Applying Effective Math Instruction to the Fully-Online Space: An Overview of CMP's New Fully-Online Courses

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Below are responses to questions posed during our recent webinar.

What are the new fully-online Pathways courses?
Recognizing a demand in the field for expanded access to high quality online entry-level mathematics offerings, the Carnegie Math Pathways has partnered with faculty in our network to reimagine our face-to-face Statway and Quantway course models for the online space. Utilizing the adaptive learning and online communication platforms, Realizeit and Zoom for Education, we are designing an online course experience that offer students active, collaborative learning experiences, curriculum contexts that are relatable and relevant to students, just-in-time mathematics supports for students who need them, and social emotional support routines that promote a positive growth mindset, sense of belonging, and encourage persistence in the course.

Which Carnegie Math Pathways offerings are available as fully-online versions?
We are piloting fully-online Quantway Core at 4 institutions this Fall 2019. It will be fully released for use at interested institutions this Spring 2020.

We will pilot fully-online Statway College and Quantway College this spring, and plan their full release for Fall 2020. We also plan to make available fully-online Statway College with Corequisite and fully-online Quantway College with Corequisite in Fall 2020 as well.

Based upon student and instructor feedback, each course will be iteratively improved upon term by term. We also aim to build additional content to better leverage Realizeit's adaptive learning features.

How would you describe the faculty and student experience?
Faculty benefit from an enhanced online instructional experience through which they are able to meaningfully engage students in an active and collaborative learning process, monitor student progress, and engagement, and receive quality data and course feedback they can act upon to support students' mindsets, sense of belonging, and study habits.

Students benefit from synchronous group sessions to work through problems collaboratively as well as independent practice opportunities that are adapted to support individual student needs. Along with the content feedback provided to students by the instructors and the online platform throughout the course, the online experience also embeds social emotional support surveys and messaging to encourage productive student engagement and persistence.

Is Realizeit something we would have to purchase separately or is it something that the Carnegie Math Pathways provides?
Institutions that elect to offer an online Carnegie Math Pathways course would be provided with access to the RealizeIt platform as well as Zoom as part of the full courseware package.

Does this tool have built in video lectures?
This course model includes video components, yet they are not video lectures. Video in this model is used as an instructional tool to provide students feedback highlighting common trends and challenges in understanding and help

guide students in grasping the content. The fully-online Pathways experience is designed to encourage students to first work individually and in groups to productively struggle with and try to make sense of the mathematics or statistics concepts. The instructor can see individual pre- and post-collaboration exercise scores and group collaboration work and intervene to offer support when necessary. Student group collaboration work is reviewed by the instructor, who then provides video-based feedback to both the group and the entire class based on specific successes and struggles identified by the instructor.

Even though the instructor is not present for these collaboration sessions, are they able to view these videos later? I believe that there is valuable assessment that can be gleaned from listening to students discuss the given activity.
Yes, the instructor can review all of the videos recordings generated by the individual groups, and, yes, we too see this as an important way to assess the learning in the course. Each collaboration session has an associated instructor guide which lays out the collaboration objectives, main mathematical ideas, and question answers, so the instructor has a resource to support them in their evaluation of and development of feedback for the group collaborations, and can prepare students for what is coming up in a future collaborations.

In face-to-face courses, many instructors permit or require students to change groups periodically. Are the "assigned groups" fixed in the online version or can these be easily modified as needed?
Initially, instructors can use a polling tool, like a survey or whenisgood,com, to determine when students are typically available during the week to meet online. Once these initial groups are established and begin to work through collaborations together, bonds can form quickly, and members are hesitant to want to switch groups. If need be, however, group members can easily switch groups, permanently or temporarily. This process can be controlled by the instructor.

What is the optimal group size?
According to faculty who piloted these courses, they found group sizes of 3-5 students to be most ideal.

I understand that the groups work independently, but if the instructor would have the opportunity to "drop in" on a group collaborative session, is that possible?
Over the first few weeks of the course, we recommend that instructors try to pop in to student group collaboration sessions to provide guidance and make sure everything is going okay. Working in a group and scheduling collaboration sessions requires a high degree of student agency, and we see that initially many students can be hesitant to take control. For this reason, it is useful for the instructor to engage with groups in the first few weeks of the course to ensure groups are functioning and any non-participation is a one-off rather than an effort to disengage from the course. Joining for just the first 5-10 minutes may be all that is necessary to ensure the group members are comfortable with the technology and working through of the content.

Faculty who piloted these courses found this to be a critical way to observe the group work and to support students over the early parts of the course. As student groups bond and become more comfortable with the expectations of the collaboration sessions, it is less necessary for the instructor to be prepared to join student group collaborations, unless upon request.

Can the students view the recordings of other groups in which they are not a member?
It is a possibility, but it would be up to the instructor to make the videos available. Additionally, it is possible for the collaboration videos to be edited and clipped and uploaded to your institutional LMS if there were something you'd like the share with the full class.

Do you have challenges with students indicating that they "did not participate this week" due to not having access / connectivity?
Faculty who piloted this course noted that this did present an issue for a few of their students. One solution for this is that students who were physically near one another could meet each other in person to mitigate this issue. Although not as ideal, students also have the option to connect with their group by phone rather than video, if they don't have a stable enough connection for video. Additionally the collaboration content, although designed to be consumed by student groups, is accessible by all students individually, so if a student misses a group collaboration session for some reason, they can catch up by working through the collaboration content on their own. We will certainly continue to consider these and other access issues and share additional learnings about how they can be mitigated to ensure that all students can benefit from the features of the course.

What does instructor training look like for the online platform, best practices, etc.?
All faculty who teach a Carnegie Math Pathways course are provided preparation training through our New Faculty Training sessions offered throughout the year. Instructors wanting to teach the fully-online Pathways courses will have access to a preparation course designed specifically for our fully online offerings. This course frames the online model and provides in-depth guidance around the course design and structure and setting up the course in your institutional LMS. It also provides instructors with a look at and gain a better understanding of the student experience in the online learning platform. Lastly, the preparation course outlines step-by-step processes related to student group collaboration grading and provides examples of student group work and instructor feedback.

How can I learn more about adopting these courses at my institution?
To learn more about the Carnegie Math Pathways offerings, you can visit our website and request access to our sample curriculum. To learn more about the next steps to bring fully online courses to your students, please contact us at info@carnegiemathpathways.org.