

## COVID-19 Impacts on Geoscience Academic Instructional Environments through November 2020

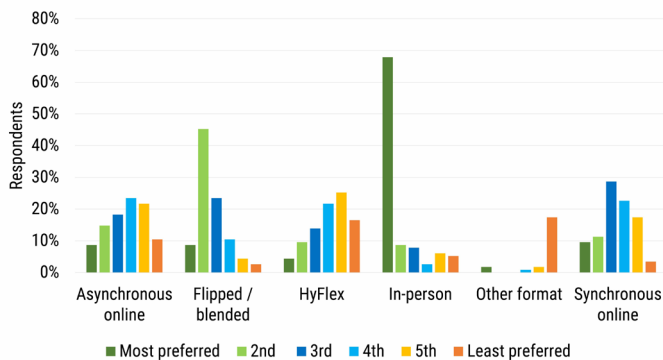
This data brief provides an update on the changes in geoscience academic instructional environments that have resulted from the COVID-19 pandemic. While the percentage of departments offering in-person instruction for courses and labs increased through the Fall, by October, these percentages began to decline. Online formats continue to be the prevailing instructional format for courses and labs for the time being, while online and local site modes are most common for field instruction and activities.

We asked faculty and students about their preferences for instructional formats for introductory courses, undergraduate courses, and upper division courses. Faculty preferred in-person instruction for all course categories over all other instructional formats with flipped/blended course formats that provide scheduled times for in-person and online instruction as their second preferred format. The least preferred format by faculty for all courses was the HyFlex format where students can choose to attend either in-person or online class sessions.

### Academic courses

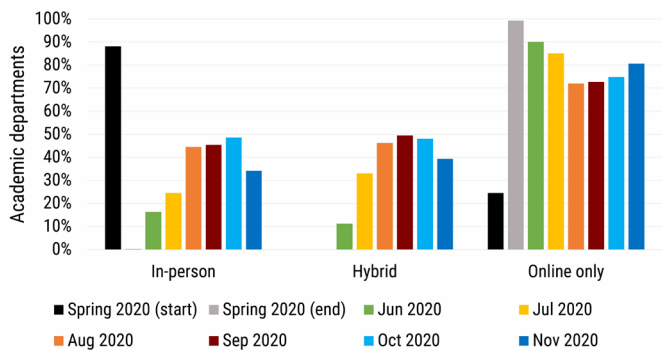
For course formats, 81% of departments were using online instruction in November 2020. Use of in-person instruction increased from 44% in August to 49% in October, thereafter declining to 34% in November, while the percentage of departments using hybrid course formats, such as flipped/blended or HyFlex formats, followed a similar trend - increasing from 46% of departments in August to 49% in September, thereafter declining to 39% in November. One-fifth of departments offered both flipped/blended and HyFlex course formats from August through October, and this percentage declined to 13% in November.

Faculty: introductory course format preference



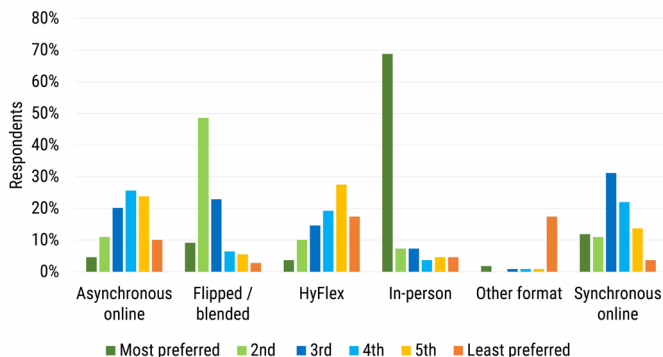
Credit: AGI; data from AGI's Geoscience COVID-19 Survey

Course instructional formats

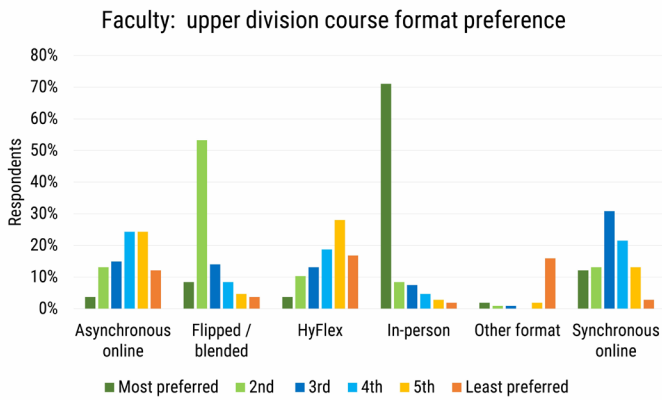


Credit: AGI; data from AGI's Geoscience COVID-19 Survey

Faculty: undergraduate course format preference

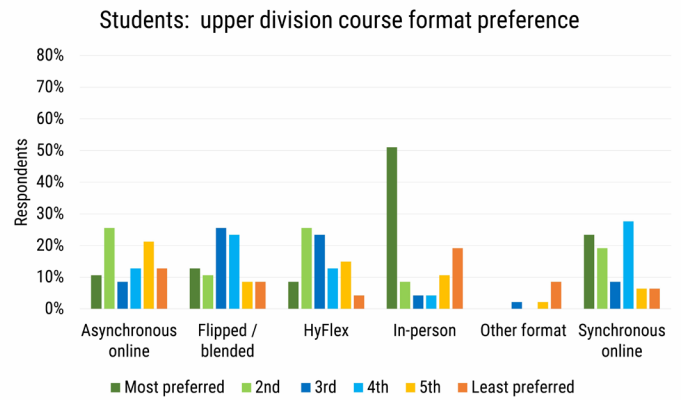


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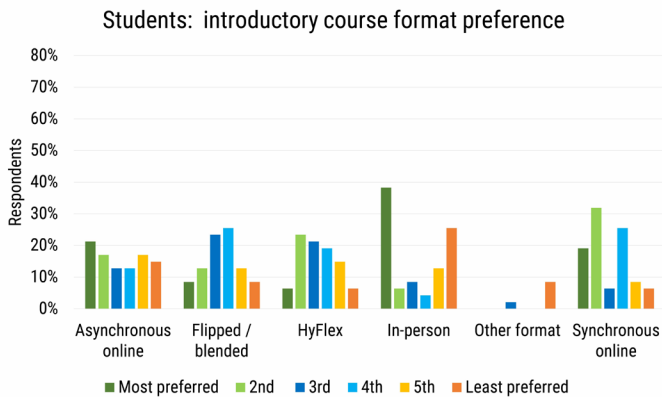
The top two preferred formats by students were in-person instruction and synchronous online instruction, with in-person formats being ranked above synchronous online formats for undergraduate or upper division courses. Instructional formats that ranked 5th or 6th (i.e., the least preferred formats) included in-person formats for introductory courses and asynchronous online formats for undergraduate and upper division courses.



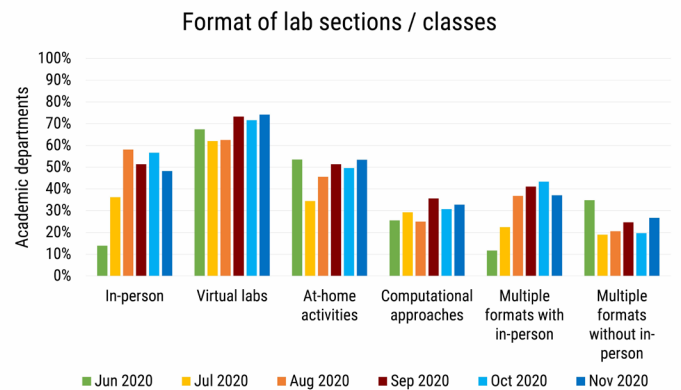
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## Lab sections and classes

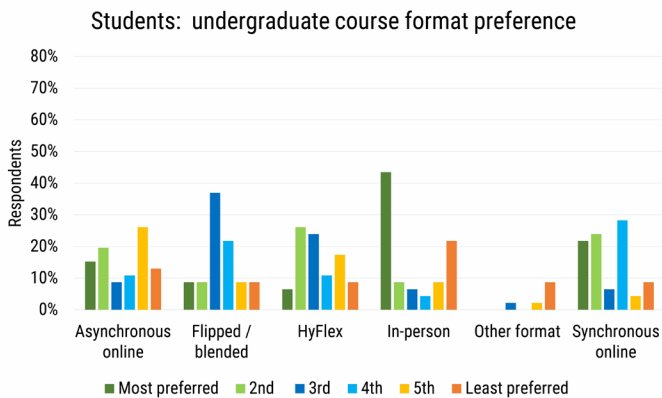
While virtual labs continue to be the most common format for lab sections and classes, throughout the summer, an increasing percentage of departments offered in-person instruction. The percentage of departments offering in-person labs peaked at 58% in August, decreasing to 48% by November. Since June, the percentage of departments using a combination of formats for lab sections and classes increased from 47% to 64% by November. In November, 37% of departments incorporated in-person lab instruction, while 27% of departments used a mix of only online (i.e., virtual or computational) formats and at-home activities.



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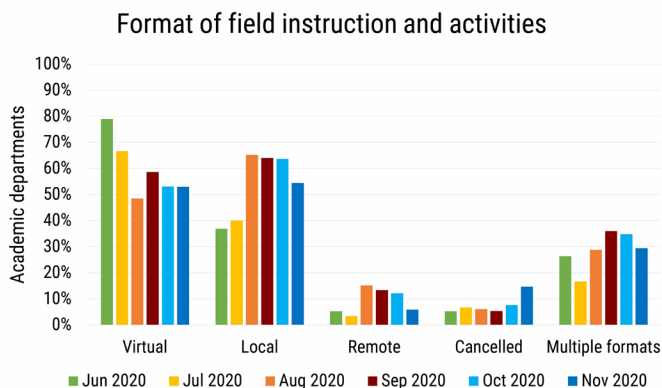
## Are virtual labs here to stay?

With most departments using virtual formats for lab sections and classes, in September we inquired about how virtual labs would be integrated into teaching strategies over the long-term. Two-thirds of departments indicated that they

planned to continue using virtual labs for the long-term, while one-quarter of departments indicated they had no plans to continue virtual lab formats. Only 9% of departments that planned to continue using virtual labs intended to use virtual labs as a replacement for in-person lab sections or classes. Most departments indicated plans for incorporating virtual labs into existing courses as supplemental activities, and several departments noted how virtual labs were useful in cases where students were unable to attend in-person lab sections or in cases where in-person instruction was not feasible.

## Field instruction and activities

Since June, field instruction and activities changed from predominantly virtual field experiences to an increasing percentage of departments offering local field activities. In addition, similar to lab instructional formats, departments have been increasingly using a combination of formats for field activities and instruction. Some respondents indicated using local field experiences included self-guided local investigations and local in-person instruction with a small number of students per instructional cohort.



Credit: AGI; data from AGI's Geoscience COVID-19 Survey

## Are virtual field experiences here to stay?

With over half of departments using virtual instruction for field activities, in September we inquired about how virtual field experiences would be integrated into teaching strategies over the long-term. Three-quarters of departments indicated that they planned to continue using virtual field experiences for the long-term, while one-fifth of departments indicated they had no plans to continue virtual instruction.

Plans for integration into existing curricula included using virtual field experiences as part of introductory courses or as supplemental activities in other courses. Many departments mentioned the benefits of virtual field experiences in increasing accessibility, especially for students who are not able to attend in-person field activities, whether because of disability, financial hardship, illness, or scheduling issues. Other departments noted the usefulness of virtual field experiences for cases where in-person instruction was not feasible, such as during the current pandemic, due to an instructor being ill, or because of inclement weather. In addition, some departments mentioned plans to use virtual field experiences as a complement to in-person field activities, such as for preparation for and post-analysis of in-person field activities. In addition, many departments, even those with plans for long-term use of virtual field experiences, acknowledged the importance of in-person field activities and the hands-on experience students gain through such experiences.

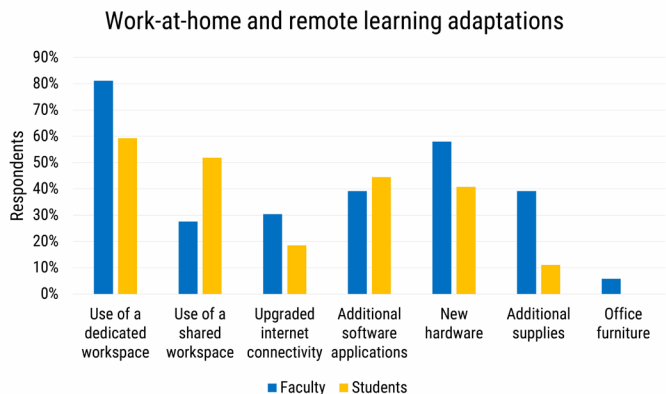
## Math and computer programming competency gaps

In November, 40% of faculty indicated they were incorporating more math and programming skills in their virtual labs and/or field activities. Of those faculty, most said that they found their students lacking the necessary math and/or programming skills required for these activities. Specific competency gaps included lack of proficiency with basic algebra, data management skills for cleaning and manipulating data, making and interpreting graphs, using Excel for basic data manipulation and analysis, and a lack of understanding for how to use programming to solve project tasks.

## Teaching and Learning Environments

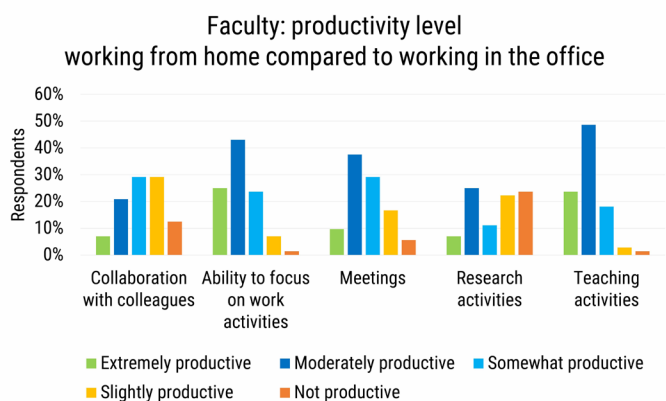
In September, we asked survey participants about their work-at-home and remote learning environments and inquired about their productivity levels and challenges with at-home learning and teaching. The majority of faculty and students reported using a dedicated workspace for their working and learning activities (81% and 59% respectively). While 52% of students reported using a shared workspace for their learning activities, such as common areas shared with other people or using spaces that also had other uses as well, such as the kitchen table, only 28% of faculty reported the same. More faculty than students reported upgrading their internet connections (30% vs. 19%), obtaining new hardware

(58% vs. 41%) and additional supplies, such as textbooks, school supplies, etc. (39% vs. 11%). In addition, 6% of faculty reported purchasing additional office furniture.



Credit: AGI; data from AGI's Geoscience COVID-19 Survey

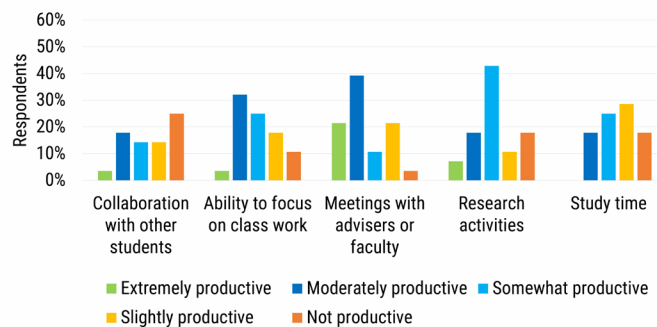
Most faculty members reported being moderately to extremely productive with teaching activities (72%) and with the ability to focus on work activities (68%), and 47% of faculty reported being moderately to extremely productive with meetings. Faculty reported being least productive with research activities and collaboration with colleagues.



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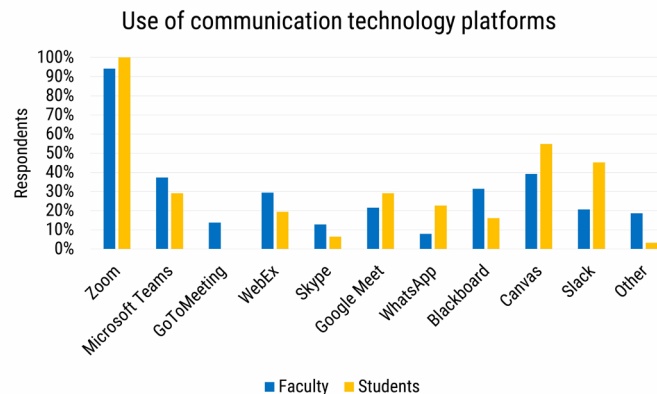
Most students (61%) reported being moderately to extremely productive with faculty and adviser meetings, and 36% of students reported being moderately to extremely productive with the ability to focus on class work. Students reported being least productive with study time, with 46% of students reporting being not productive or slightly productive, and 39% of students reported being not productive or slightly productive with collaborating with other students on research projects.

Students: productivity level remote learning compared to in-person learning



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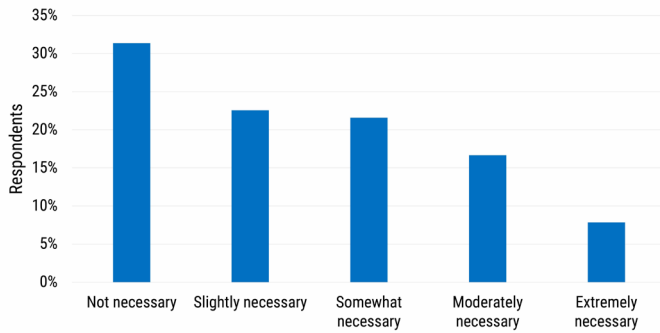
Faculty and students reported using a variety of communication technology platforms for teaching and learning. Over 90% of faculty and students reporting using Zoom, and less than half of faculty and students reporting using other platforms. More faculty than students reported using Microsoft Teams, GoToMeeting, WebEx, and Skype, and more students than faculty reported using Google Meet, WhatsApp, and Slack. Other platforms mentioned included Asana, Brightspace, Design2Learn, Collaborate Ultra, Discord, Piazza, Google Docs, Learning Symposium, Moodle, Panopto, Sakai, Schoology, Big Blue Button, and Top Hat.



Credit: AGI; data from AGI's Geoscience COVID-19 Survey

When asked about needing to be physically present at the office, 54% of faculty reported it was either not necessary or slightly necessary. Only 25% of faculty reported that their physical presence at the office was moderately to extremely necessary.

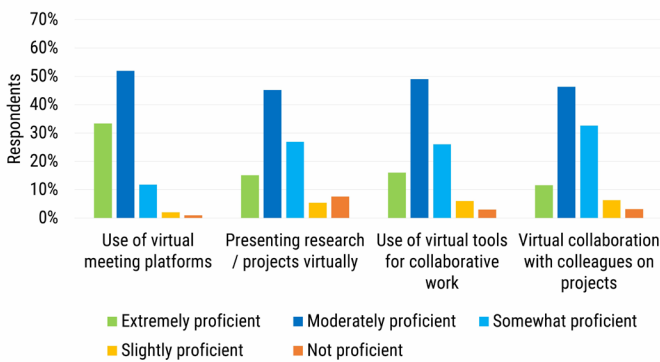
### How necessary is it for you to be physically present at your employer's office to do your work duties?



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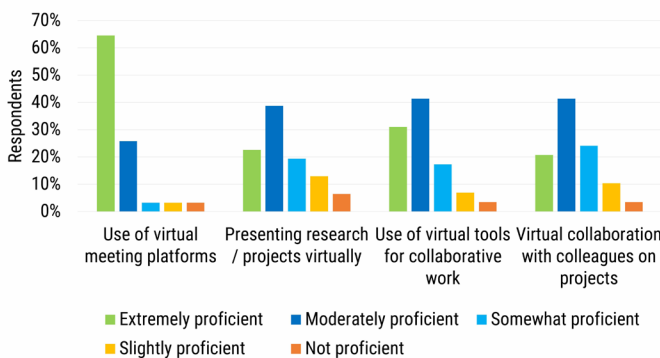
When asked about their current proficiency with virtual platform features relative to last year, the majority of faculty and students reported being moderately to extremely proficient with using the platforms, presenting and collaborating virtually, and using the platform tools for collaborative work. Students reported higher levels of proficiency than faculty across all categories.

### Faculty: proficiency with virtual platform features



Credit: AGI; data from AGI's Geoscience COVID-19 Survey

### Students: proficiency with virtual platform features



Credit: AGI; data from AGI's Geoscience COVID-19 Survey

Challenges mentioned by faculty in working from home centered around several key topics: how their work-at-home environment is set up, sharing their workspace with other members of their household, lack of childcare and interruptions from other members of their household, increased workloads due to providing both online and in-person instruction, lack of work-life balance, facility restrictions impacting research productivity, students needing more attention and interaction, lack of IT and institutional support, and issues with online teaching and student interactions.

Challenges mentioned by students about their remote learning environment centered around the ability to stay focused and motivated to complete coursework, with how their home-based learning environment was set up, and issues with interruptions and distractions from sharing the space they use for learning with other members of their household.

We will continue to provide current snapshots on the impacts of COVID-19 on the geoscience enterprise throughout the year. For more information, and to participate in the study, please visit: [www.americangeosciences.org/workforce/covid19](http://www.americangeosciences.org/workforce/covid19)

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