen, 2013).

Although online professional learning is becoming more widespread due to technological accessibility improvements, it is often conducted in ways that are not consistent with

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essential elements of high-quality professional learning as described in the Standards for Professional Learning (Learning Forward, 2011).

For example, many massive open online courses (MOOCs) and webinars offer teachers little to no opportunity for active engagement, even though such engagement is what promotes changes in practice and student learning (Learning Forward, 2011). Historically, online professional learning has often been designed for participants to "learn in isolation rather than as a member of a team where participants learn from colleagues' expertise, experience, and insights" (Mizell, 2010, p. 9). That is changing, but best practices are not universal — and they are needed now more than ever.

From 2016 to 2020, a team of K-12 and higher education mathematics educators worked to address the need for high-quality online learning by creating a multisession, fully online professional learning course as part of a larger National Science Foundation-funded research project.

As our team worked to design and facilitate online professional learning, our goal was to maintain the core aspects and guiding principles of high-quality in-person professional learning, as articulated in research and in the Standards for Professional Learning (Learning Forward, 2011). In particular, we worked to design online professional learning that established collaborative learning communities and was grounded in research and models of human learning — common practices of in-person learning that are challenging to maintain online.

Through this project, our team learned valuable lessons about how to make the technology work in service of the learning. These lessons are highly applicable to the widespread use of distance teaching and learning in the era of the COVID-19 pandemic.

GOING DIGITAL

The project involved redesigning for an online setting a course that had been designed and previously implemented in an in-person setting.

The original in-person professional learning course consisted of multiple two-hour sessions occurring over several months. It was designed to engage K-12 mathematics teachers in sustained and ongoing professional learning connected to their practice, with a goal of increased student learning.

It aimed to deepen both mathematics content and pedagogical knowledge by supporting teachers in reflecting on and making changes in their instructional practices with a focus on student discourse.

To deepen content knowledge, facilitators modeled the phases of implementation of a mathematics task, while participating teachers engaged as learners in an environment that allowed for productive struggle, communication, and collaboration. Thus, participants faced the same challenges their students might encounter during task implementations in their classrooms.

To deepen pedagogical knowledge, participants analyzed aspects of teaching practice, such as questioning and formative assessment, and learned to gauge the impact of teacher moves on student learning. In addition, we required activities to be completed between sessions that incorporated reading, writing, and reflecting to extend and enhance the learning during the sessions.

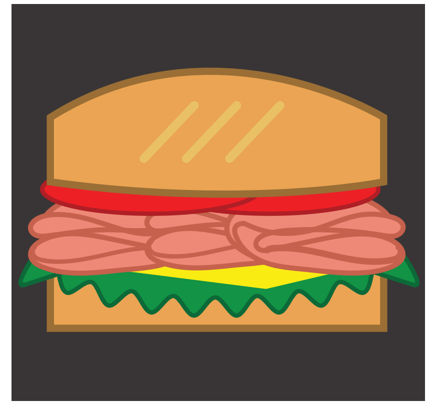
As we transitioned in-person professional learning to an online space, we designed a mostly synchronous online course consisting of six two-hour sessions over several months to create a collaborative community of learners and an active learning environment. In addition, we included asynchronous activities for participants to engage in between weekly sessions, outside the constraints of time and place (Mayadas, 1997).

The combination of synchronous and asynchronous components complemented each other by providing several ways for participants and facilitators to exchange information, collaborate on work, and get to know each other (Hrastinski, 2008).

We began by selecting an online learning platform and a collaborative online space, then we built in time to familiarize participants with the technology to minimize loss of instructional time as participants

THE TURKEY SLICE TASK

A man decides to go on a diet in the new year. He goes into a deli shop to buy some turkey slices. He is given 3 slices which together weigh 1/3 of a pound, but his diet allows only 1/4 of a pound. How much of the 3 slices can he eat while staying true to his diet? Be prepared to justify your answer with numbers, words, and/or pictures.



ANSWER 1

Assuming all three slices weigh the same amount!

1/3 lb. divided by 3 = 1/9 lb. (weight of each slice)

2 slices = 2/9 lb. x 4/4 = 8/36 lb.

1/4 = 9/36 lb.

9/36 lb. (allowed) - 8/36 lb. (2 slices) = 1/36 lb. more allowed by diet

1/36 = 1/4 of 1/9; the man can eat 2 and 1/4 slices of turkey

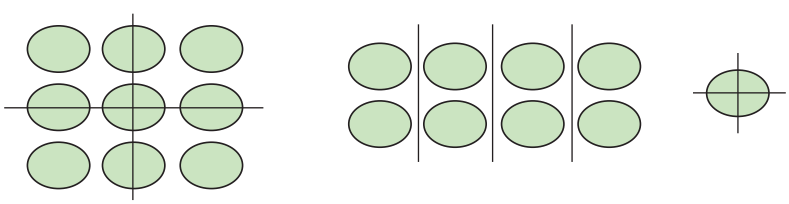
ANSWER 2

Need to find out how much each slice weighs

Each slice weighs 1/9

If each slice is 1/9 we need to find how many times does 1/9 go into 1/4 lb.

1/4 x 9/1 = 2¼



ANSWER 3

3 slices = 1/3 lb.   9 slices/1 lb.

Diet allows 1/4 lb.

1/4 x 9 = 9/4 slices

2¼ slices for diet

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1 lb. = 9 slices

3	3	3

3

9 slices

1/4

4 units = 9

1 unit = 9/4

Participants recorded various strategies in a shared Google Doc or Google Draw files by creating tables, drawing figures, and writing text. Notes and diagrams are re-created here.

navigated the new tools. We held a one-hour practice session before the course began to introduce the technology and tools and provide the opportunity to practice using the features.

Still, we anticipated that some participants might continue to need technology assistance during online sessions because we realized that participants would have varying levels of experience and comfort with the technology.

To address individual technology needs during course sessions without disrupting the content, we used two facilitators to teach each session — one to manage technology issues and the other to facilitate the learning experiences.

MAXIMIZING TECHNOLOGY TOOLS

In our online course design, we determined how to best use technology tools in ways that would build a community of learners while encouraging active engagement through interaction, collaboration, and inquiry-based experiences.

Connecting via Zoom

We chose the video-conferencing software Zoom as our technology platform because it allowed for seeing all participants' faces during synchronous whole-group discussions as well as small-group interactions.

One of the most advantageous features for building community was the ability to create breakout rooms for small groups. We used these rooms to engage participants in small groups for a variety of experiences, as we would in an in-person setting.

For example, in breakout rooms, groups of three to four participants discussed prompts related to readings, collaboratively engaged in mathematics tasks, reflected on implications for their practice, and shared classroom experiences.

Facilitators were able to move between breakout rooms to monitor discussions, ask questions, and note various mathematics strategies being used. This allowed the facilitators to then structure and support large-group conversations in meaningful ways when participants were brought back to the main room, simulating what would happen in an in-person setting.

The Zoom chat window, in which facilitators and participants can write comments or questions to the whole group or privately, was also highly useful. We found that the use of the chat window supported engagement and participation in ways that a large-group discussion didn't. Some participants were reluctant to share verbally, but through strategic use of the chat window, we attained nearly 100% participation for most whole-group activities, thus increasing active engagement with the course content.

For example, we used the chat window to survey initial thinking when introducing a new topic (similar to an in-person turn-and-talk), gather reflections at the end of a learning experience (a stop-and-jot), and capture thinking after a reading (similar to a say something protocol).

Over time, participants began using the chat window without prompting to ask a question during a whole-group discussion, make a connection, or share a thought while others were talking. The chat window therefore provided efficient avenues of synchronous participation that went beyond what was possible in an in-person setting.

Engaging in shared work via Google tools

We used Google Docs and Google Draw for creating shared work spaces and Google folders for shared storage space to support active engagement and the development of a learning community.

Before each session, facilitators created Google folders for participants to access. A folder could include a mathematics task, a note catcher with prompts to respond to, or handouts that were needed during the session.

While engaging in mathematics tasks, such as the Turkey Slice task shown on p. 48, participants recorded their strategies in a shared Google Doc or Google Draw file by creating tables, drawing figures, and writing text. Additionally, some participants uploaded pictures of work they had done by hand to the Google file to share their thinking.

Because facilitators had access to these folders, they could observe and monitor participants' thinking without actually being present in a breakout room. This feature was essential as facilitators planned the orchestration of whole-group discussions. Facilitators were able to select particular documents created in breakout rooms to be shared via the share screen feature in Zoom.

We often found that the online implementation of these structures was more efficient than the analogous in-person structure. A gallery walk, for example (where participants interact and respond to various groups' work on large poster paper), took place online by participants viewing the Google files created by other groups and using the comment tool to respond. This generated robust conversations that actually took less time online than in an in-person gallery walk.

The use of Google folders also allowed participants and facilitators to engage in asynchronous work through the use of an online reflection journal. We created a Google folder containing weekly journal prompts for each participant. Between synchronous sessions, participants responded to the prompts, which were designed to encourage them to reflect more deeply about their experiences with the course content.

The online reflection journal allowed facilitators to gain a sense of participants' thinking before the synchronous session. Facilitators then designed meaningful activities for participants to engage with these shared online reflections in nonthreatening ways.

During synchronous sessions, facilitators asked participants to read a selection of responses from other participants and discuss similarities or differences to their own reflection. At other times, facilitators created a summary of the reflection journal responses and asked participants to read and reflect on the summary. Facilitators and participants also had opportunities to provide feedback to individual reflections using the comment feature in Google Docs.

ENHANCING LEARNING

Although convenient and accessible, online professional learning experiences must also maintain aspects of high-quality professional learning consistent with research and models of human learning. Despite the challenges, we were able to use technological tools to not only create collaborative experiences similar to our in-person professional learning, but also strengthen and augment these experiences.

Participants' course evaluations reflect the value of these learning experiences. One found the breakout rooms "very effective." Another noted the value of being able to see and speak with other participants: "Just as in an in-person class, it was great to have transitions between teacher presentation and discussions among my colleagues."

Another participant said, "I loved that it was a discussion-based course even though it was online. Other online classes I have taken have been 'discussion' but only in reading and responding to prompts. That is not a conversation, and I have not found it to be collaborative or worth my time in the end. This was a pleasant surprise and a great way to collaborate with other math teachers and experts in the field."

While we designed and implemented this online professional learning before the COVID-19

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support professional learning, the productivity of a video platform depends on the norms and routines used and continuously renewed by the collaborators who interact around and through it. To get the most out of it, mentors, novices, and university faculty should be intentional and transparent about why and how they use video.

It is also important to recognize that, just as teaching is shaped by and shapes the environments in which it happens, video platforms can shape the focus of professional dialogue (through frameworks available in the platform) and the tone (the comment type options that are available) of interactions. It can also provide metadata that support reflection and improvement of its use.

The examples shared here show that the video platform can bring tools, structures, and norms supporting professional learning together. There is much that teachers can learn from engagement as mentors, and well-designed video platforms provide a way of harnessing that potential.

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pandemic, we leveraged technology that has since become commonplace. We hope that our work can serve as an illustration of how to maintain high-quality professional learning in an online space.

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