

Pandemic Impacts on Geoscience Graduate Students

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The results and interpretation of the survey are the views of the American Geosciences Institute and not those of the National Science Foundation.



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Project Goals

1

Assess
pandemic
impacts

2

Establish
baseline for
workplace and
instructional
environments

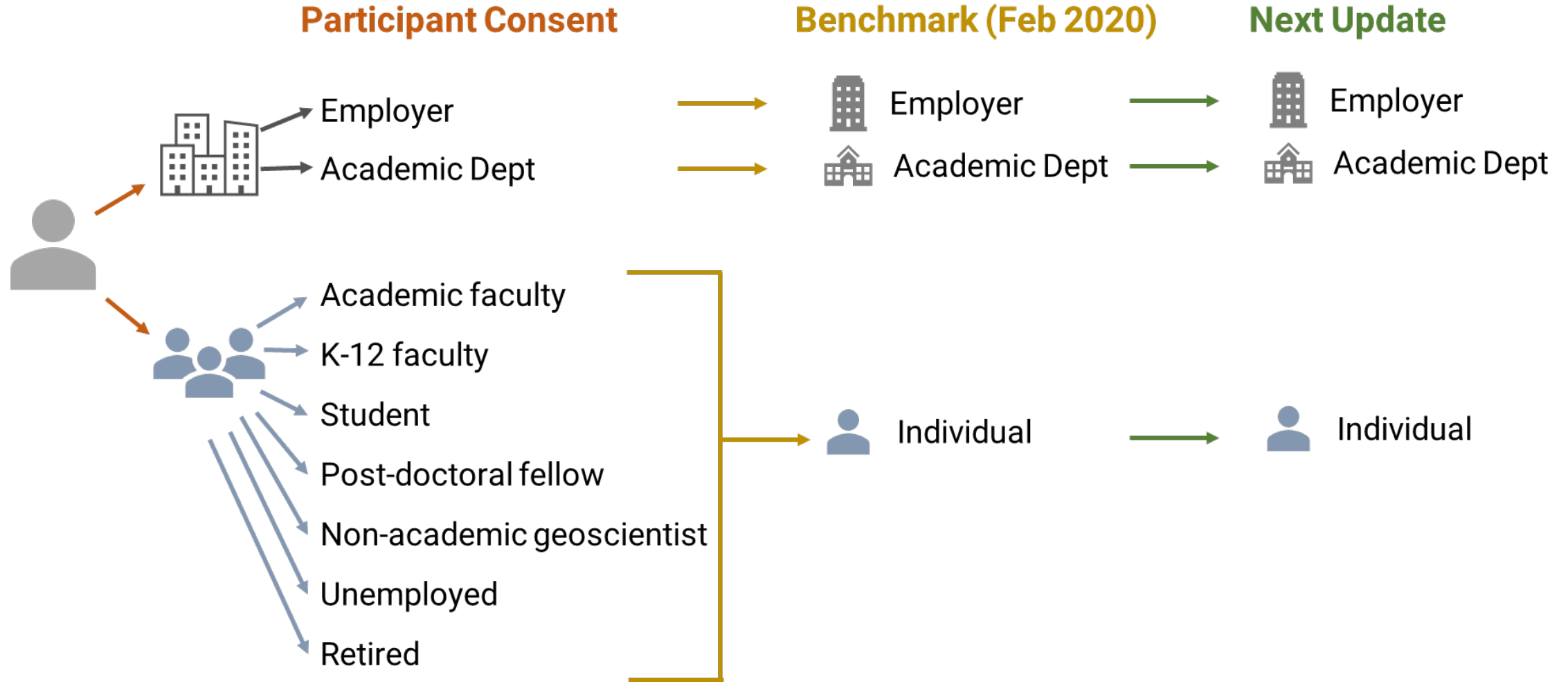
3

Analyze
magnitude and
permanency of
changes

4

Inform response
and recovery
planning for
future disasters
and disruptions

COVID-Impacts Survey Design



Data Type	Consent	Benchmark	Next Update
Participant Type	I	I	I
Employment / Enrollment Status	I	I	I
Organizational Affiliation	I A E	I	I
Educational Background	I	I	I
Job-seeking Activities	I	I	I
Retiree Activities	I	I	I
Work / Learning Environment		I A E	I A E
Academic Activities		I A	I A
Work & Research Activities		I A E	I A E
Professional Development		I	I
Outlook & Concerns		I A E	I A E
Contact Info	I A E		
Demographic Info	I		
Business Operations		A E	A E



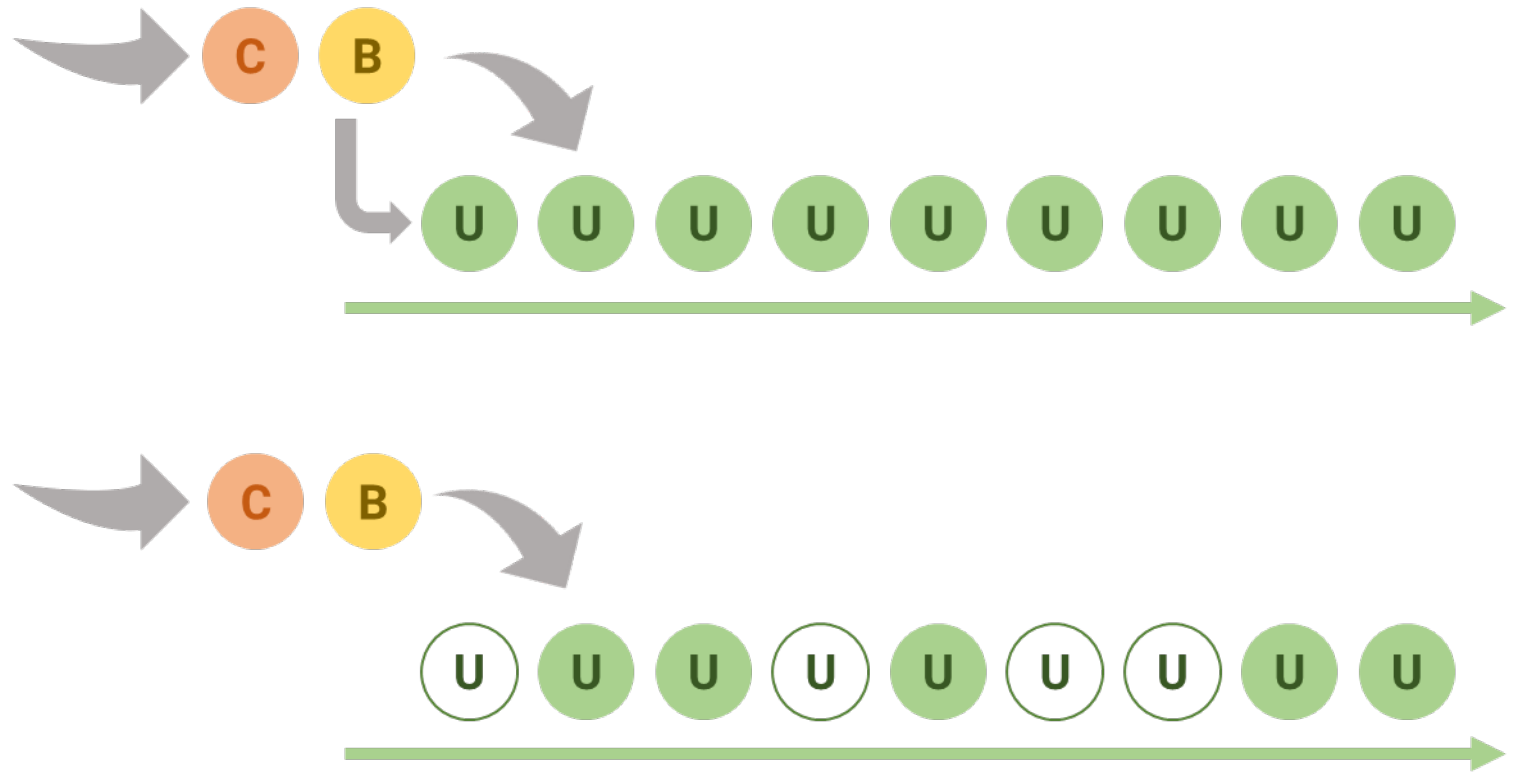
Survey Design

Multi-cohort longitudinal survey

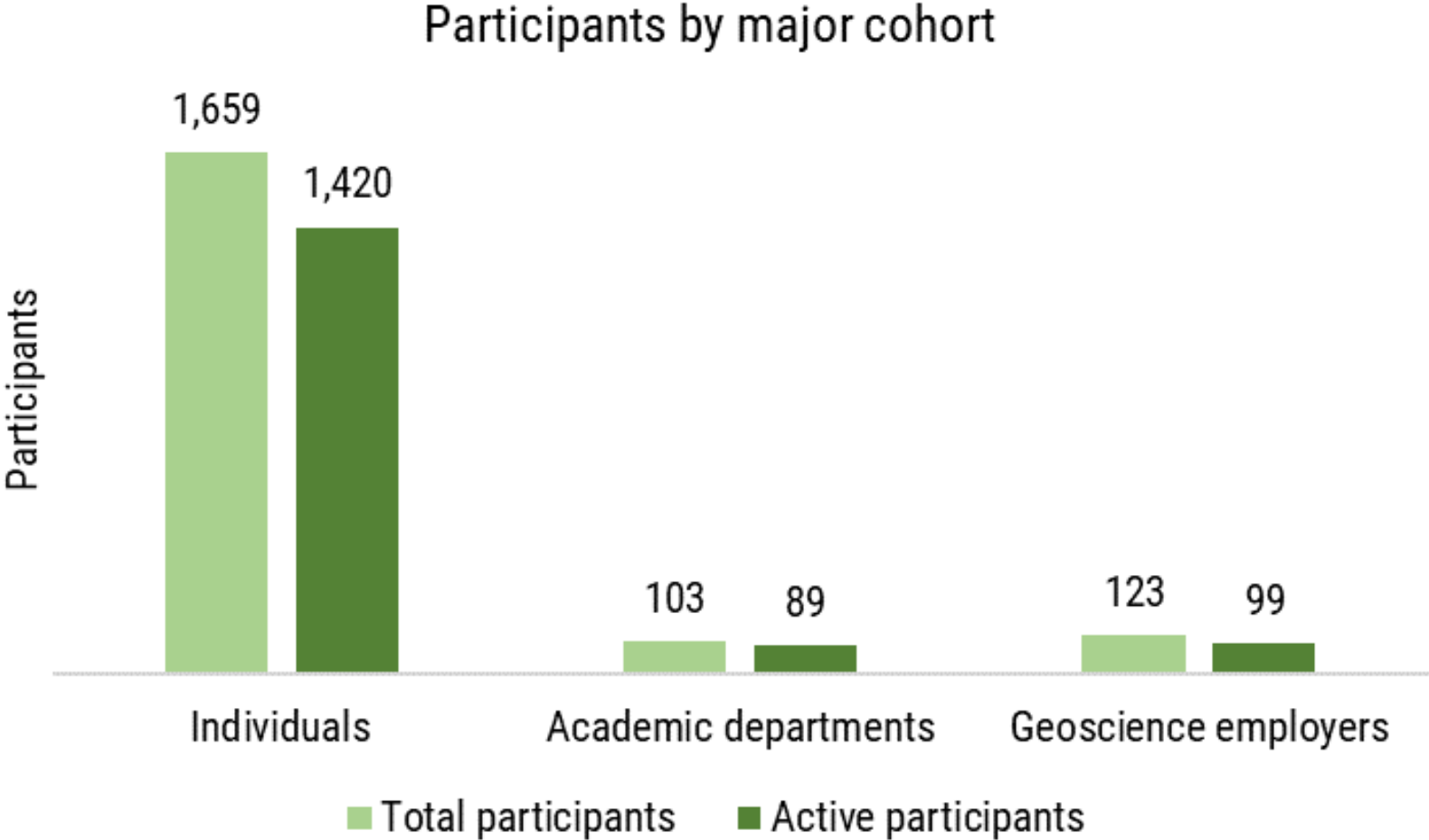
Continuous onboarding
May 2020 – Dec 2021

Participants are not required
to answer every survey

Survey sent every 2 weeks



Survey participation by major cohort



Pandemic impacts on graduate students

- **How have academic programs changed?**
 - Enrollment and degree trends
 - Instructional modes, including virtual
 - Degree programs and requirements
 - Graduate research impacts
- How have graduate-degree recipients fared?
- How have technical and virtual skills changed?
- What are the current trends for hiring?

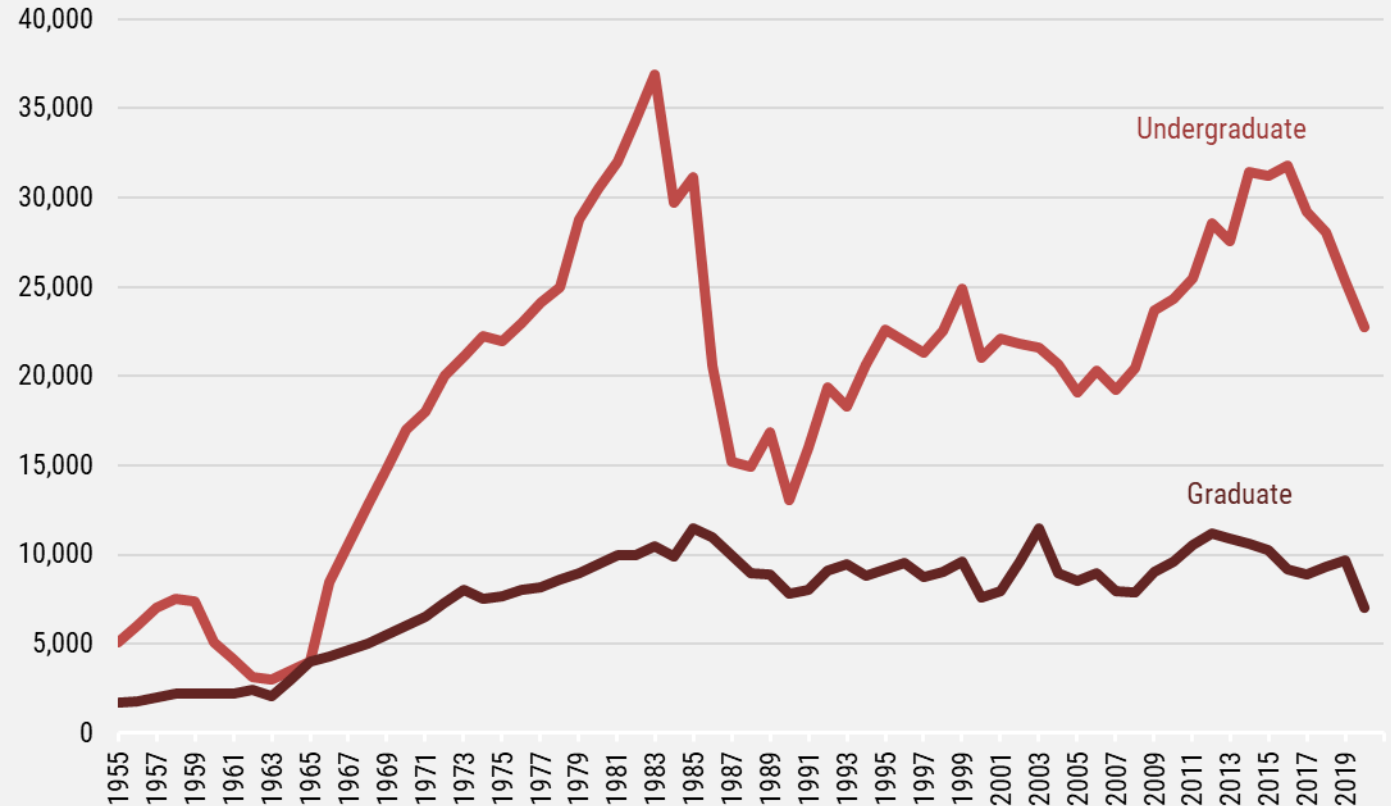
Enrollments

Recent enrollment declines from:

- Contraction of oil and gas sector
- Increase in online programs
- Declines in on-campus majors

Graduate enrollment trend likely related to pandemic impacts to degree completion

Geoscience Student Enrollment 1955-2020
United States Colleges and Universities



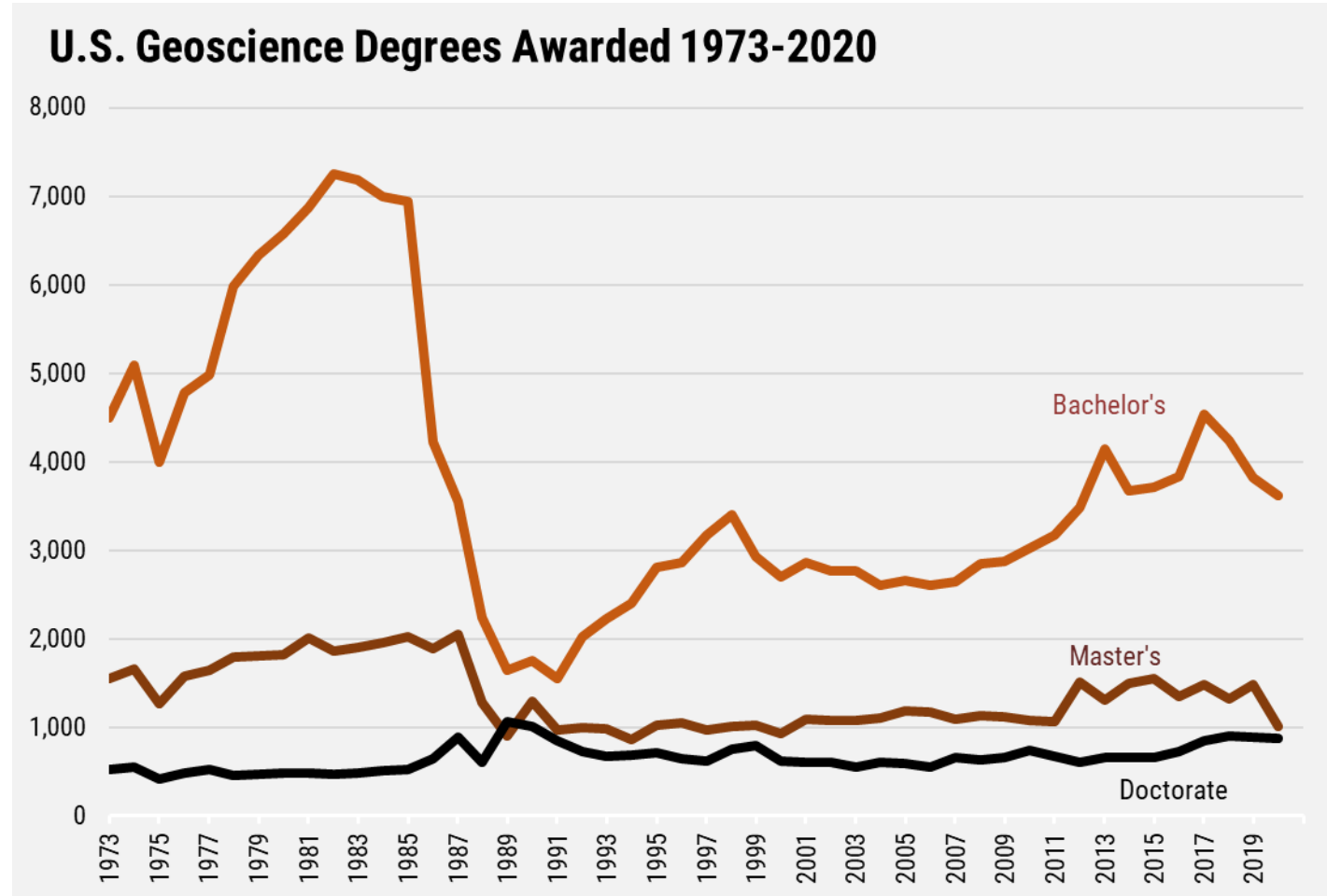
Degrees

Recent declines due to:

lower enrollments

pandemic impacts on completion

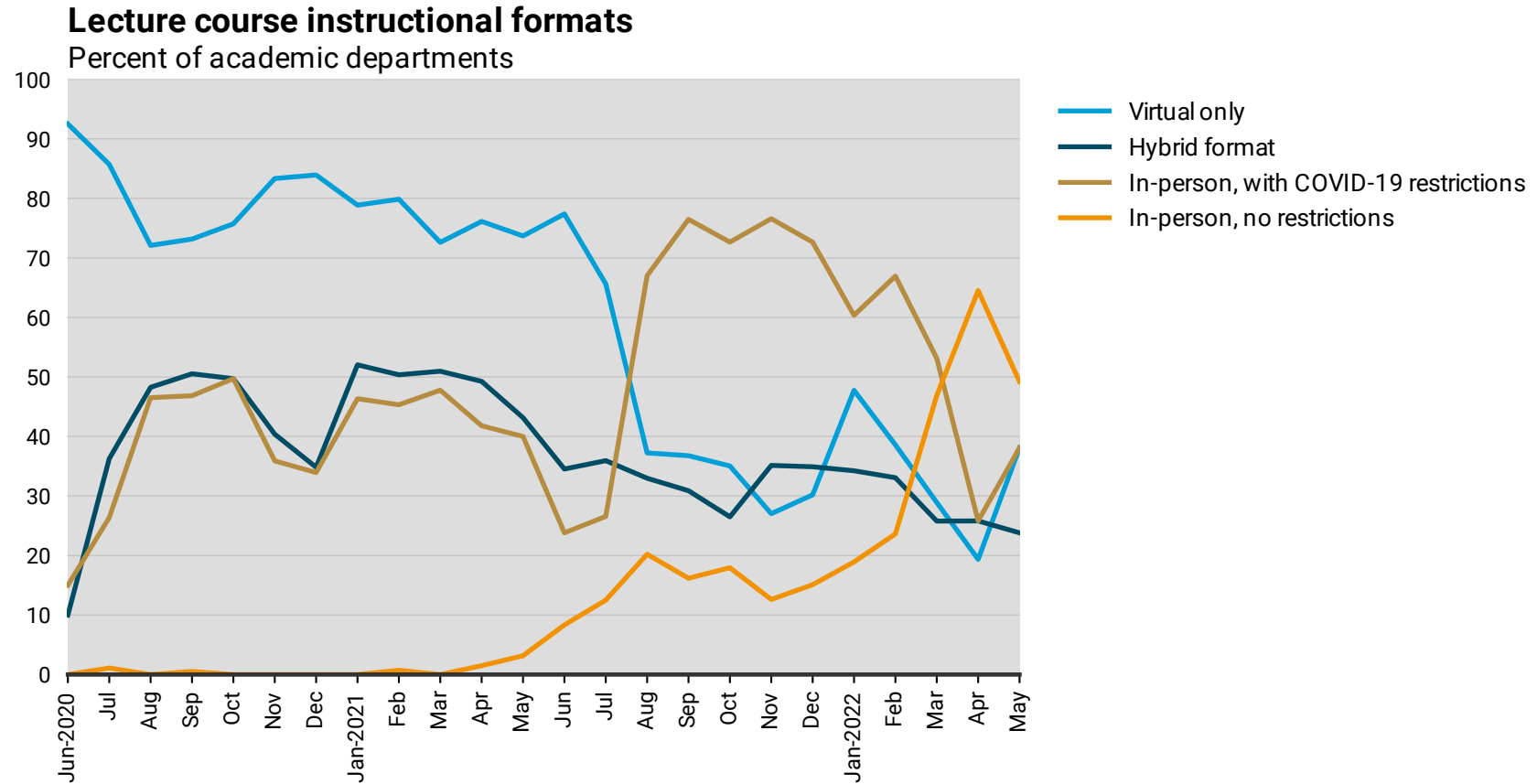
soft job market



Lecture courses

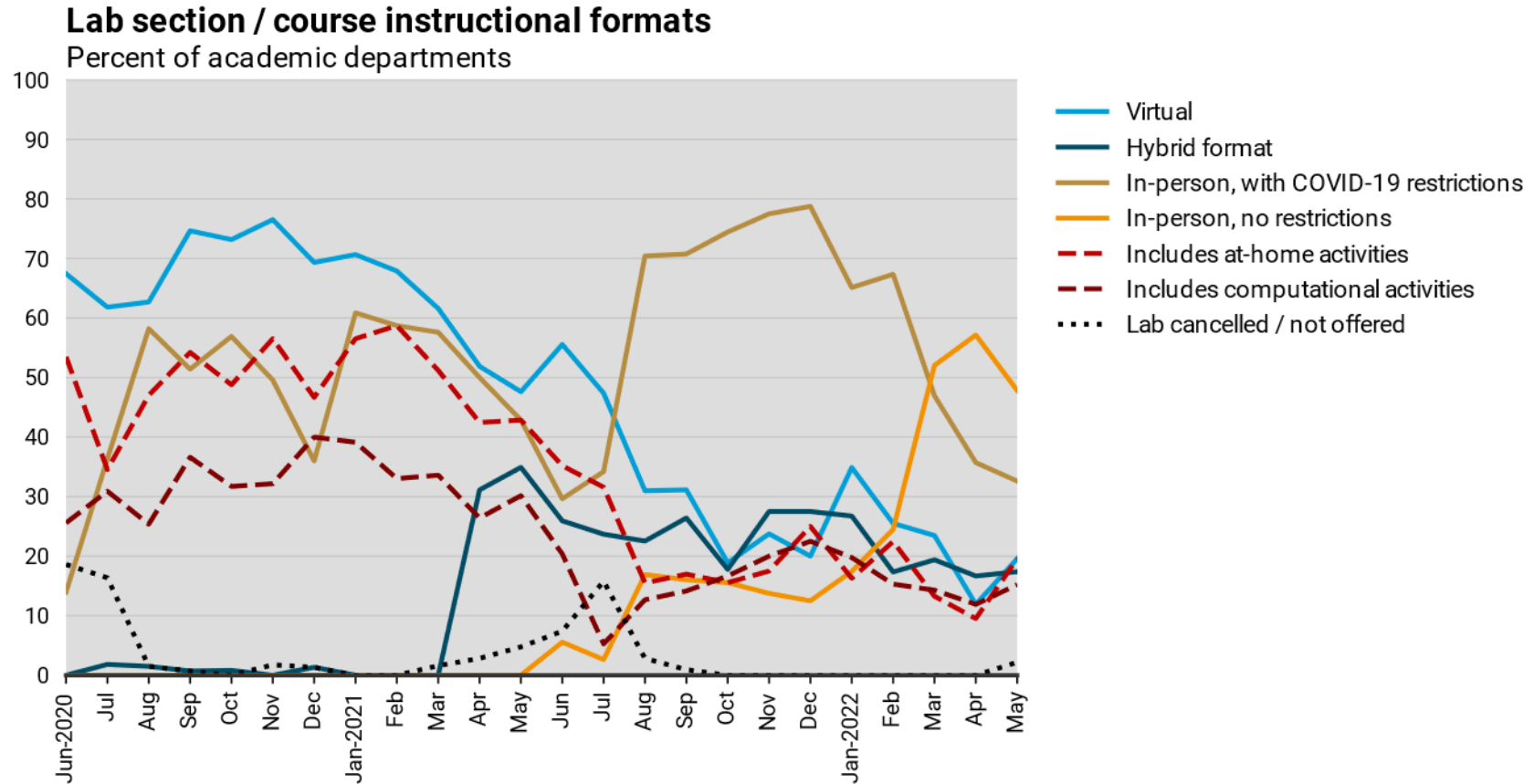
Just over half of departments offering only in-person course formats.

The other half offer in-person formats with either virtual or hybrid options.



Lab sections / courses

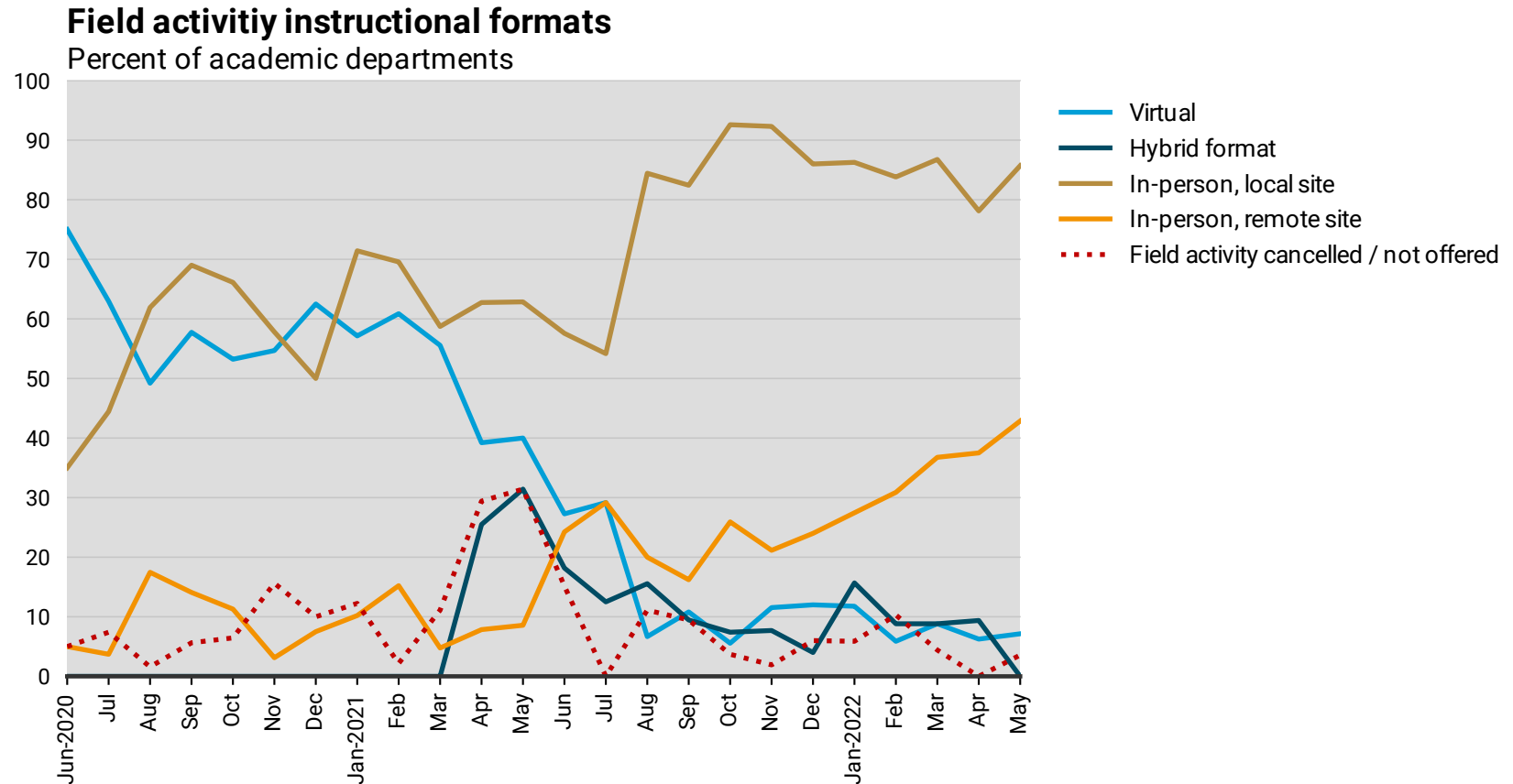
Lab instruction has also predominantly returned to only in-person instruction.



Field instruction

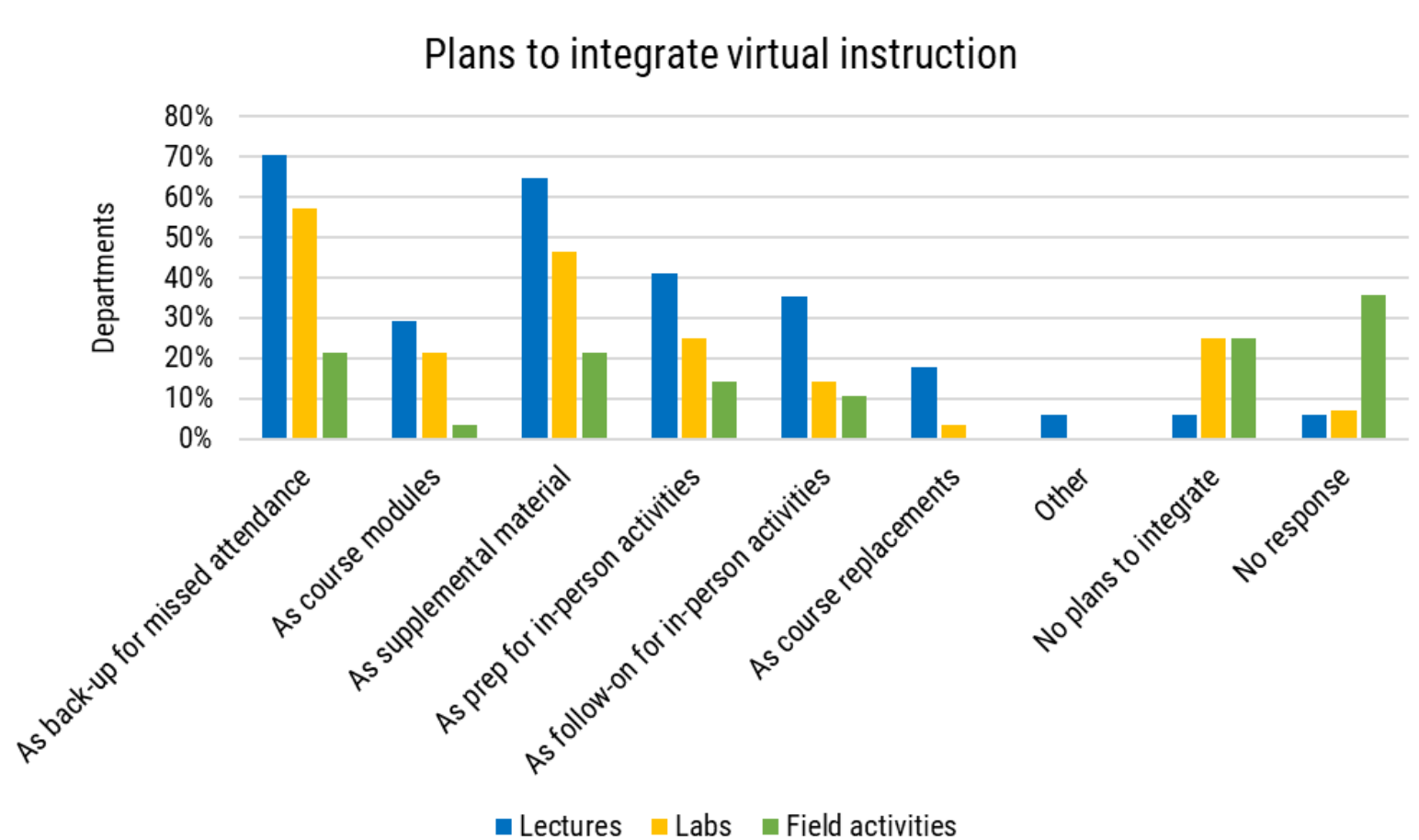
Local sites continue to be the primary field instructional format.

Increase in remote field instruction since Fall 2021.



Integration of virtual instruction

Looking ahead, virtual instructional activities are more likely to be used in lecture courses and labs.

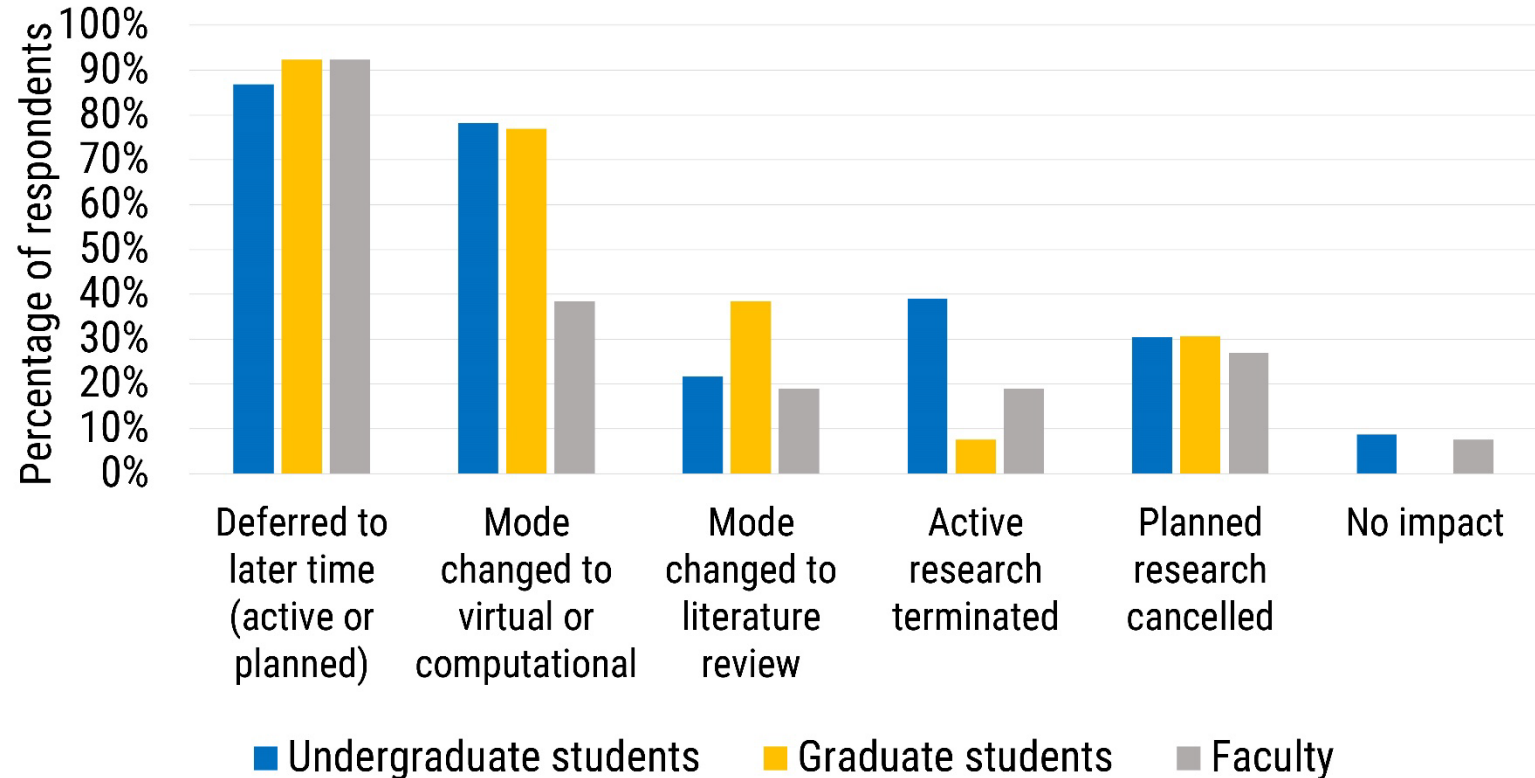


Impacts to graduate research, Spring 2020

Graduate research activities were more likely to be deferred than cancelled.

Shuffling / changing of research mode to computational / literature review where possible.

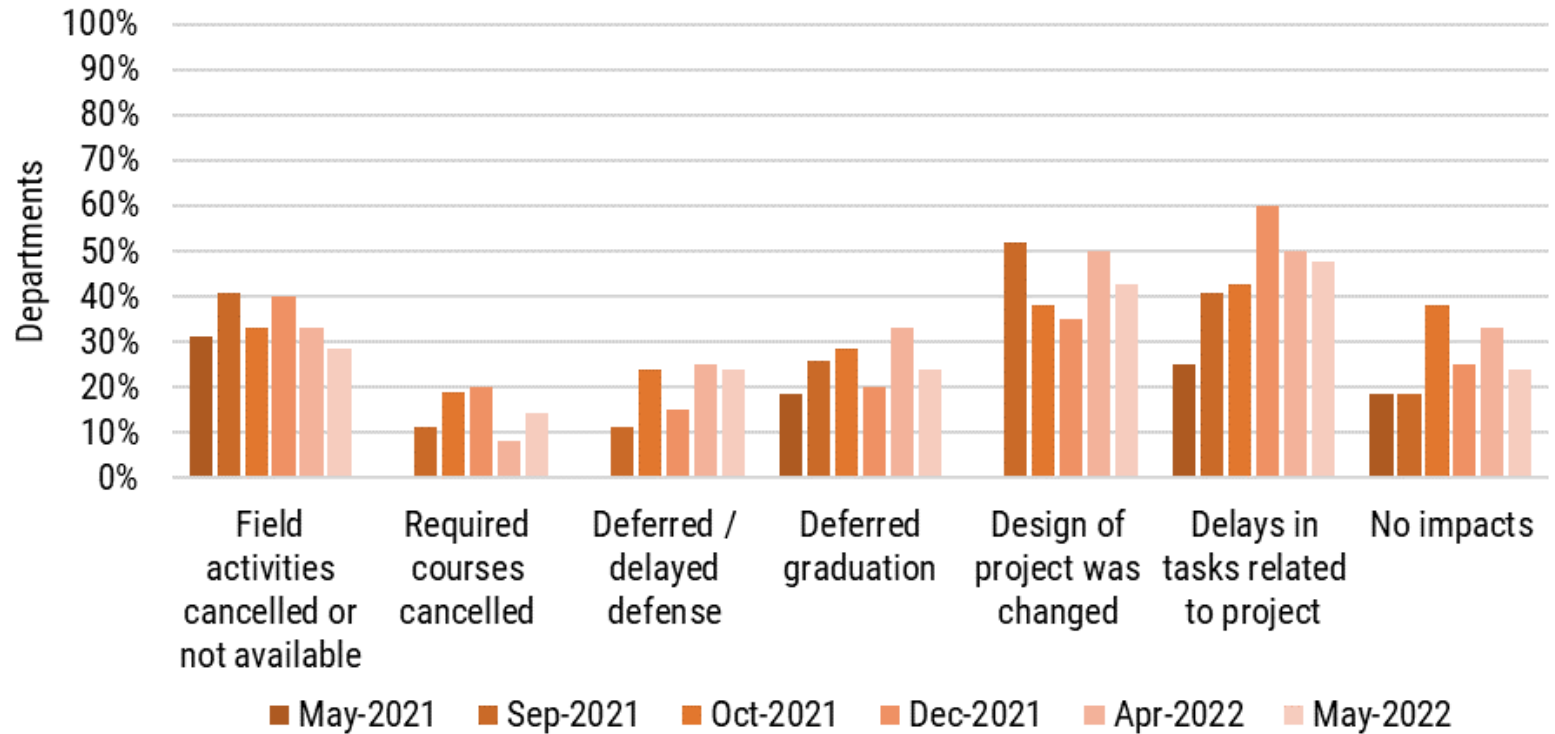
Research impacts during Spring 2020



Impacts to degree completion, departments

Increasing impacts related to delays in research project tasks and deferral of defenses / graduation.

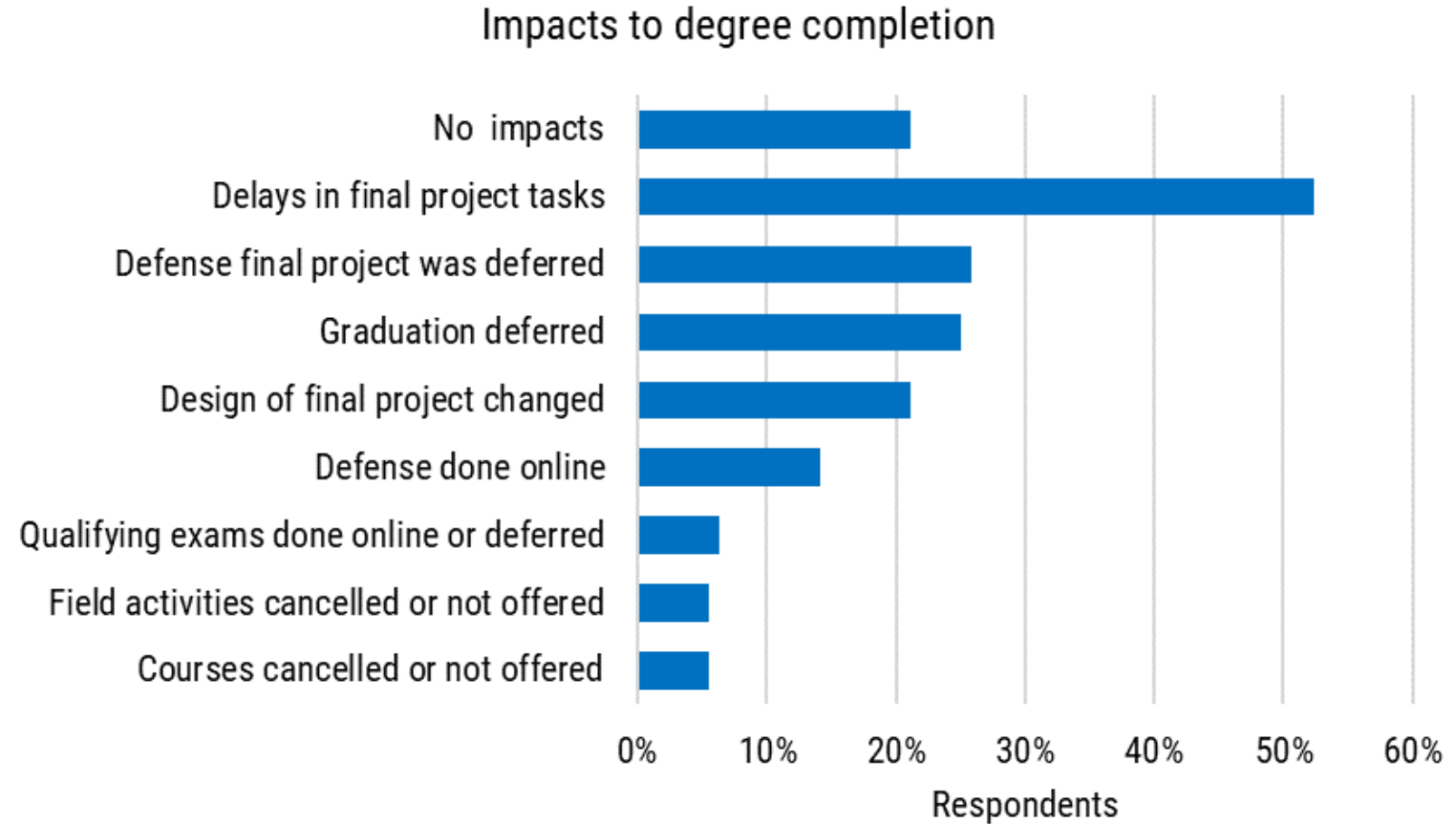
Degree completion impacts reported by departments



Impacts to degree completion, students

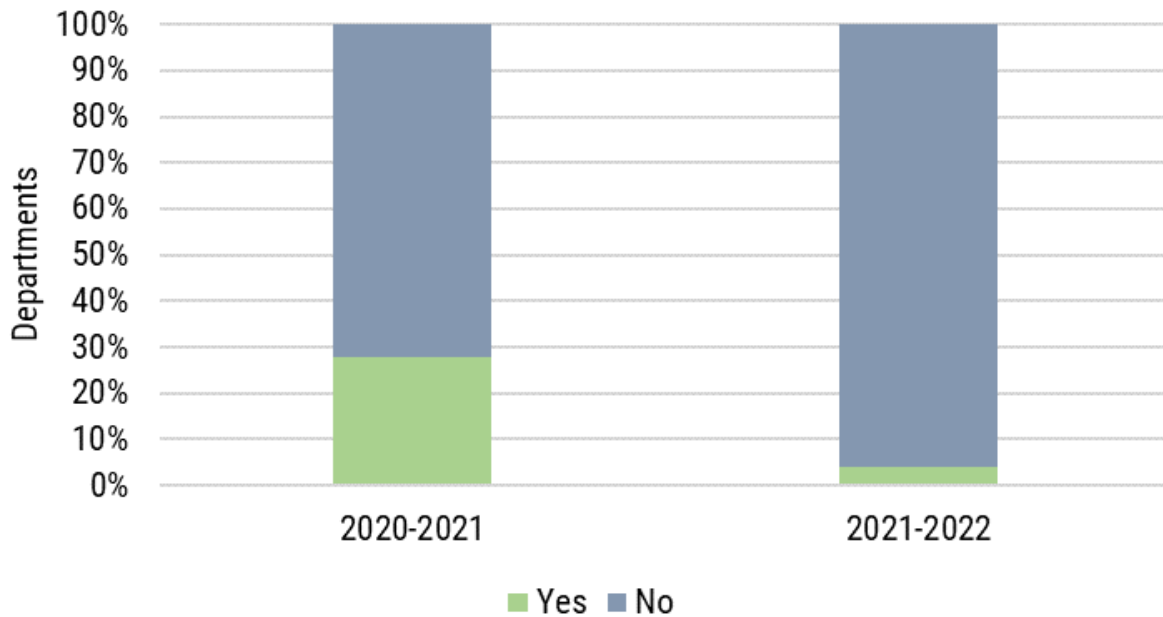
Delays in dissertation / thesis project tasks was top impact reported by graduate students.

1/5 of graduate students reported no impacts to degree completion.

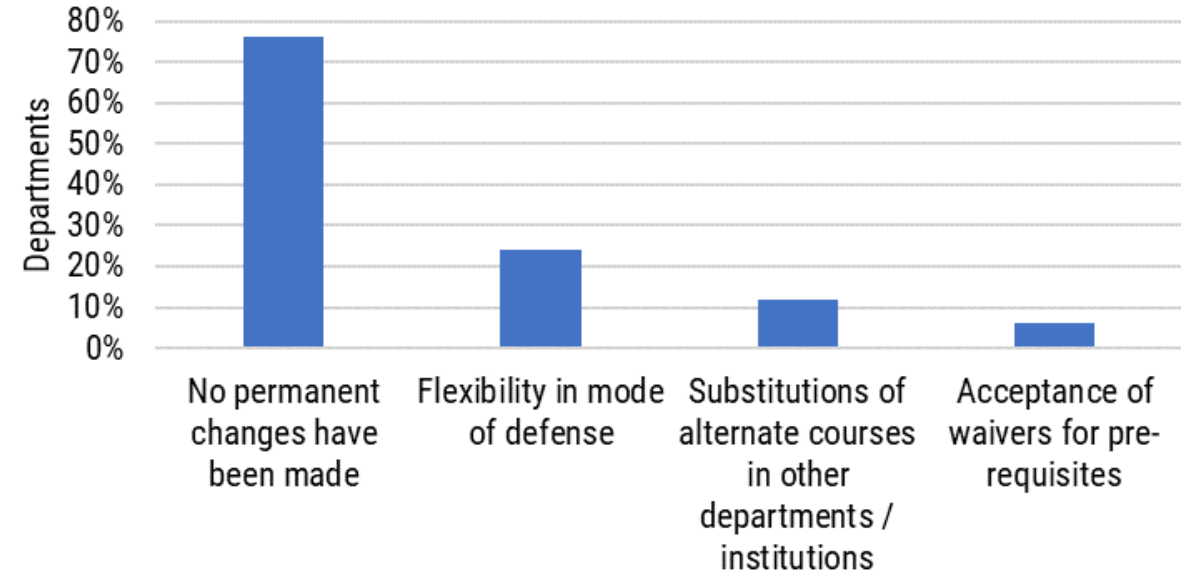


Adaptations to degree requirements

Changes to degree requirements due to the pandemic



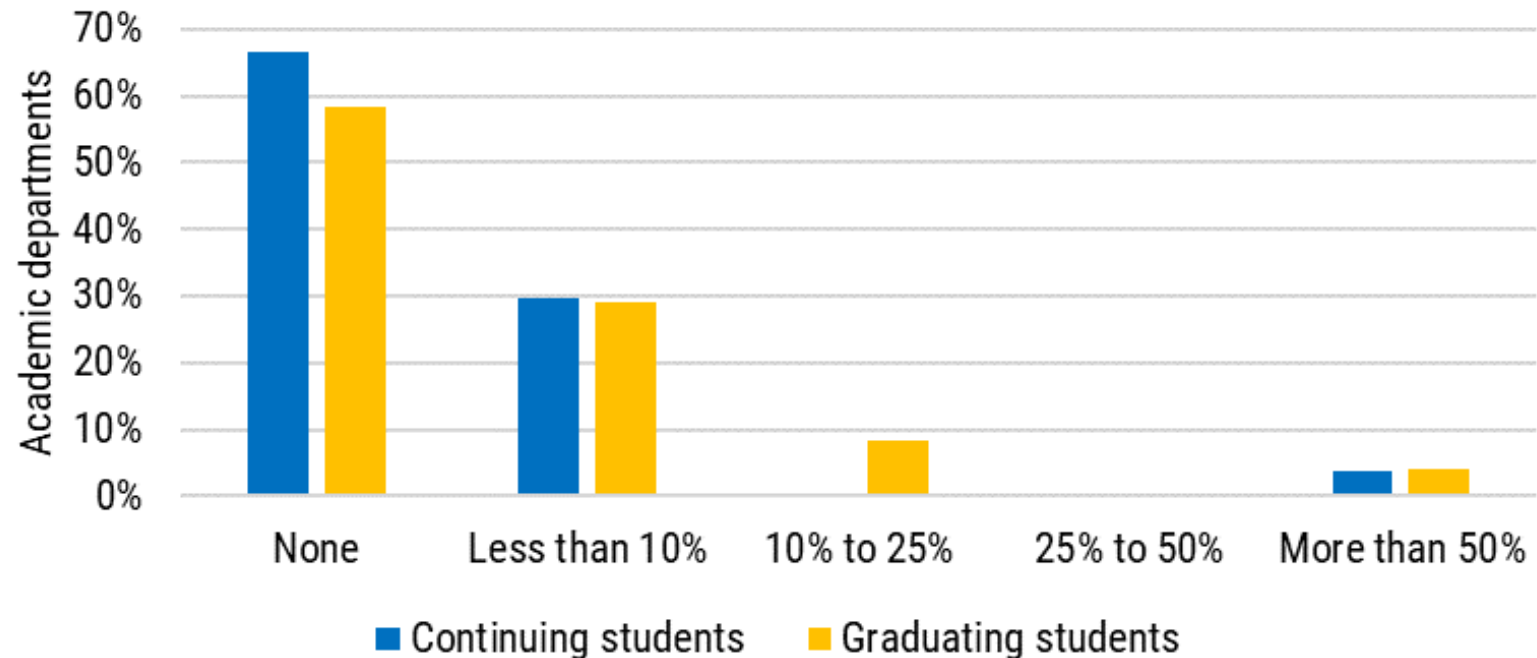
Permanent changes to degree requirements because of the pandemic



Impacts to course taking

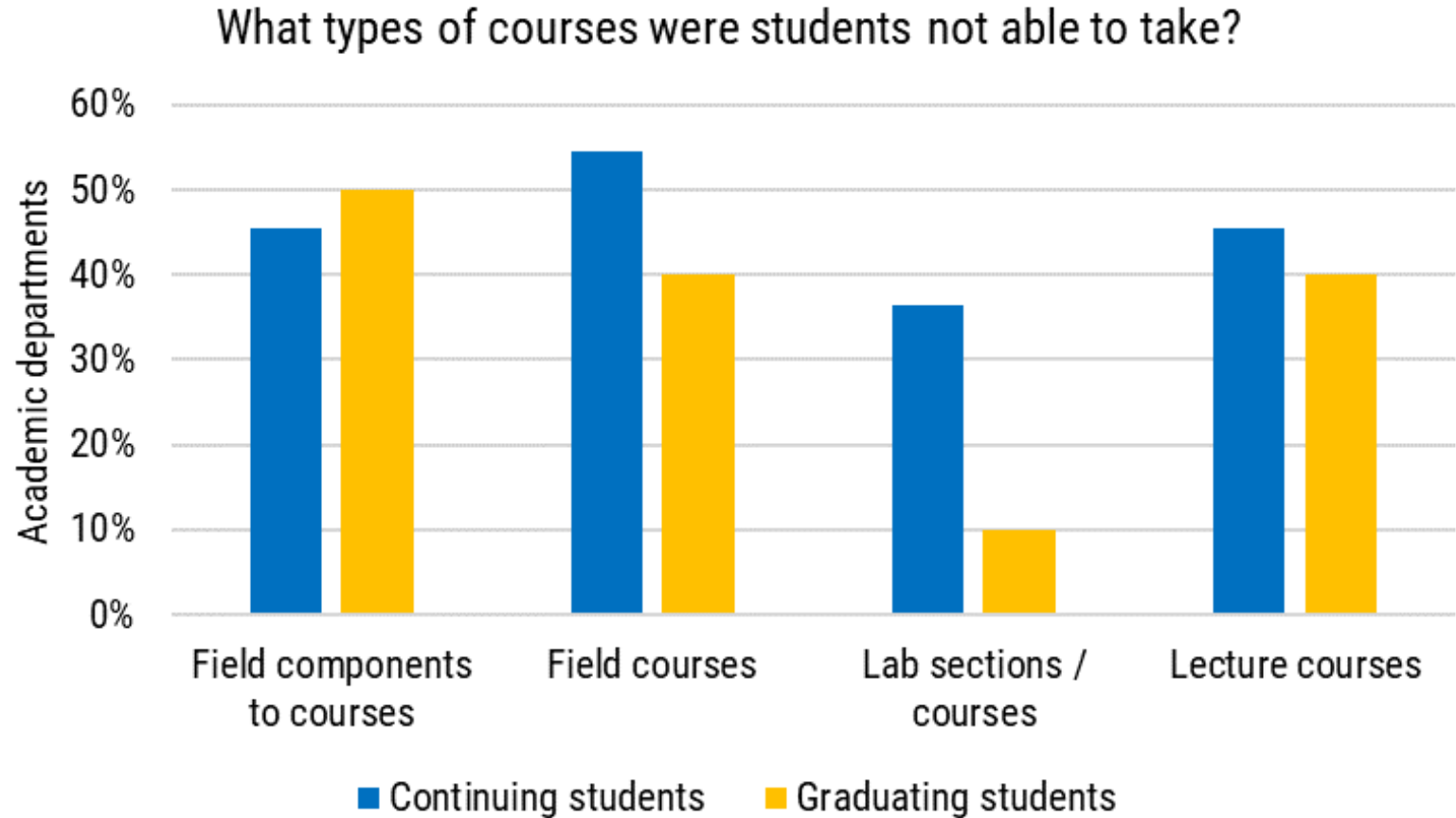
Continuing students had less of an issue with taking required courses than did graduating students.

What percentage of geoscience majors in your department were unable to take required courses during the 2021-2022 academic year?



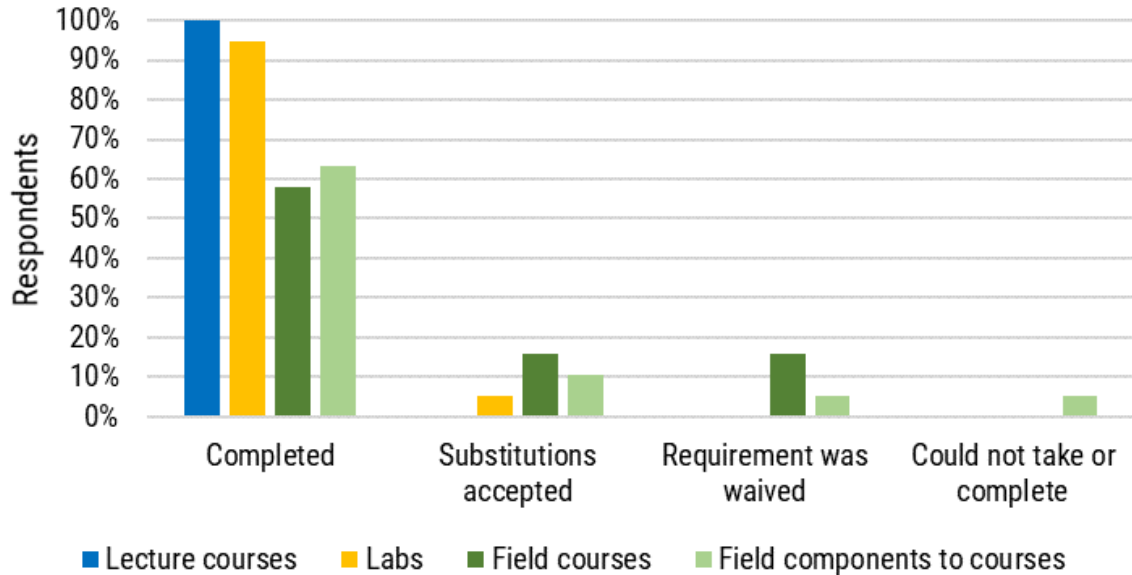
Impacts to course taking

Field instructional activities (field courses or field components of courses) were more likely to have not been taken.

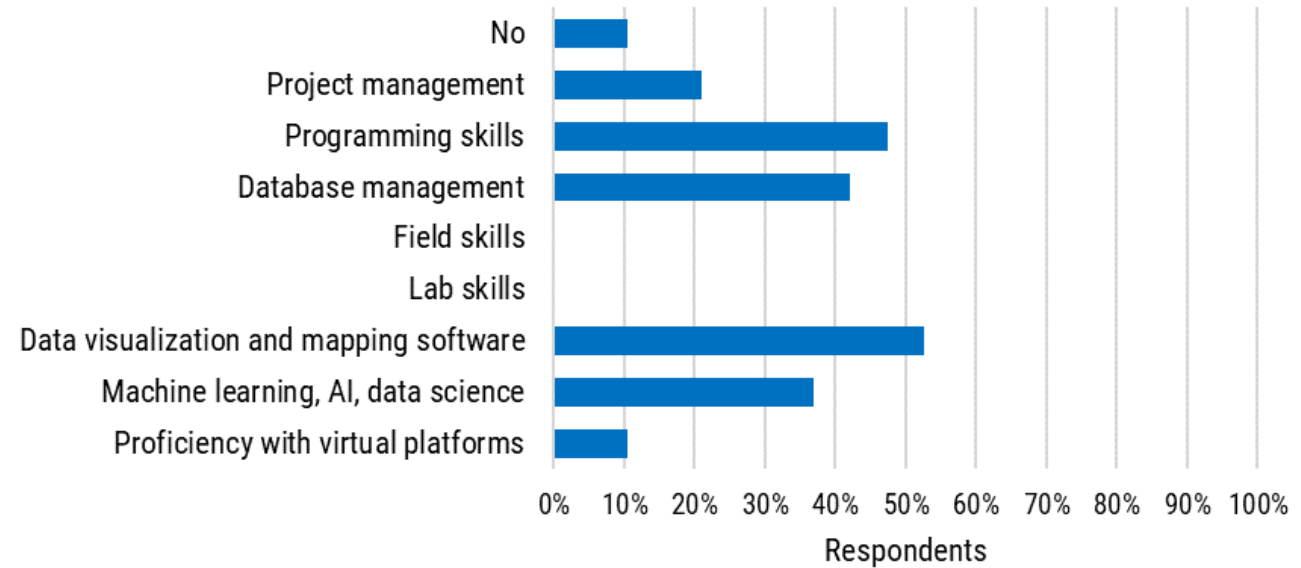


Pandemic Graduates

How did you handle courses that were required for your degree completion?



Are there skills and/or knowledge that you wish you had acquired prior to graduation?



Most graduates acquiring skills via self-taught instruction or via on-the-job training.

Pandemic impacts on graduate students

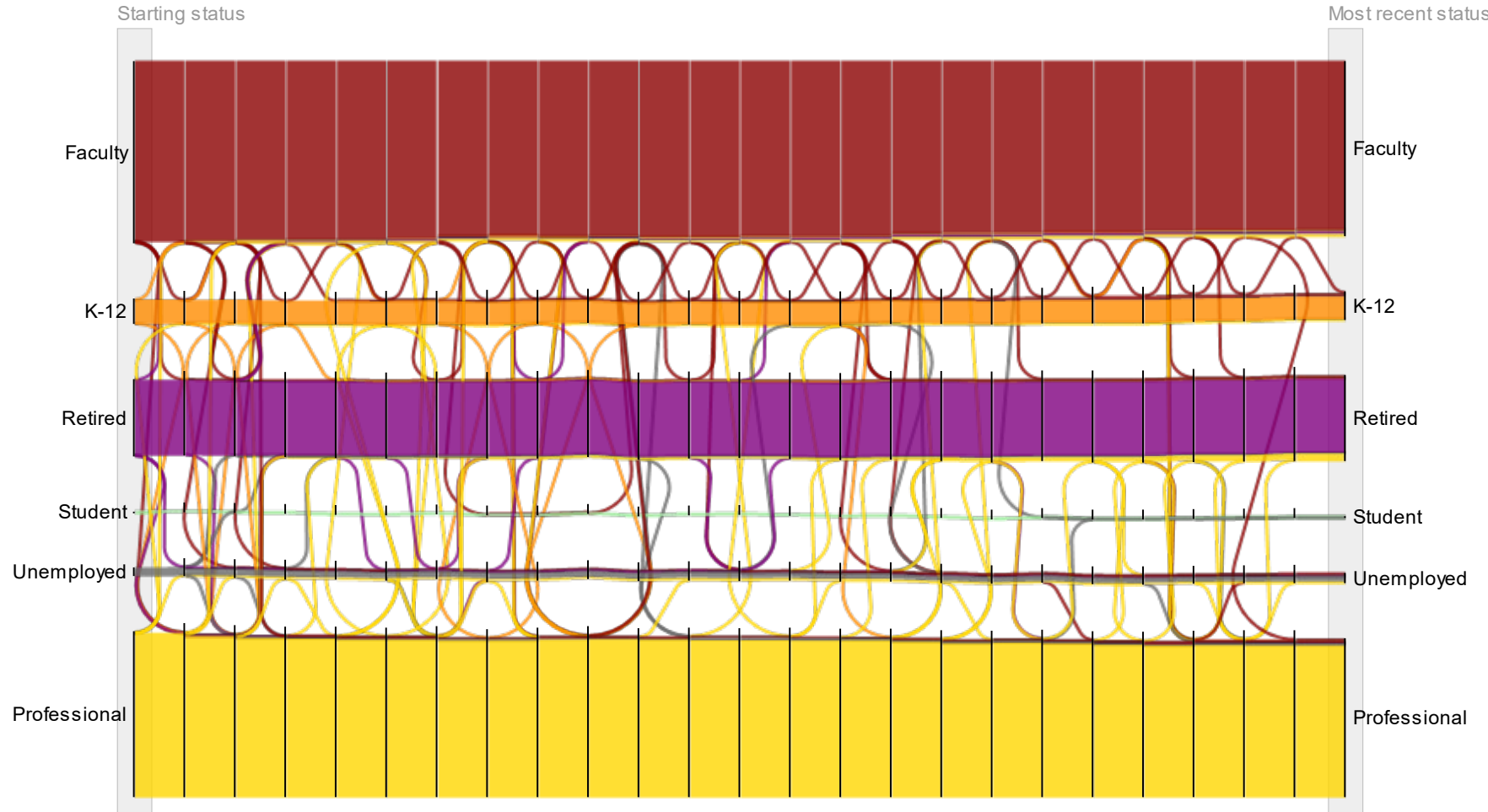
- How have academic programs changed?
- **How have graduate-degree recipients fared?**
 - Career trajectories
 - Work environments
- How have technical and virtual skills changed?
- What are the current trends for hiring?

Career trajectories

Relatively stable employment for those graduating prior to 2014.

Slight increase in retirements for those working in non-academic careers (i.e., “professional” category)

Occupational status of graduate degree recipients, graduating before 2014

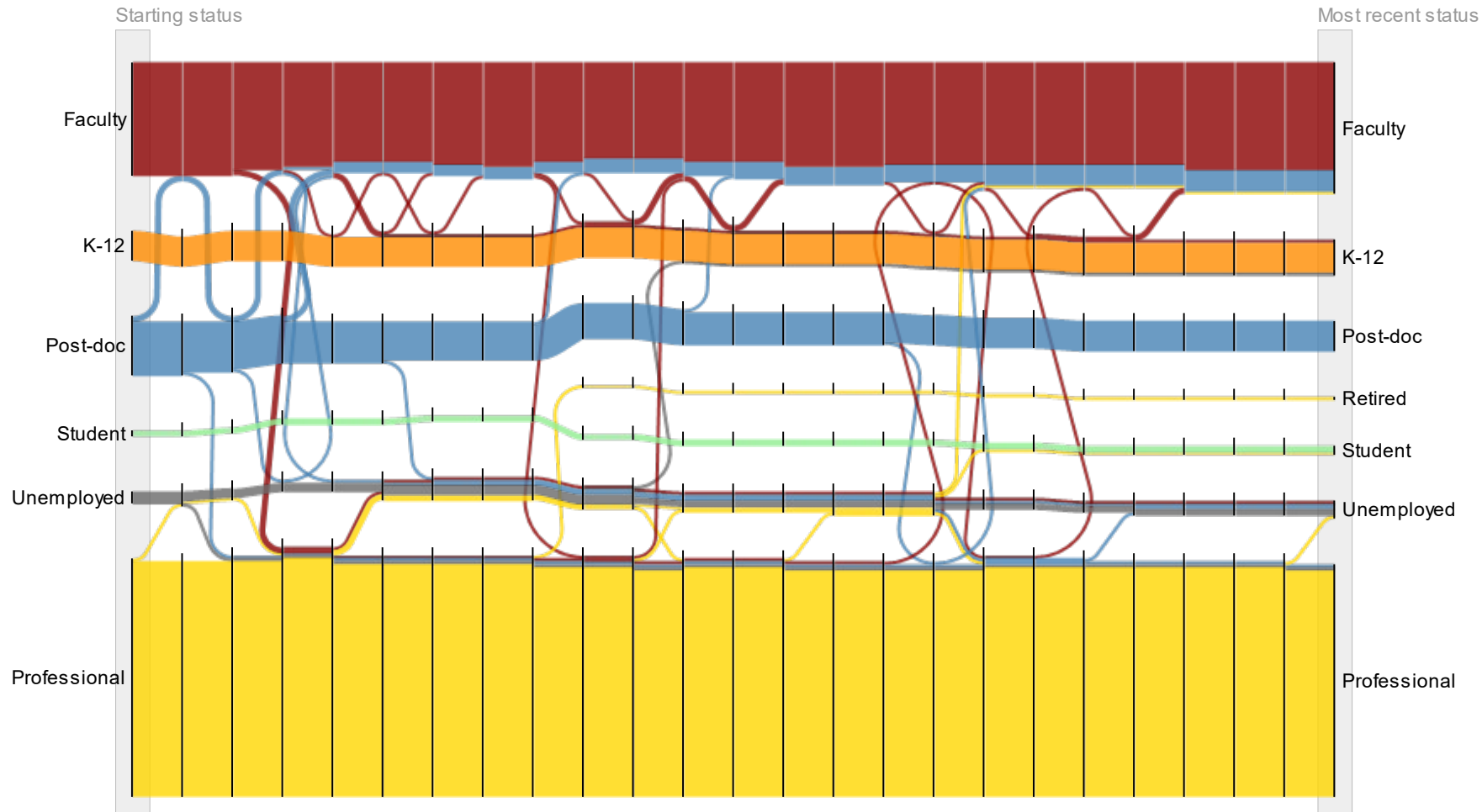


Career trajectories

Occupational status of graduate degree recipients, classes 2014-2018

Most movement is for post-docs finding jobs in academia and in non-academic positions.

Some temporary increase in unemployment.

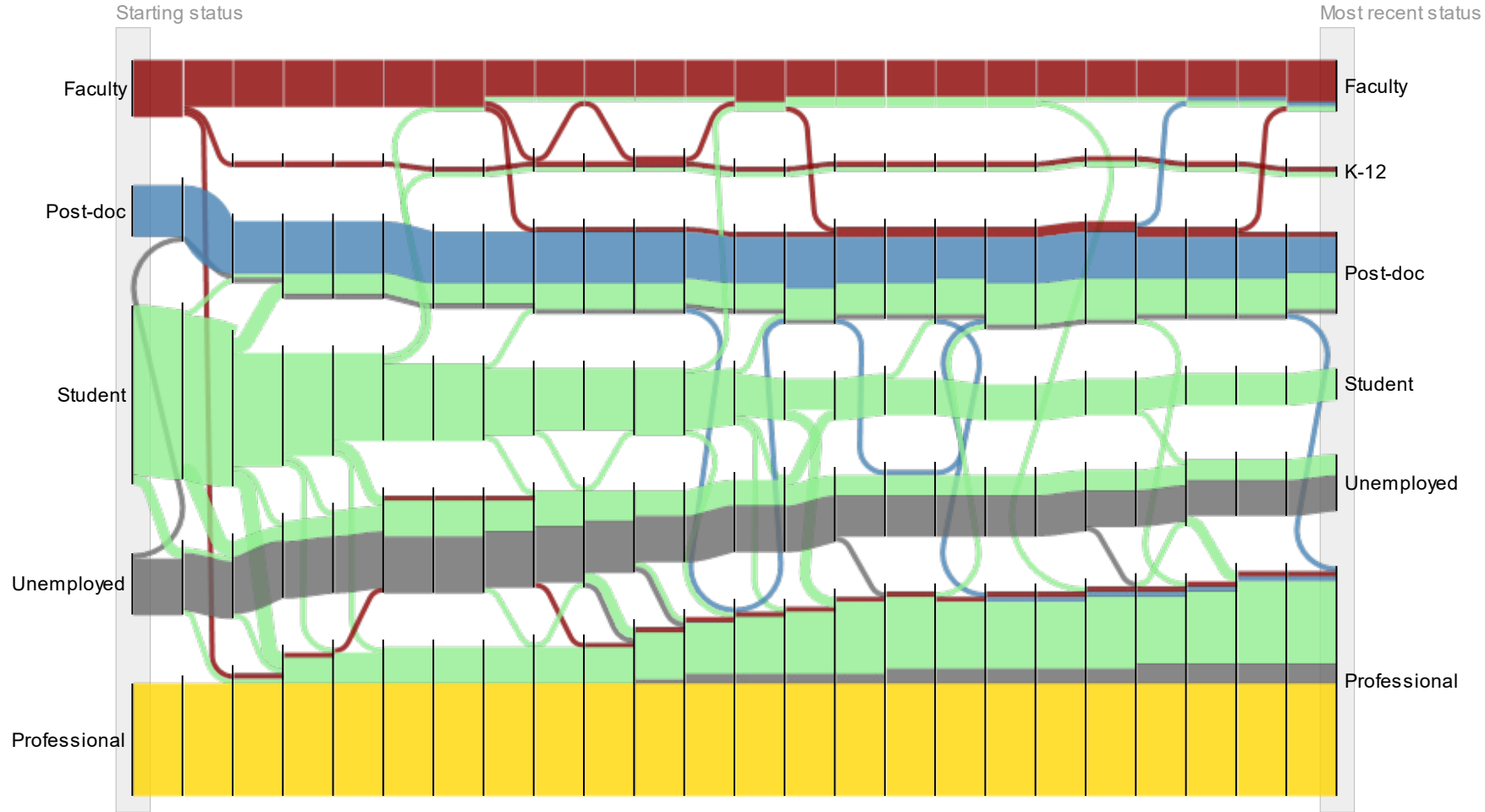


Career trajectories

Growth in post-doc and non-academic professions.

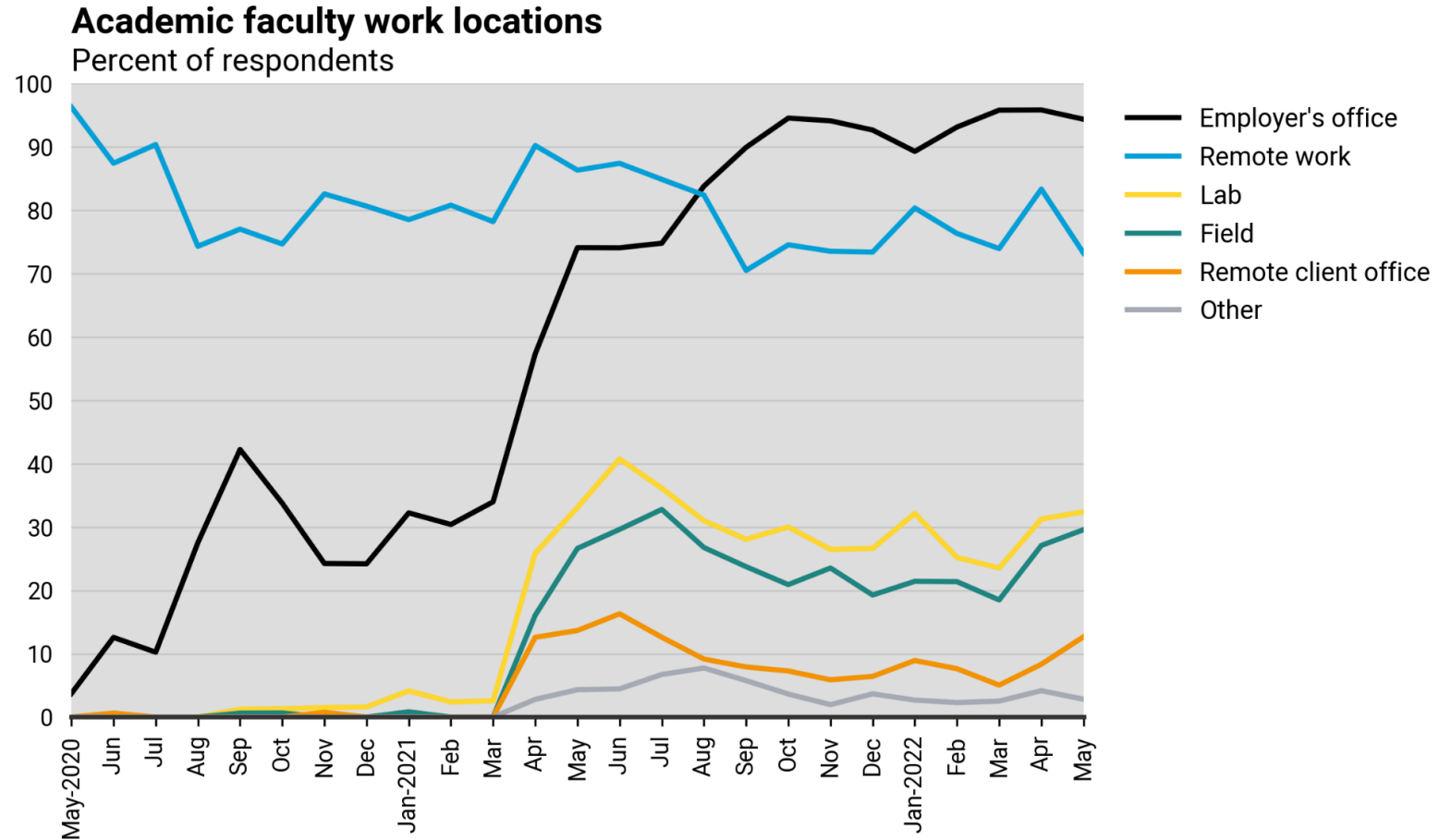
Some increase in unemployed graduates.

Occupational status of graduate degree recipients, classes 2019-2022



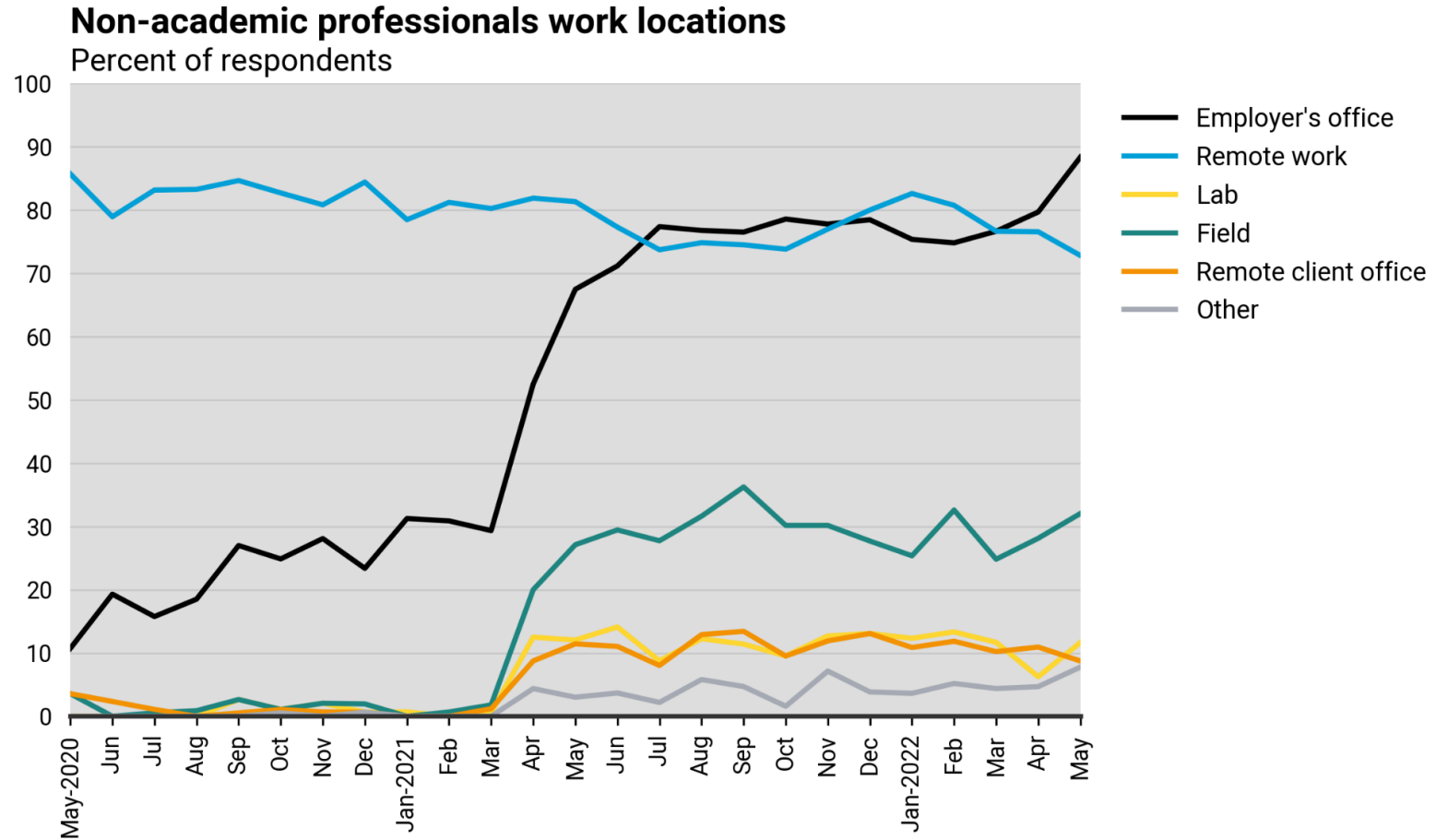
Work locations of academic faculty

Remote work persists even with a return to in-office / on-campus work, although not as a primary work modality.



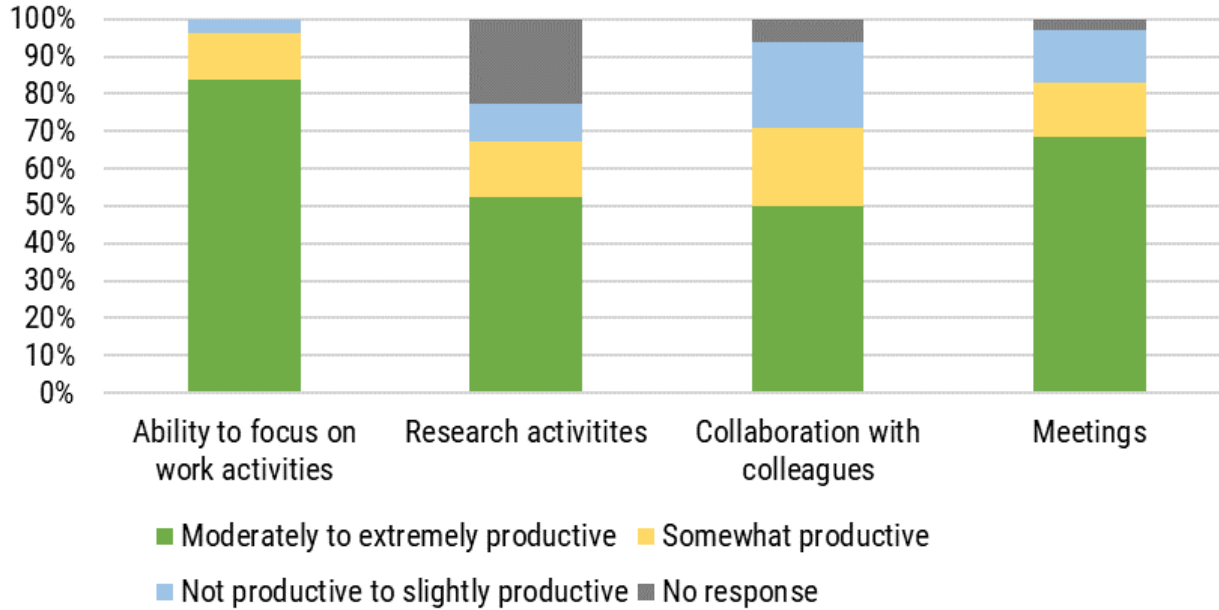
Work locations of non-academic professionals

Remote work remains a primary work option for most employees with over half of employees reporting working more than half-time from home.

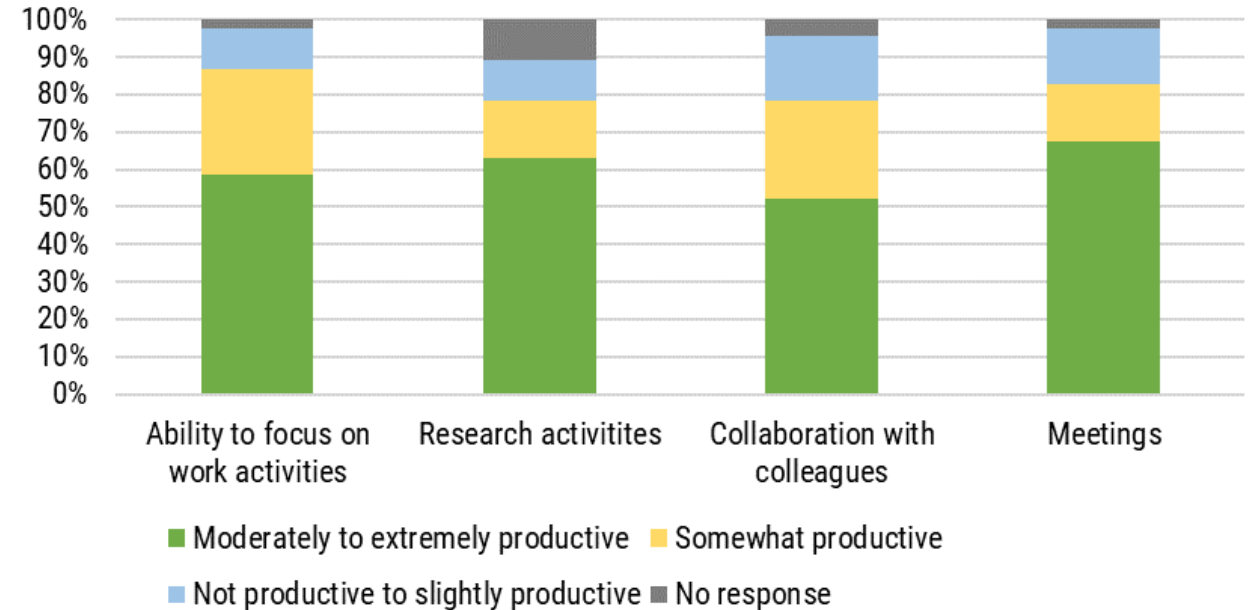


Remote work productivity

Productivity working from home with select activities
graduate degree holders graduating before 2014



Productivity working from home with select activities
graduate degree holders, Classes 2014-2022

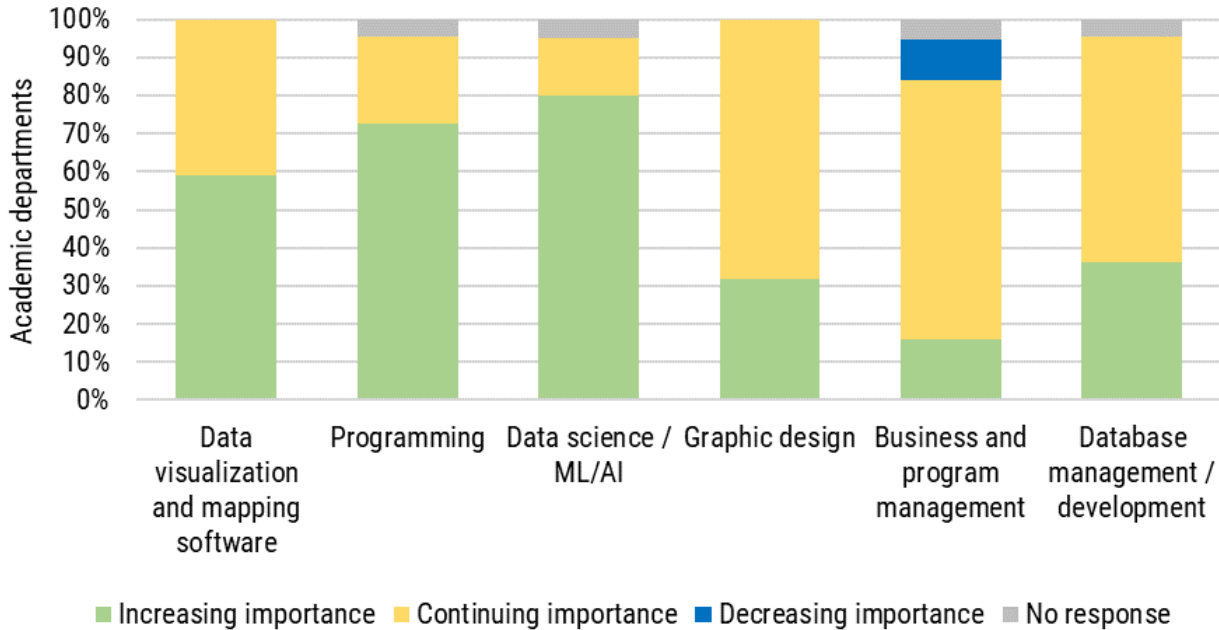


Pandemic impacts on graduate students

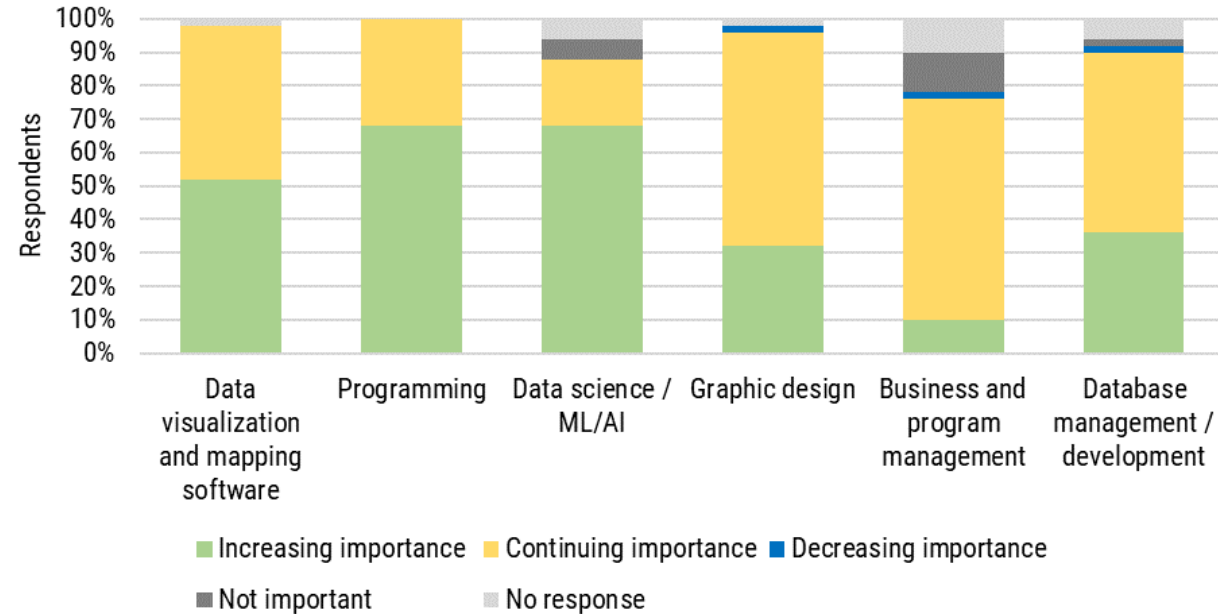
- How have academic programs changed?
- How have graduate-degree recipients fared?
- **How have technical and virtual skills changed?**
 - Importance vs. proficiency
 - Academic program integration / expectations
 - New hire skillset expectations
- What are the current trends for hiring?

Importance of skills to the profession

Importance of select technical skills, academic departments



Importance of select technical skills, graduate degree holders, Classes 2014-2022

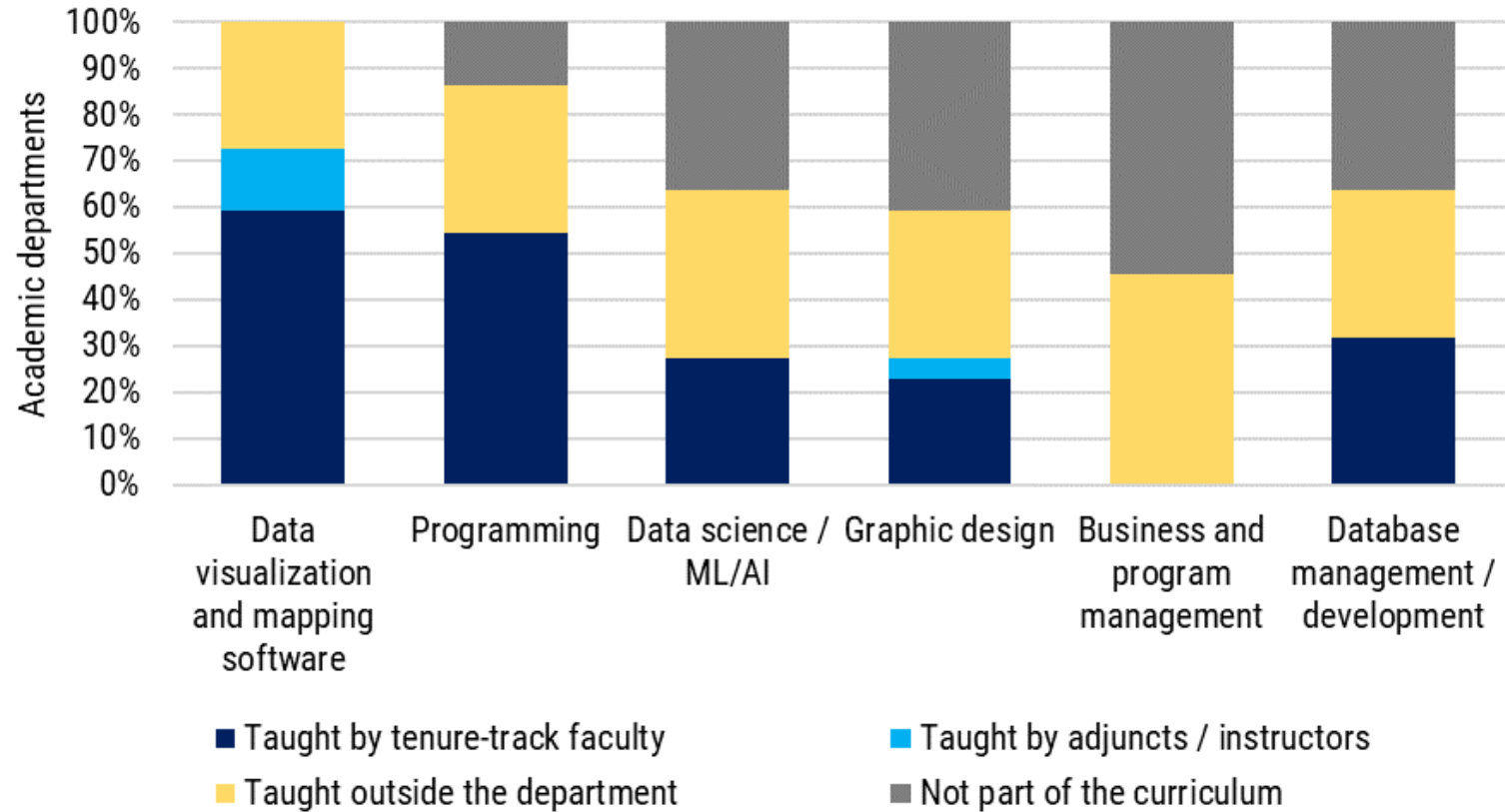


Where are skills taught in the curriculum?

Most skills taught either in the department or outside of department.

Business skills are generally not included in the curriculum, despite departments reporting these skills as continuing in importance to the profession.

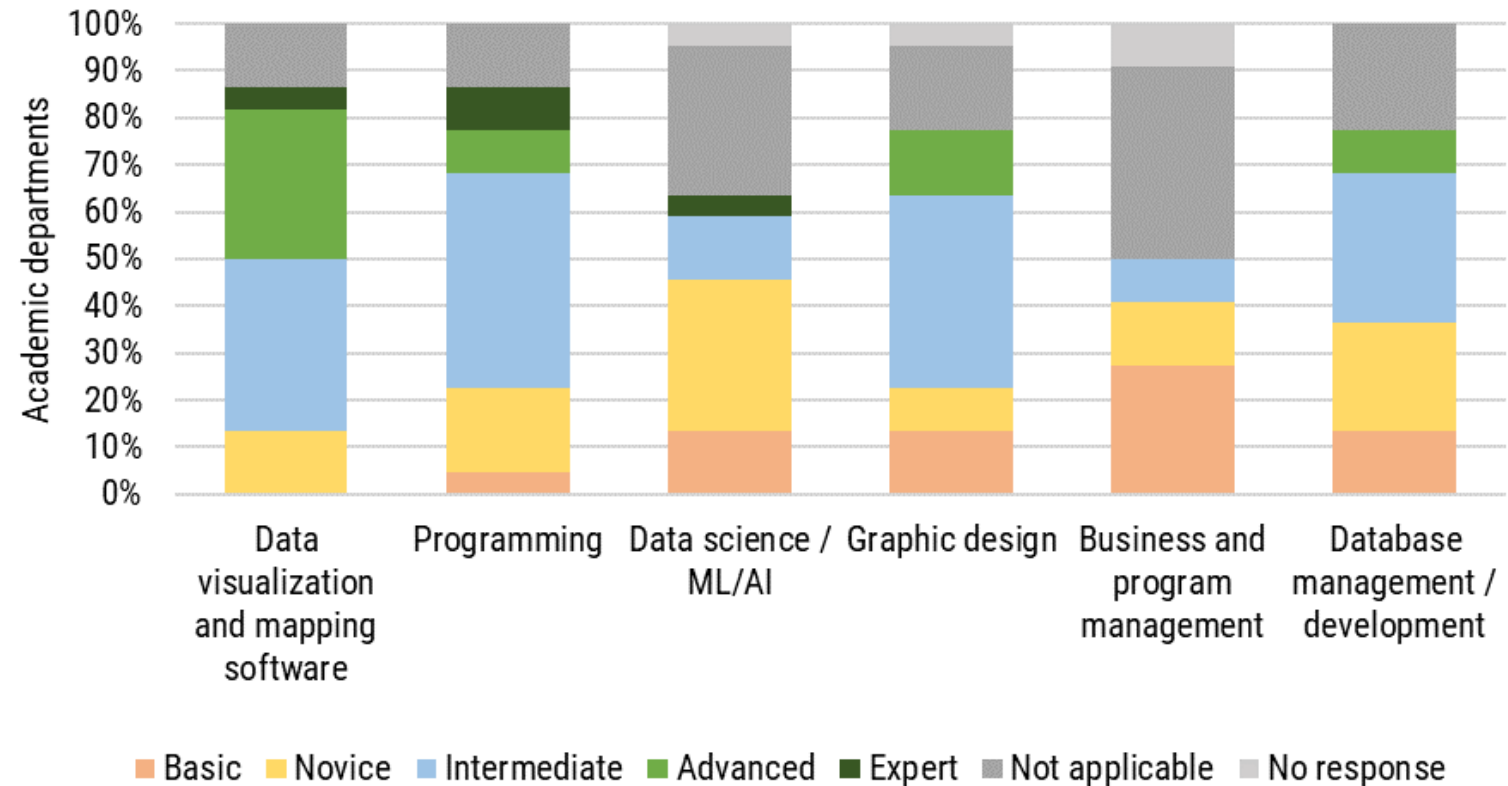
Incorporation of skills in academic programs



Expected proficiency of graduate students

Most departments expect graduate students to have working proficiency with data visualization, programming and graphic design.

Expected proficiency upon graduation, graduate students

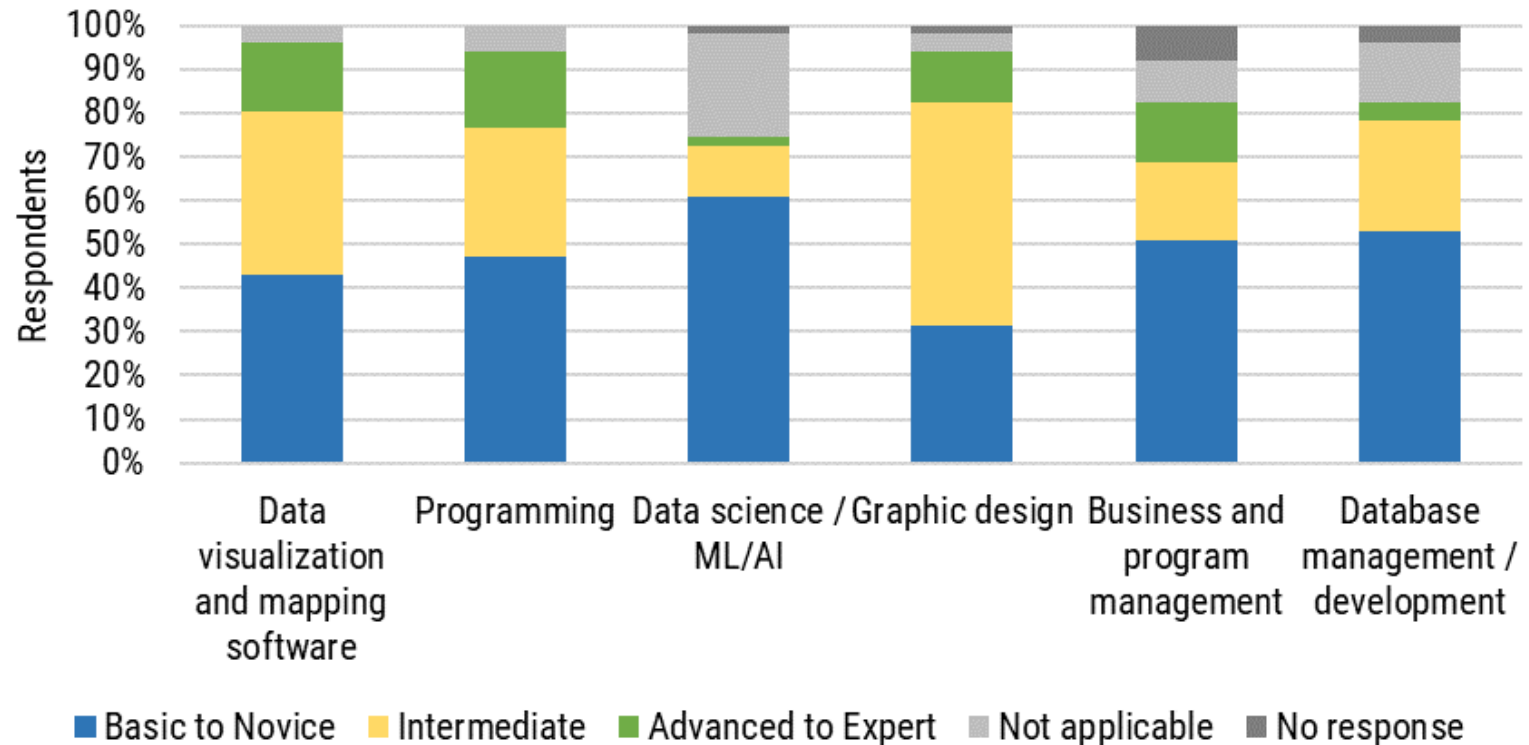


Proficiency with skills, graduates

Skills graduating students wished they had prior to graduation:

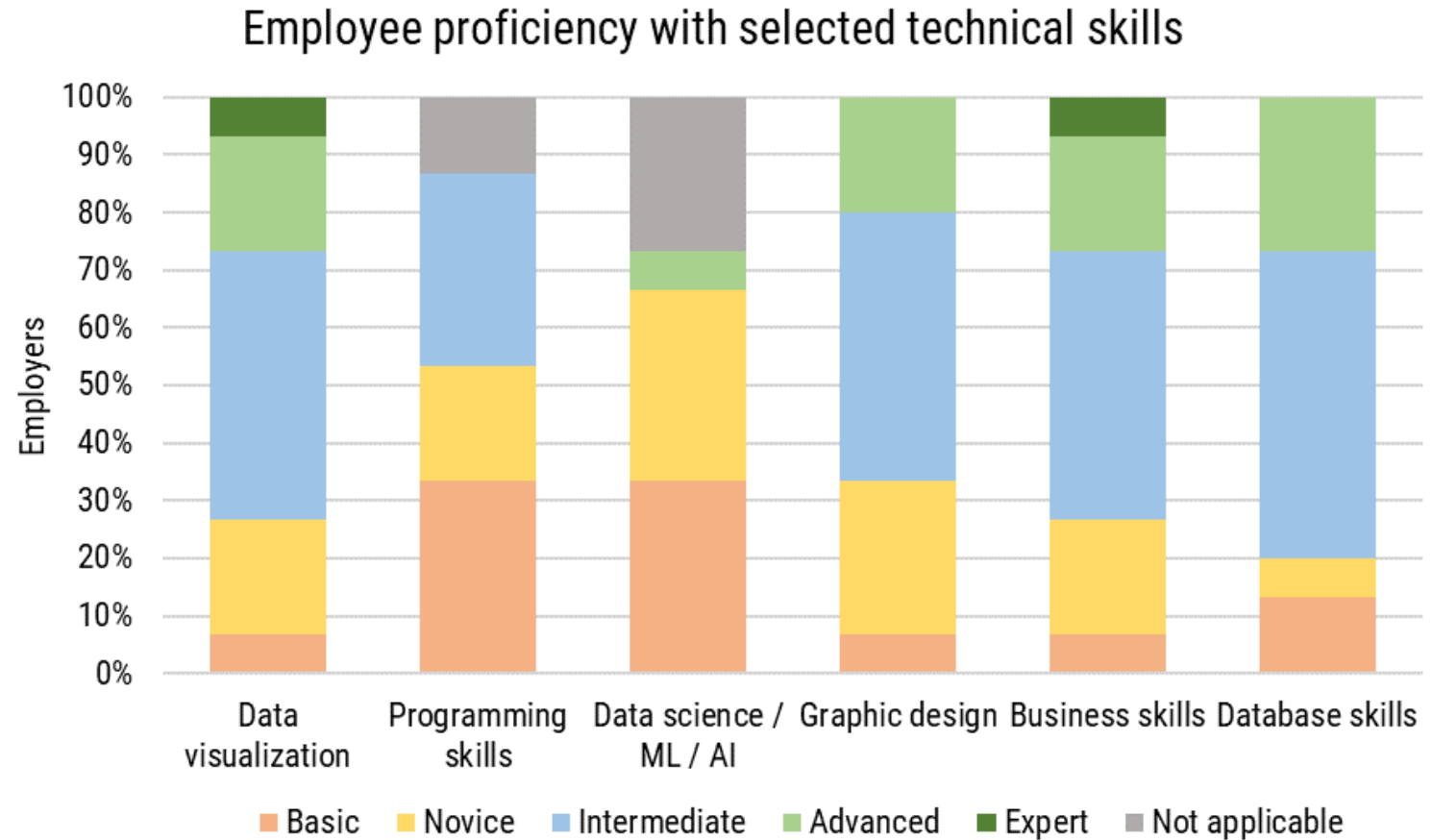
- Data science
- Programming
- Data visualization
- Database management / development

Proficiency with select technical skills
graduate degree holders, Classes 2014-2022



Proficiency of employees across skillsets

Employees are most proficient with data visualization, business, and database skills.

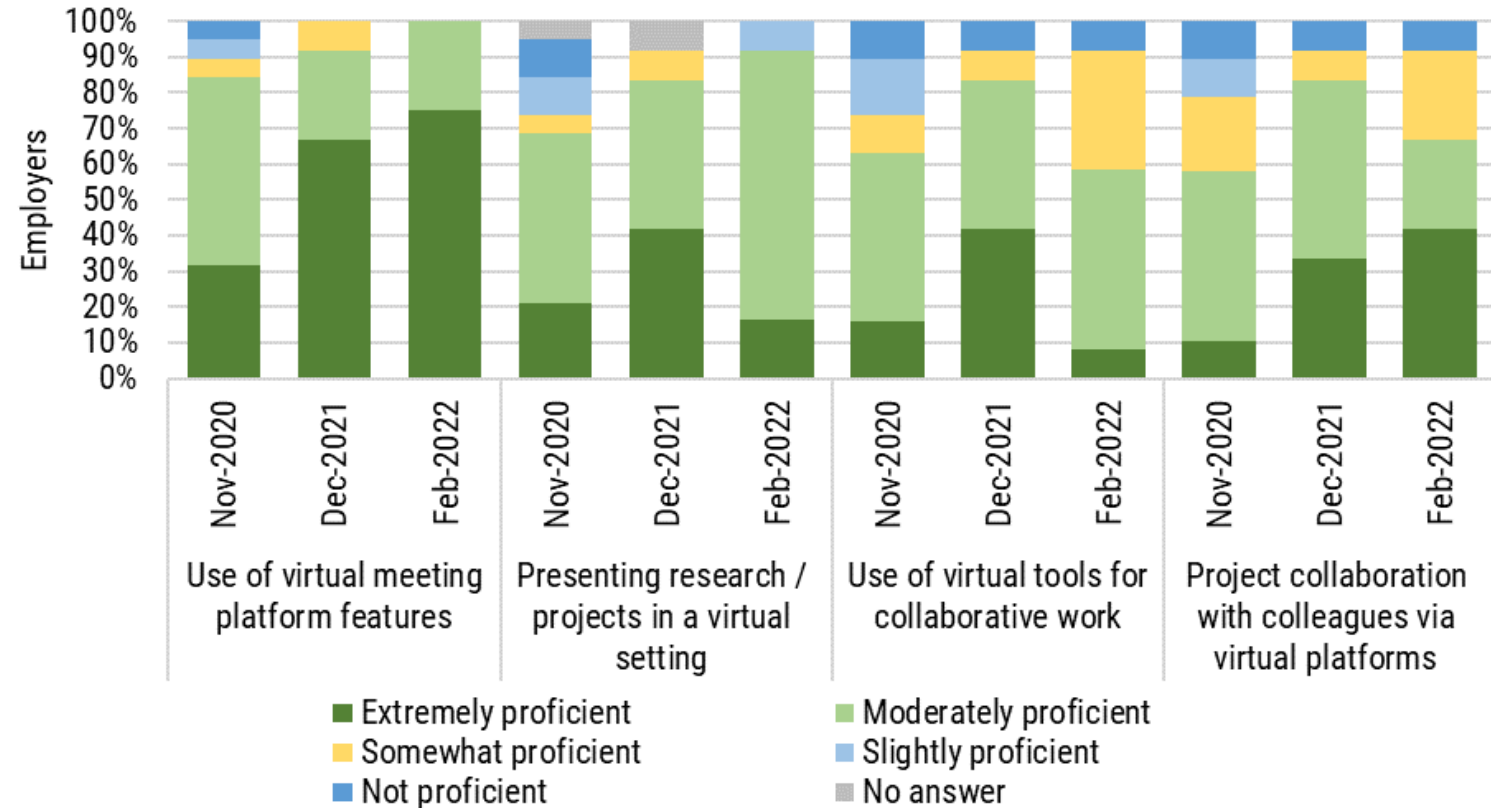


Proficiency of employees across skillsets

Increased proficiency across all categories.

Most improvement in project collaboration.

Employee proficiency with selected virtual skills



Skills employers want in new hires

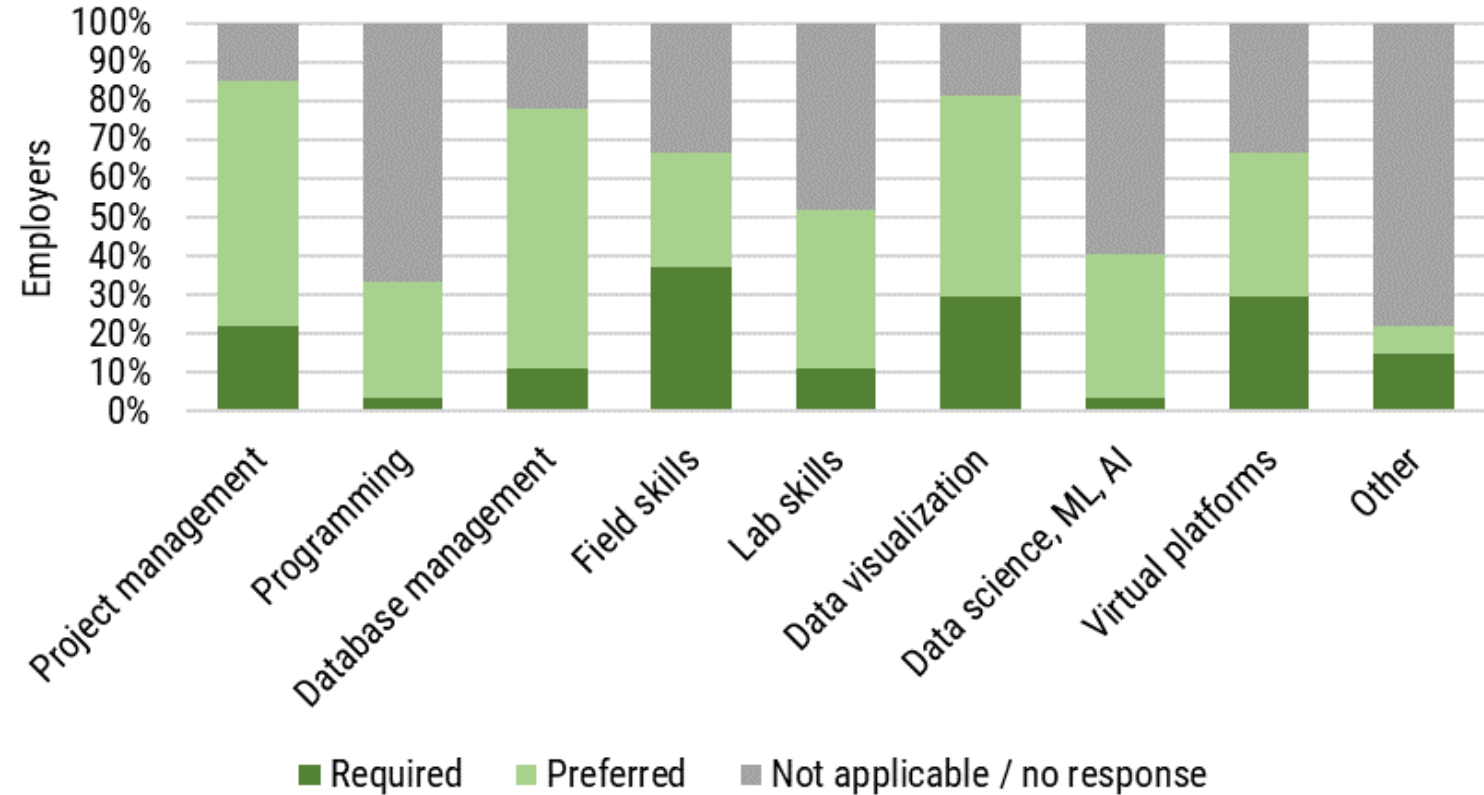
Top required skills:

field skills

proficiency with virtual
platforms

Proficiency with virtual
platforms is becoming
increasingly important.

Skills employers are seeking in new hires



Degree levels of new hires

Geoscience employers have traditionally hired at the bachelor's and master's level.

During the pandemic there has been an increase in hiring at the doctorate level.



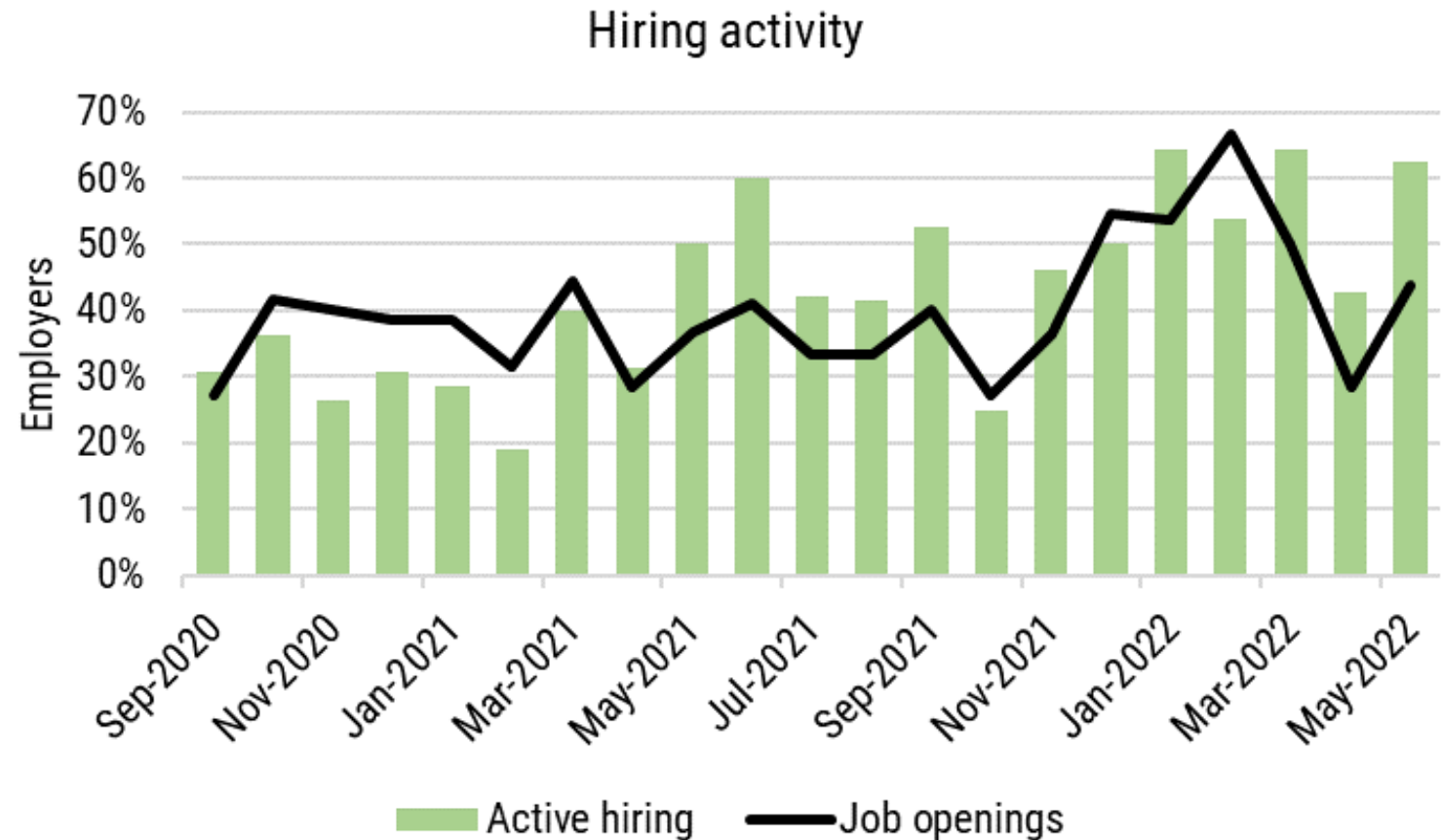
Pandemic impacts on graduate students

- How have academic programs changed?
- How have graduate-degree recipients fared?
- How have technical and virtual skills changed?
- **What are the current trends for hiring?**
 - Job openings and active hiring
 - Challenges with hiring and onboarding
 - Pandemic vs. pre-pandemic hires

Job openings and hiring

Hiring picked up in mid-2021 and then again in late 2021.

Job openings remained relatively steady, with an increase in late 2021.



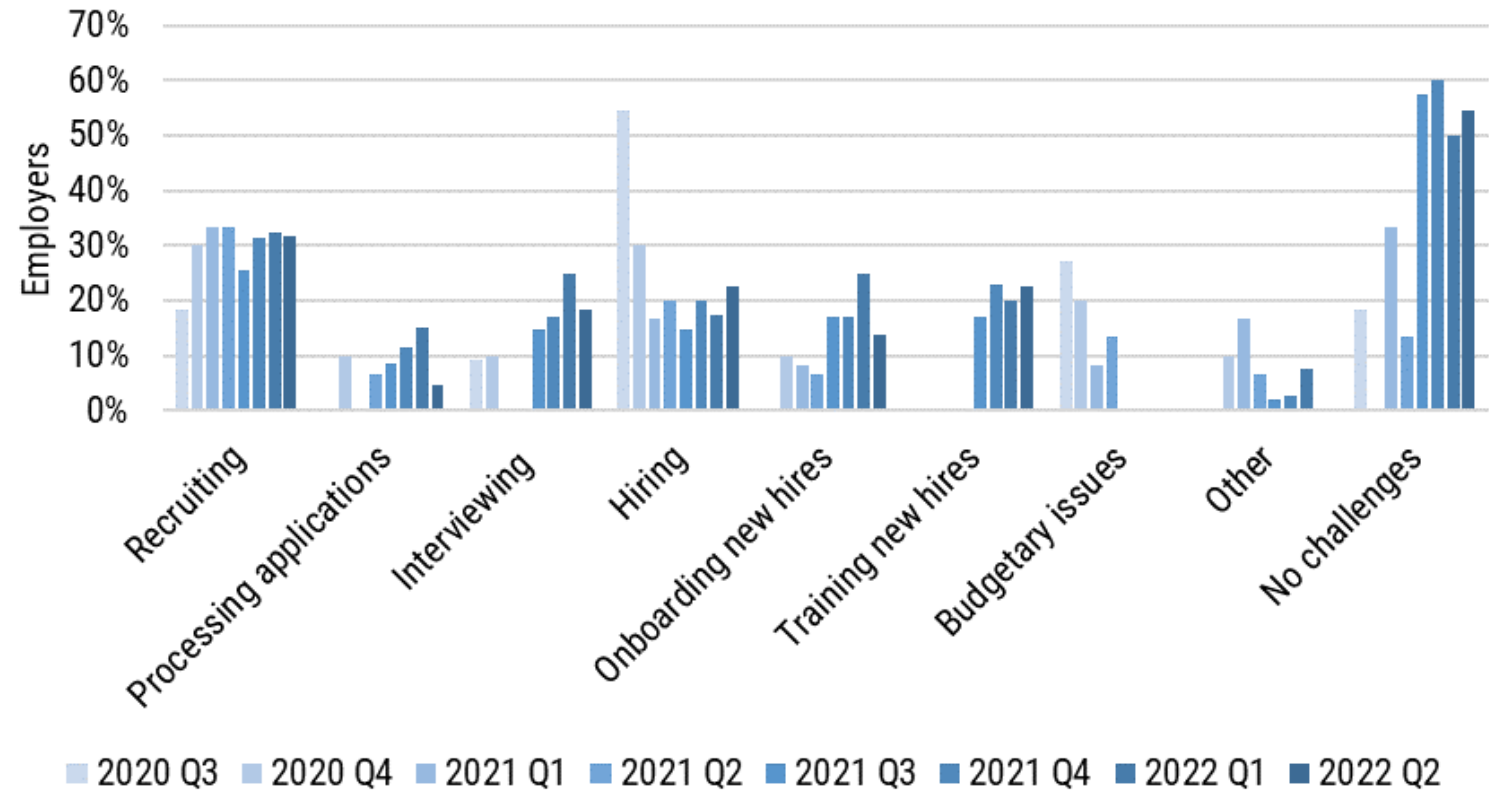
Challenges with finding and hiring talent

Increases in the percentage of employers reporting no challenges with finding and hiring talent.

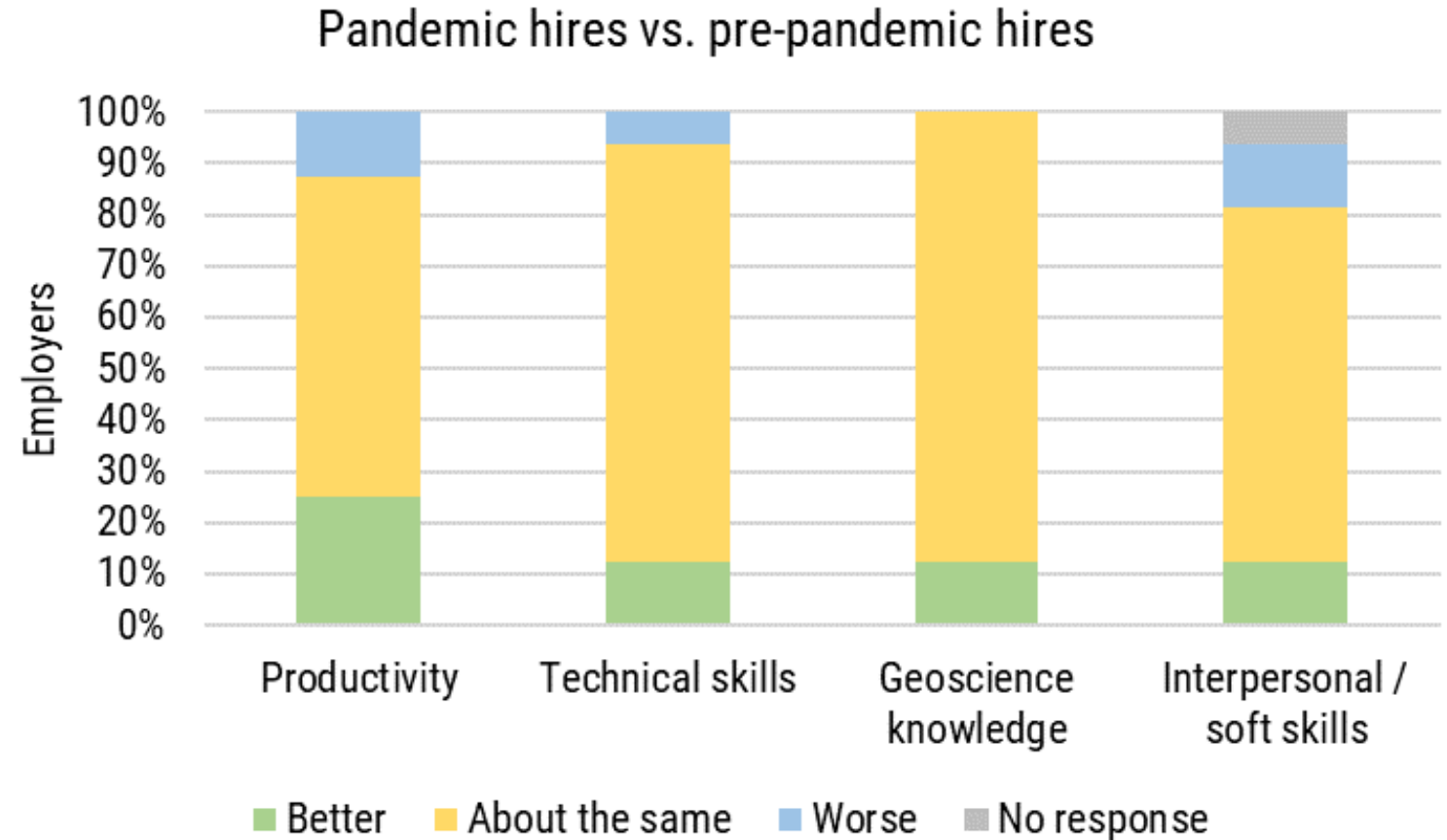
Recruitment continues to be an issue for employers.

Onboarding new staff, especially into remote working environments, remains a challenge.

Challenges with recruiting, hiring, and onboarding activities



How are pandemic new hires doing?



Thank you!

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