

Patterns and Outcomes of Electronic Mentoring Among Engineering Graduate Students During the COVID-19 Pandemic



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National Science Foundation
WHERE DISCOVERIES BEGIN

Acknowledgment -

Funded by the NSF RAPID program (DGE-2051263; DGE-2031069), using funds from the Coronavirus Aid, Relief, and Economic Security (CARES) Act

The challenges facing grad students due to the coronavirus (opinion)

Submitted by Katy Krieger on March 24, 2020 - 3:00am

As graduate students, we are often located in the liminal space of being both students and instructors. That means that during the time of the COVID-19

Students in great need of mental health support during pandemic

Submitted by Greta Anderson on September 11, 2020 - 3:00am

While the country continues to battle the coronavirus, college health professionals are also monitoring a

The pandemic has worsened equity gaps in higher education and work

Submitted by Paul Fain on June 17, 2020 - 3:00am

Even before the pandemic, higher education faced growing scrutiny about its role in contributing to severe societal equity gaps ⁽¹⁾ that afflict black and Latino

The importance of academic advising during and after the pandemic (opinion)

Submitted by Eric R. White on June 16, 2020 - 3:00am

With little warning, colleges and universities had to move from classroom to online instruction this spring. No doubt, it will take quite some time to

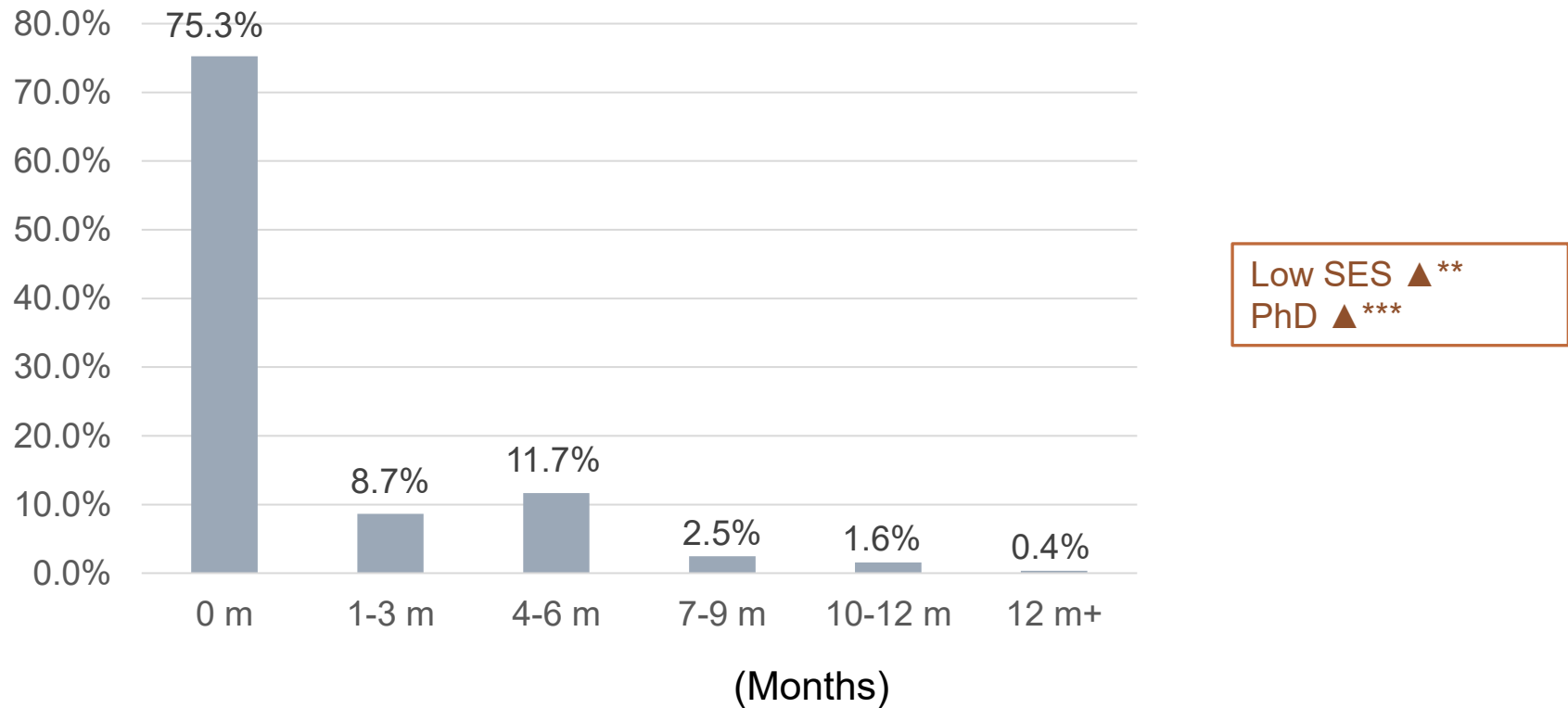
A National Survey of Engineering Graduate Students during the COVID-19 Pandemic

- **Part of National Study of STEM Faculty and Students during the COVID-19 Pandemic** (3,269 students; 1,052 faculty)
- 12-15 min online surveys (Qualtrics)
- Survey invitations sent to deans/associate deans in 214 engineering colleges
- June 3-22, 2020 (retrospect of experience in Spring 2020)

Background Characteristics of Survey Sample

- 566 engineering grad students (44 institutions in 16 states)
 - Female (40.3 %)
 - Black/Hispanic/Native American (13.8%)
 - Household experienced a loss of income (33.2%)
 - Disability (6 types; 12.0%)
 - International (36.4%)
 - PhD (38.7%)

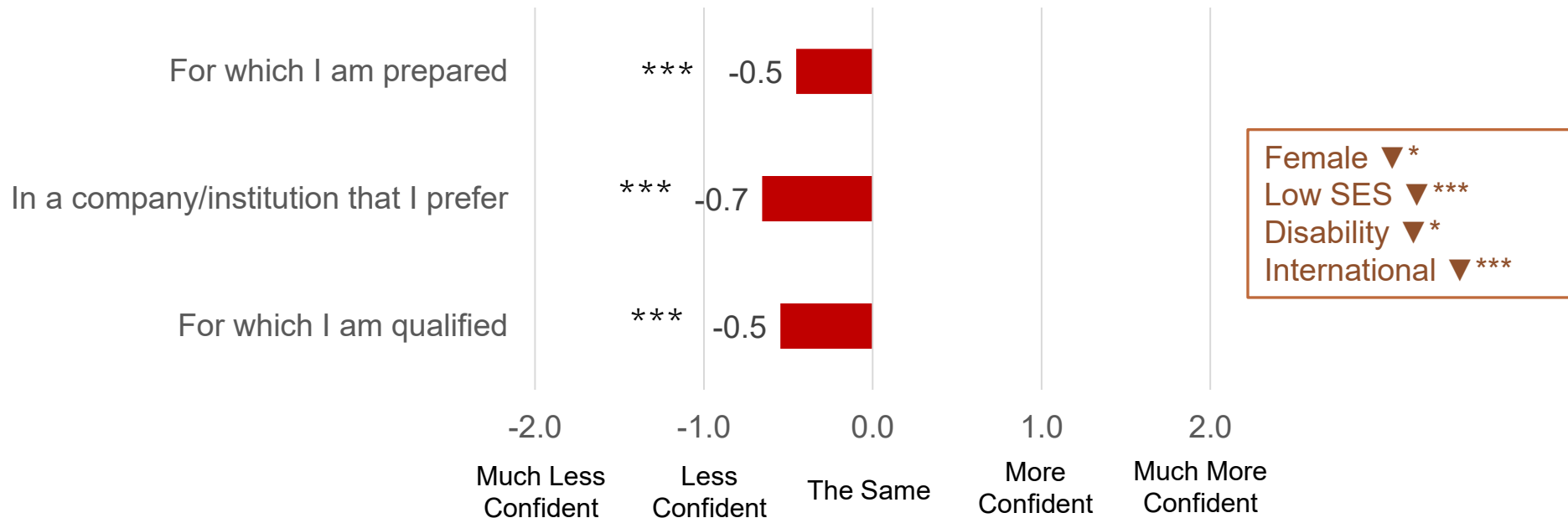
Delayed Graduation due to the COVID-19 Pandemic





Job Search Self-Efficacy

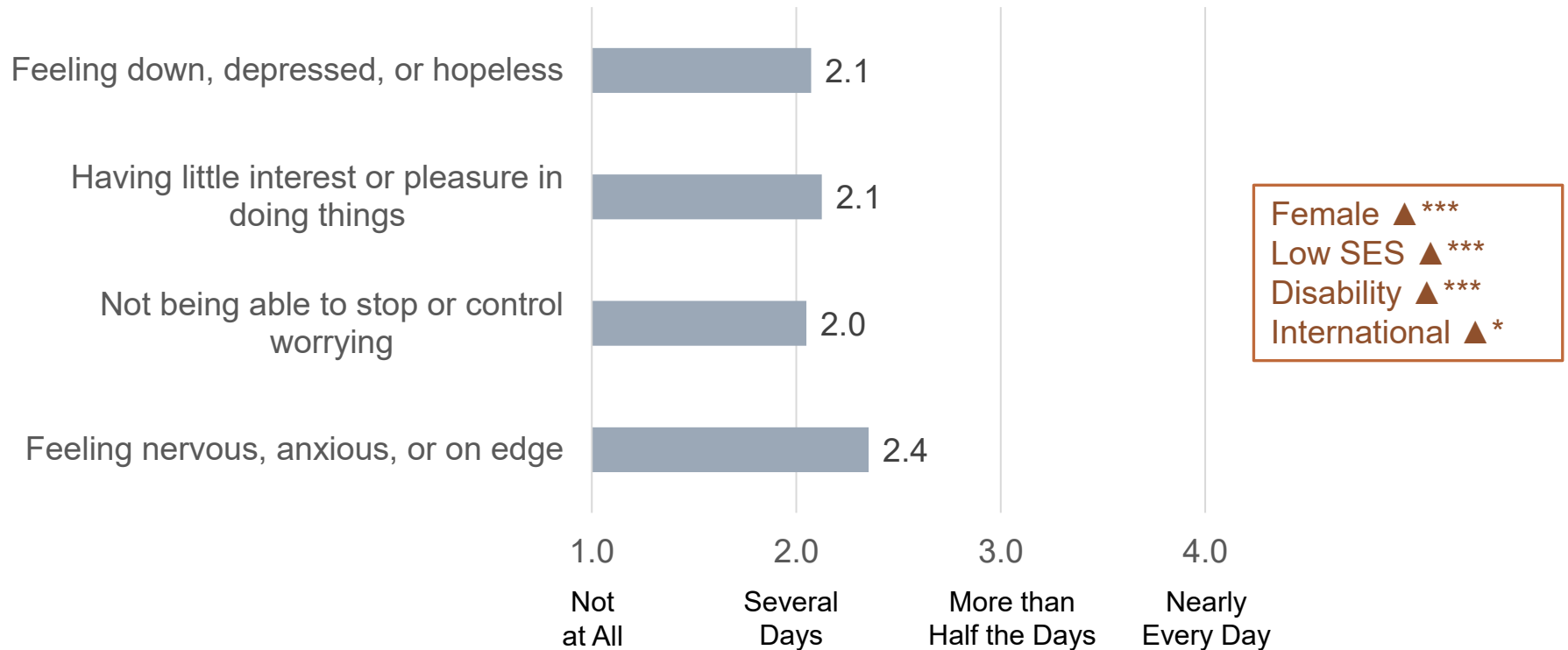
Since the COVID-19 outbreak occurred, how confident have you become in finding...



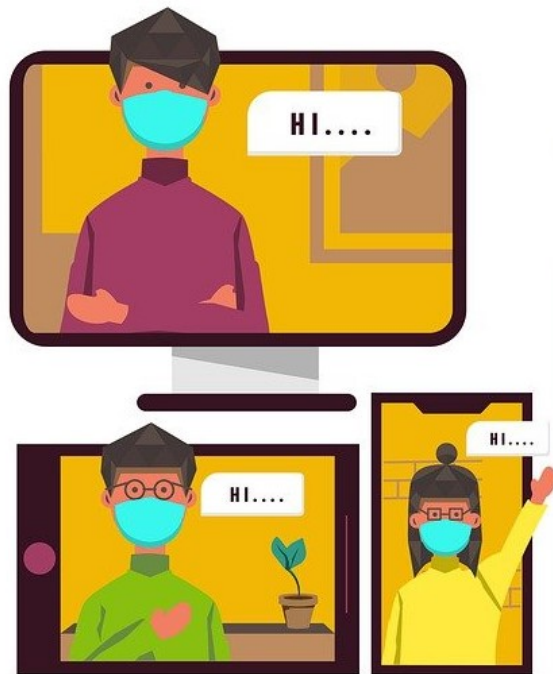
Mental Health Problems: Depression & Anxiety



Over the last 7 days, how often have you been bothered by the following problems?

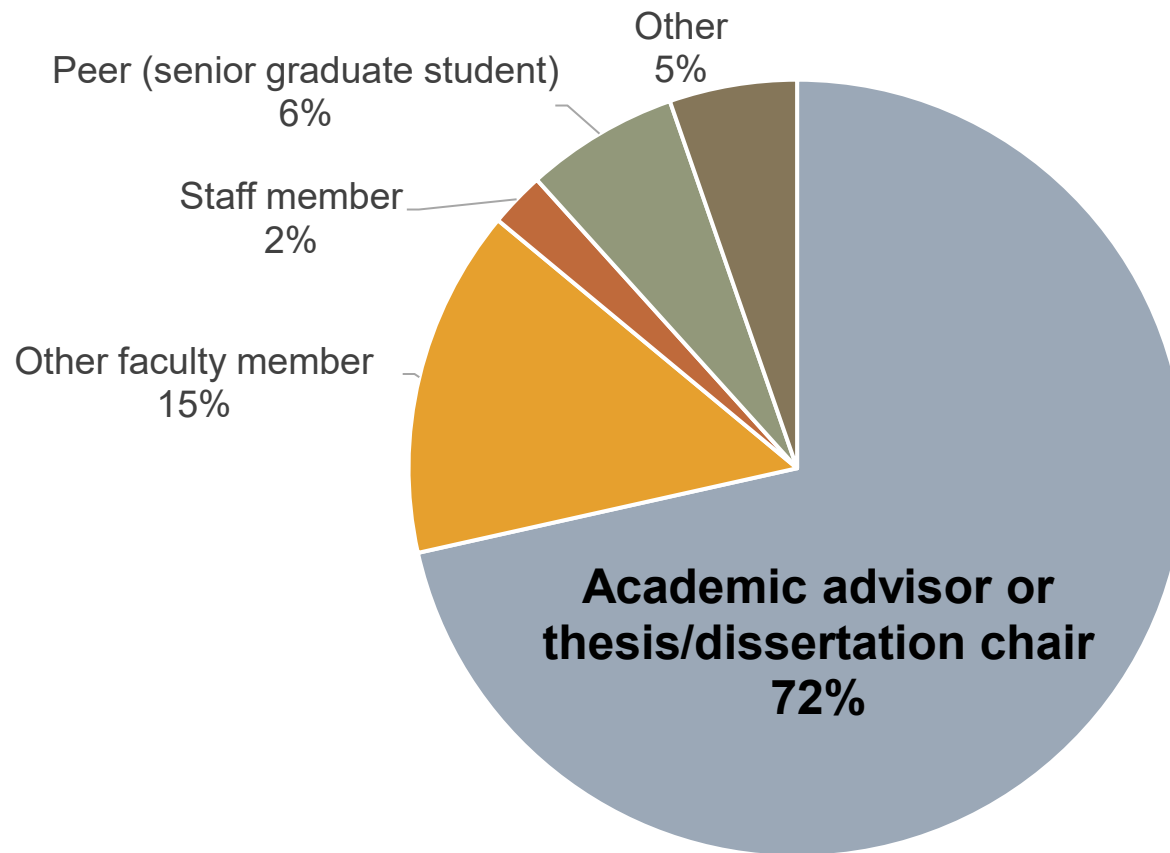


Can e-Mentoring Address these Challenges?



Primary Mentor on Campus

among 566 Engineering Graduate Students



e-Mentoring Frequency during the Pandemic

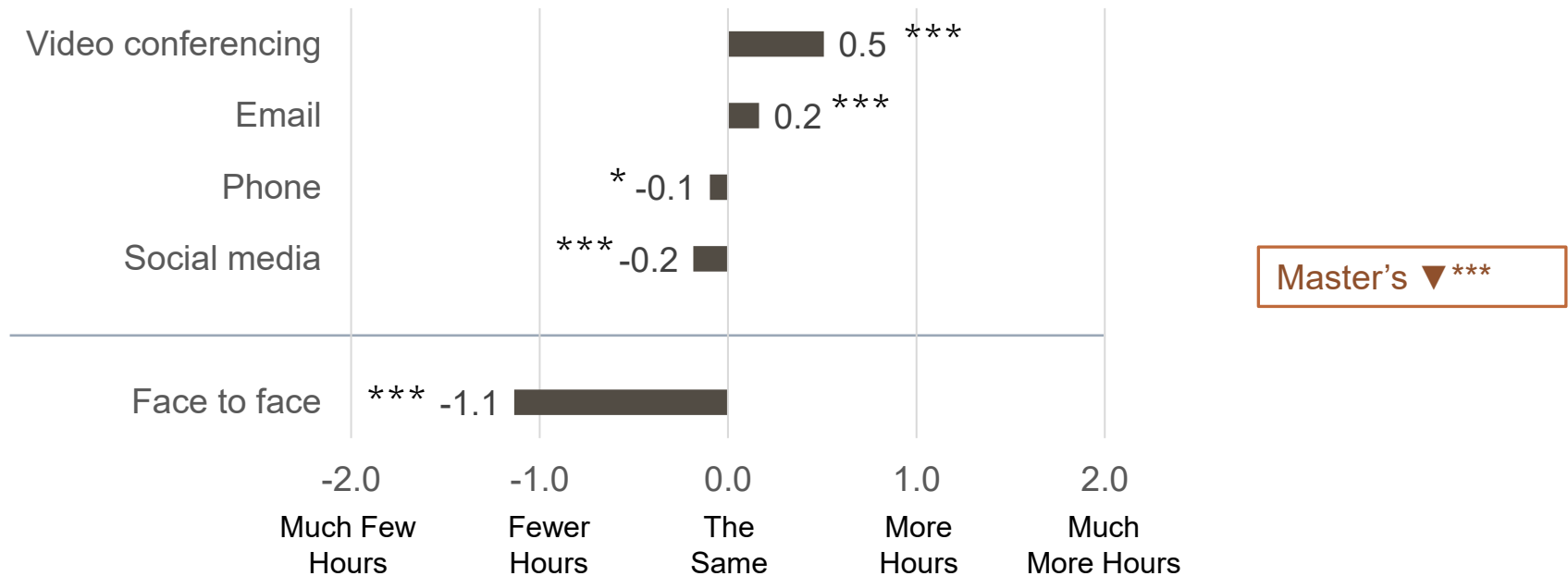
Poll: What is the main approach to interacting with your mentee/mentor during the COVID-19 outbreak?

Select one:

- ☐ Video Conferencing
- ☐ Email
- ☐ Phone
- ☐ Social Media
- ☐ Face-to-Face

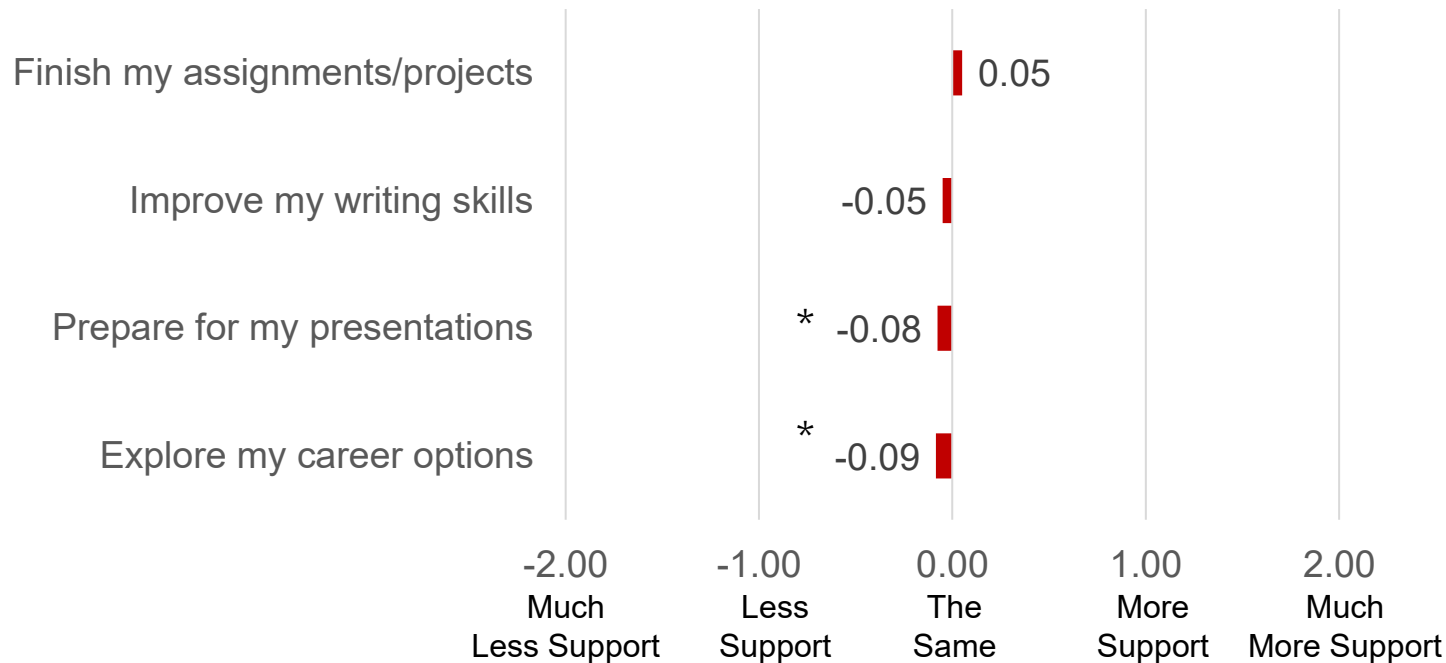
e-Mentoring Frequency during the Pandemic

among 566 Engineering Graduate Students



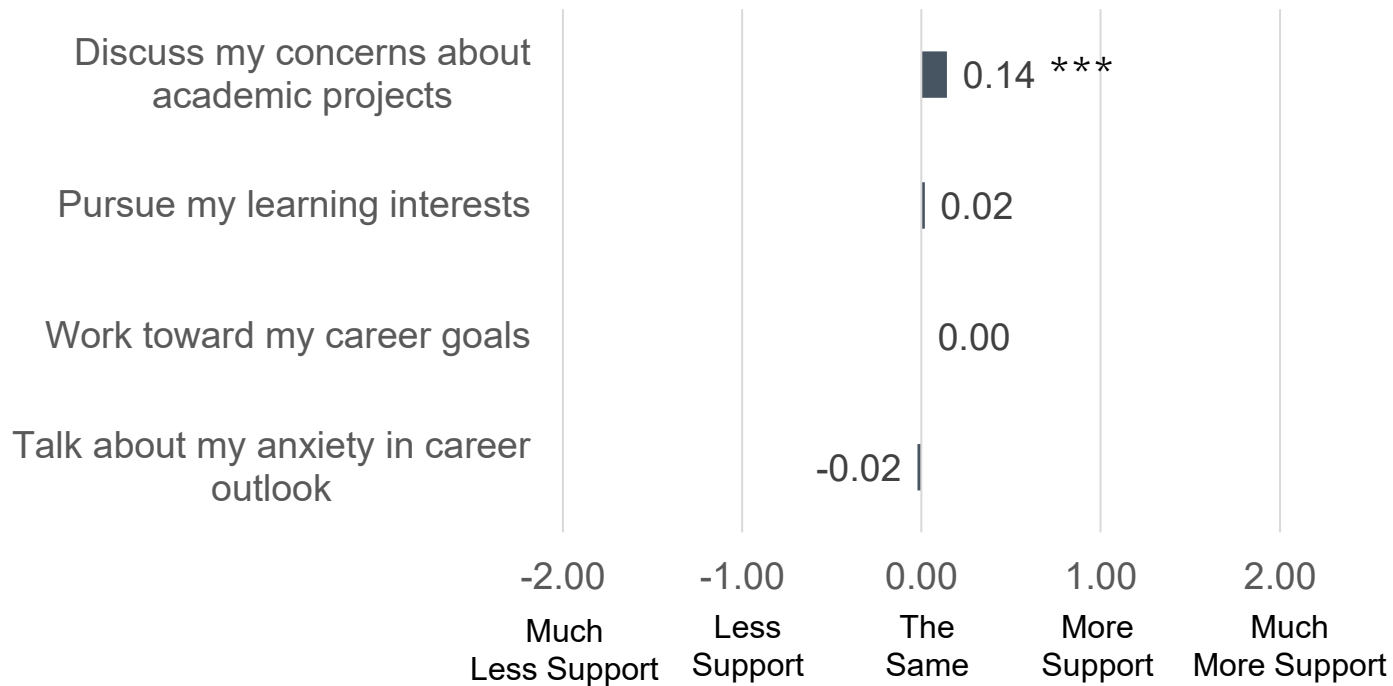
Perceived Instrumental Support

After the COVID-19 outbreak, my primary mentor provided more/less support to help me...



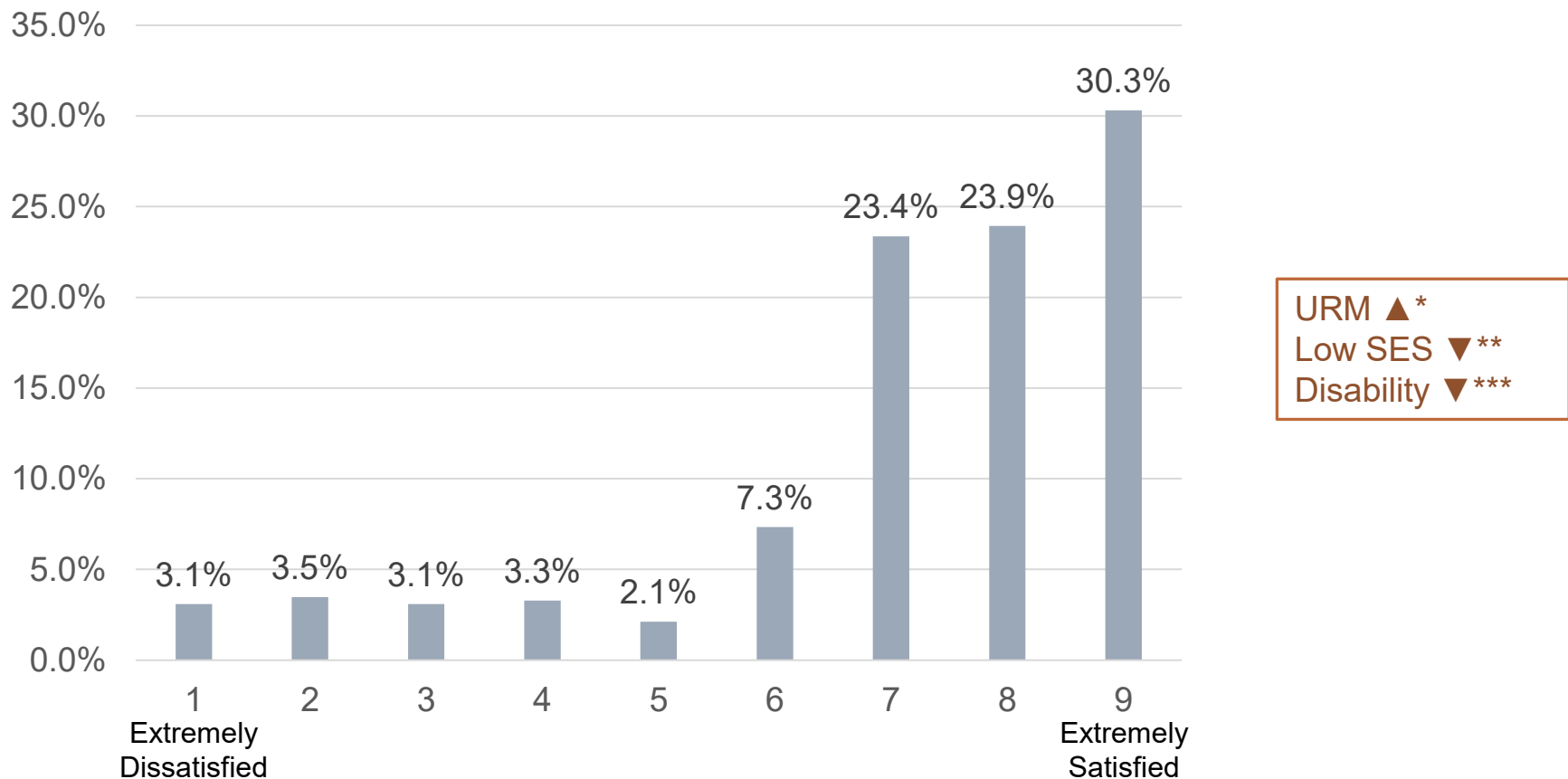
Perceived Psychosocial Support

After the COVID-19 outbreak, my primary mentor provided more/less support to encourage me to...

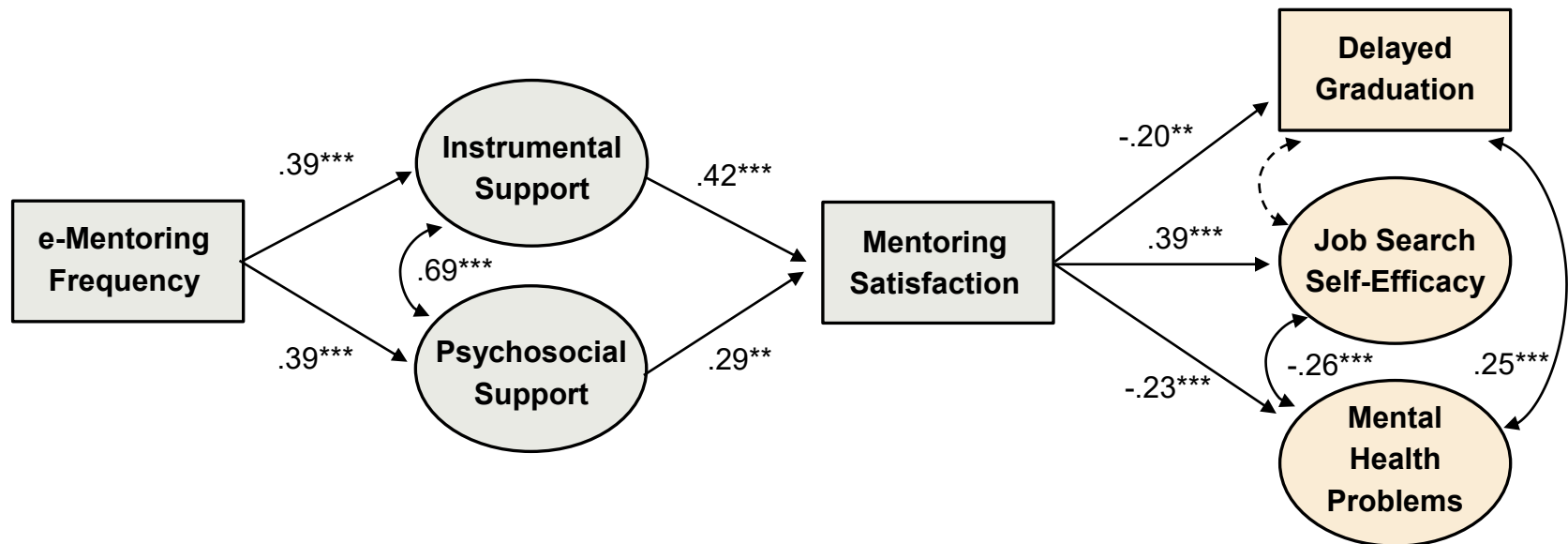


Mentoring Satisfaction

How satisfied were you with the support you received from your primary mentor during the pandemic?



How e-Mentoring Supports Student Outcomes during the Pandemic?



Note. Structural Equation Modeling (SEM) was employed. Good model fit (RMSEA=.03; CFI=.95; SRMR=.07). Demographics were controlled. Values are standardized path coefficients. Dashed paths are not statistically significant. * $p < .05$, ** $p < .01$, *** $p < .001$.

Attitude Toward e-Mentoring

For the following mentoring activities, which communication approach is more effective?

FF = face-to-face; **EC** = e-communication (e.g., email, phone, video conferencing, social media)

When a mentor helps me:

Finish my assignments/projects

*** -0.6

Improve my writing skills

*** -0.2

Prepare for my presentations

*** -0.6

Explore my career options

*** -0.6

Low SES ▼**

When a mentor encourages me to:

Discuss my concerns about academic projects

*** -0.6

Pursue my learning interests

*** -0.5

Work toward my career goals

*** -0.5

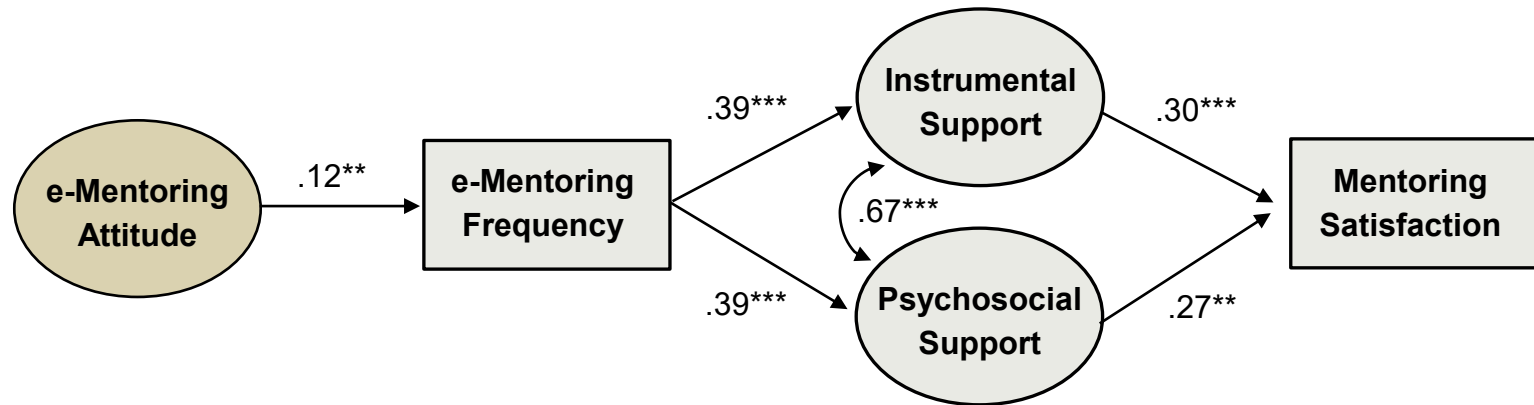
Talk about my anxiety in career outlook

*** -0.6

-2.0 -1.0 0.0 1.0 2.0

FF Much **FF** More Both Equally **EC** More **EC** Much
More Effective More Effective Effective Effective More Effective

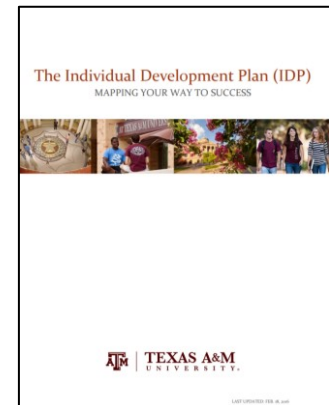
How does e-Mentoring Attitude relate to Mentoring Process and Satisfaction during the Pandemic?



Note. Structural Equation Modeling (SEM) was employed. Good model fit (RMSEA=.05; CFI=.93; SRMR=.05). Demographics were controlled. Values are standardized path coefficients. Dashed paths are not statistically significant. * $p < .05$, ** $p < .01$, *** $p < .001$.

Individual Development Plan (IDP)

- Promotes mentor-mentee interactions
- Self-assessing skills, exploring career goals/paths, and developing action plans
- Required by some universities and NSF/NIH funded programs



Individual Development Plan (IDP)

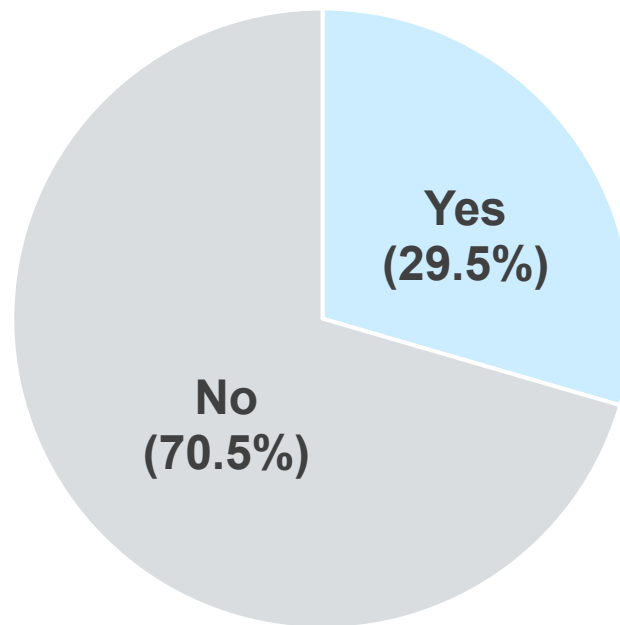
Poll: Have you ever used an IDP with your mentee/mentor?

Select one:

- ☐ Yes
- ☐ No

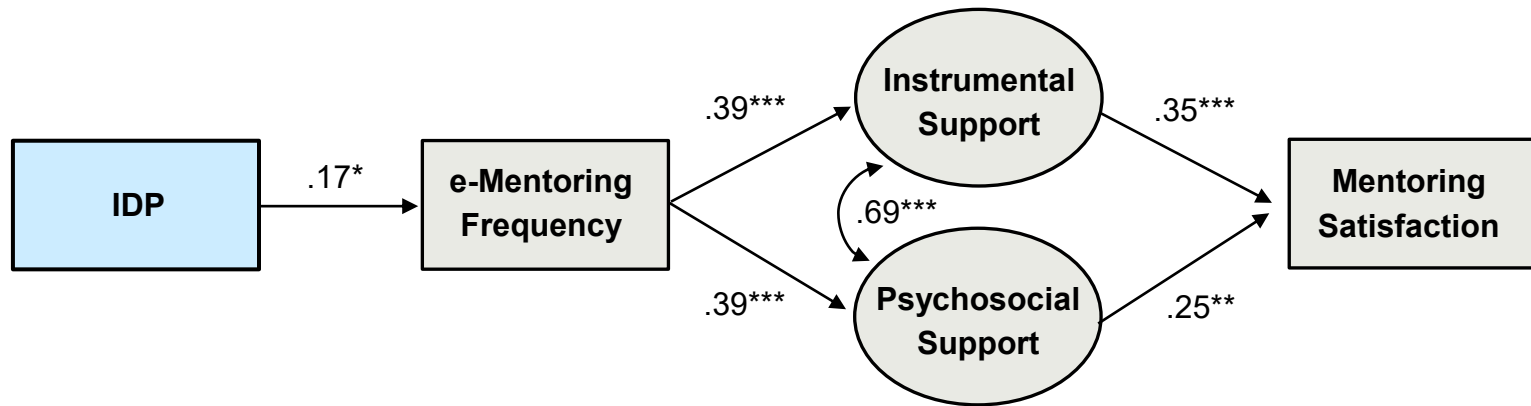
The Use of IDP

among 566 Engineering Graduate Students



Disability ▼^{*}
Master's ▼^{***}

How the IDP Enhances the Mentoring Process and Satisfaction during the Pandemic?



Note. Structural Equation Modeling (SEM) was employed. Good model fit (RMSEA=.03; CFI=.97; SRMR=.07). Demographics were controlled. Values are standardized path coefficients. Dashed paths are not statistically significant. $^*p<.05$, $^{**}p<.01$, $^{***}p<.001$.



Key Takeaways

- Pandemic (-) academic, career, and mental health outcomes of engineering grad students, especially among URM
- e-Mentoring: (+) hours on video conferencing and emailing
- e-Mentoring: (+) mentoring support, satisfaction, and student outcomes
- e-Mentoring attitude (+) e-mentoring frequency
- Concerns: Low SES students (-) e-mentoring attitude and satisfaction
- IDP (+) e-mentoring frequency

Thank You!

We look forward to working together
in supporting our students and faculty



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