COVID-Related Impacts on STEM Students: Findings Summary and Recommendations

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July 2020
https://wise.arizona.edu/research

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Background

- Students overall have experienced negative impacts to their academic experience and progress due to the COVID pandemic (Daniels et al. 2020).

- STEM degree programs have unique characteristics and challenges.

- Prior to COVID, many STEM fields already had significant gender and race-based disparities in enrollment, persistence, and graduation.

Research Questions:

1. How is the COVID-19 pandemic impacting STEM student academic experiences; professional and career development; and academic progress and persistence?
2. Are particular groups of students being impacted more than others?
3. Are there indications that the COVID-pandemic could exacerbate already existing inequities?

Methods and Sample

- A confidential Qualtrics survey was administered between 5/4/20 – 5/29/20.
- The survey addressed three areas: 1) STEM academic experience and progress; 2) STEM persistence; and 3) STEM related career and professional development.
- Data were not weighted. Means were compared and differences between groups were tested using a t-statistic ($p < 0.05$).

Undergraduate Sample
403 respondents (3% of all UA STEM undergrads)
67% Women
57% White
77% In-State
64% College of Science

Graduate Sample
95 respondents (3% of all UA STEM grads)
53% Women
64% White
24% International
53% College of Science
69% RAs / 26% TAs

More on Sample: https://wise.arizona.edu/research

* Based on Fall 2019 enrollment

Findings and Recommendations

1. Academic Experiences
2. Professional and Career Development
3. Funding and Progress to Degree
4. Vulnerable Populations

Academic Experiences

Recommendation 1: Develop standardized policies for how information is shared with students and how expectations are communicated in online contexts.

38% of undergraduate respondents reported being dissatisfied with the quality of STEM classes since moving online.

Difficulty keeping track of assignments and communicating with instructors were commonly cited challenges.

"Some professors are doing great with helping and some aren't. Some professors did not move anything back or drop any assignments and I understand that being a professor is extremely difficult in a way I won't understand but not changing the course at all during this time is almost cruel."

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Recommendation 2: Dedicate substantive time to review key concepts from spring 2019 in fall 2020 course. Hold free standing review sessions in early fall 2020.

84% of undergraduate respondents reported they have faced challenges transitioning to online STEM coursework.

35% of undergraduate respondents reported being concerned they would not learn enough in online STEM classes to proceed with their academic program as planned.

"While I still was able to keep up, I am not confident in all of the content presented to me and it worries me to think I am underprepared for future courses because the transition online jolted my learning methods."

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Recommendation 3: Develop programs to better prepare and support graduate student teaching assistants to adapt to online teaching and integrate this training into existing TA trainings.

67% of graduate respondents who were TAs found the transition to online instruction moderately to extremely challenging.

"The overhead of learning ZOOM and trying to coordinate 10+ students in my office hours is way more difficult online than in person, as in person I had an office and could just tally my time to each student or explain things to multiple students on the whiteboard."

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Professional and Career Development

Recommendation 4: Evaluate the feasibility of scaling-up existing research opportunities and internships for STEM students in academic year 2020-21.

58% of undergraduate respondents reported that the COVID pandemic had a **negative impact** on their involvement in required research or projects.

62% of undergraduate respondents reported that a research experience or internship had been **cancelled or postponed** due to the COVID pandemic.

"Hands-on research internships in labs that I applied for over the summer have been cancelled and replaced with a virtual training. Although I am grateful, it won't be the same learning experience in conducting actual research. I may have a harder time finding another position/job once I return to campus in the fall as well."

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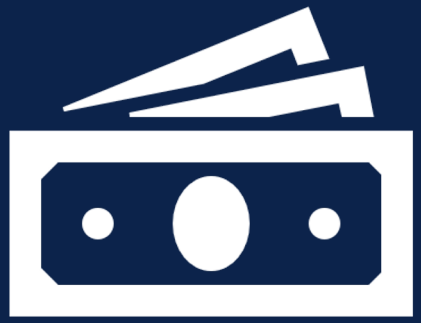
Recommendation 5: Ensure that graduate students are being prepared for non-academic, as well as academic, career paths in order to support broad workforce readiness.

65% of graduate respondents cited negative impacts such as limited job prospects during economic recession and a scarcity of academic available positions.



"I was already thinking about leaving academia after graduating from my doctoral program and after seeing the impact this crisis has had in the university, in terms of funding, enrollment uncertainties, etc., I definitely want to leave academia and will pursue a STEM career in industry."

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Funding and Progress to Degree

Recommendation 6: Develop greater support infrastructure to assist graduate students whose research agenda has been slowed, interrupted, or cancelled.

76% of graduate respondents reported that a job, research experience, or internship had been cancelled or postponed due to the COVID pandemic.

65% of graduate respondents thought that the COVID pandemic had a negative impact on their involvement in research or projects required for their academic program.

"It will take longer for me to graduate with my PhD. I am anticipating maybe a semester to a year? It really just depends on when I can do field work."

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Recommendation 7: Adopt clear, consistent guidelines on funding and progress to degree timeline modifications.

61% of graduate respondents report expecting negative impacts on their STEM academic paths

26% of graduate respondents reported considering delaying graduation as a result of the COVID pandemic.

"The number of days I am allowed to perform research on-site in my lab, has been limited from 5 days per week to 1 day per week. This has greatly inhibited my ability to make progress on my research projects which are necessary for my graduation. Due to these delays, it seems like I will have to extend my enrollment at the university which is a financial strain. The stress of this situation has made me less productive overall."

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Vulnerable Populations: Under-represented Students and Caregivers

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Recommendation 8: Bolster STEM diversity and inclusion programs so as to mitigate the existing structural barriers that may be exacerbated by the COVID pandemic.

Undergrad Group	AVG # of Challenges Reported
URM Men	3.78
URM Women	3.67
White Women	3.49
White Men	3.10

Undergrad SES Group	AVG # of Challenges Reported
Low Income	3.96
Middle-class	3.53
Upper-class	3.20

Caregiving and Increased Vulnerability

Undergraduate Group	% of Total Respondents (n=403)	% of Caregivers (n=114)
Women	(270) 67%	(85) 75%
Native American	(12) 2%	(10) 7%
Latinx/Hispanic	(86) 17%	(34) 25%
Low Income	(128) 32%	(45) 39%
CALS	(76) 19%	(32) 28%

Graduate Group	% of Total Respondents (n=95)	% of Caregivers (n=12)
Men	(41) 43%	(8) 67%
Latinx/Hispanic	(9) 10%	(2) 17%
Low Income	(33) 35%	(8) 67%
CALS	(10) 11%	(4) 33%

Recommendation 9: Encourage and enable flexibility in curricular and course expectations in order to facilitate persistence and success among students who have had to take on additional caregiving responsibilities due to COVID.

28% of undergraduate respondents and **13%** of graduate respondents have taken on additional COVID-related caregiving responsibilities.

Caregiving students cited **more challenges** on average than non-caregiving students.

"I've had to babysit more on top of trying to focus on my zoom online classes and do homework. I've had to do all of my parents grocery shopping and anything that is outside because they still work and have to quarantine themselves."

"If schools and daycare stays closed, I will not be able to complete my degree requirements."

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Where do we go from here?

Breakout Groups

Thank You

Please feel free to reach out!

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