



RUTGERS

School of Management
and Labor Relations

**EDUCATION AND EMPLOYMENT
RESEARCH CENTER**

PREPARING MATH MAJORS FOR CAREERS

Before we begin...

1. Zoom name: Name & Institution
2. What do you hope to learn about today?
(answer in the chat box)



TPSEMath

Transforming Post-Secondary Education in Mathematics



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Preparing Math Majors for Careers

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TPSEMath
Transforming Post-Secondary Education in Mathematics

STUDY GOALS

- Research the strategies math faculty/departments/institutions use to help students identify career pathways in math
- Study the career readiness strategies and programs being used by math departments around the country
- Help TPSE identify promising career readiness practices which can be promoted, implemented, and scaled across the nation
- Disseminate findings nationally
- Identify potential next steps for research

What do you hope to learn about today?

Type in the chat box

METHODOLOGY

- Information gathering to identify TPSE's areas of interest
- Online national survey
 - Constructed survey with TPSE input
 - Survey focus: current career readiness activities and resources
 - Disseminated to TPSE members and other math groups (N = 946)
 - 219 respondents (23% response rate)
 - 148 institutions and organizations across 37 states
- In-depth phone interviews
 - 26 interviews across 8 institutions
- Analysis of emergent themes and categories
- Developed six topic briefs

SIX TOPIC AREAS

- Practices and Policies for Career Readiness
- Revising Curriculum
- Advising Strategies and Practices
- Professional Development for Faculty and Staff
- Working with Alumni
- Partnering with Industry

Current Career Readiness Practices

- Incorporating real-world problem solving into class assignments
- Developing and encouraging internships
- Providing specific career preparation classes
- Holding competitions using mathematical skills
- Encouraging on and off campus research experiences
- Engaging alumni
- Engaging industry partners

Revising Curriculum

- Integration of career readiness activities with mathematics content:
 - Real-world problem-solving
 - Modeling exercises
 - Career-focused modules integrated into mathematics courses
 - Required/elective career-specific courses
 - Classroom visits by employers/alumni/juniors and seniors /internship coordinators
 - Resume-building exercises in classes or through career centers

Advising

- Career advising commonly occurs in two campus settings:
 - In the math departments by faculty
 - In campus career centers by professional advisors

- Faculty often lack industry connections and lack information about career pathways in math and the ways a math major might use skills and knowledge.

- Professional advisors often do not have a good grasp what students are learning in their math courses, nor are they up to date about opportunities for internships, research projects or math career pathways.

Professional Development

- Many respondents reported faculty's limited real-world experience or facility with applied mathematics

- Strategies to increase faculty's experience and knowledge about career readiness include:
 - Establishing inter-disciplinary classes and/or research assignments
 - Sponsoring in-house workshops and seminars
 - Providing release time to foster and facilitate the development of partnerships with industry
 - Allocating travel grants for professional conferences

Working with Alumni

- Many respondents reported they either did not conduct systematic outreach to alumni; or did not reach out to them at all
 - Alumni can provide helpful feedback to keep curriculum current
 - Alumni can exemplify different career pathways and specific jobs that use math skills
 - Alumni can serve as conduits to industry and employers
 - Alumni can serve as donors supporting departmental activities and student scholarships.

Partnering with Industry

- Respondents frequently acknowledged the benefits of industry partnerships but seemed unsure how to develop and maintain such networks
- Helps inform about changes in technology, facilitating faculty's preparation of students for the 21st century workplace
- Industry partnerships and contacts provide opportunities for externships, information about changing industry needs, as well as job leads

POLL – SIX TOPICS

- Practices and Policies for Career Readiness
- Revising Curriculum
- Advising Strategies and Practices
- Professional Development for Faculty and Staff
- Working with Alumni
- Partnering with Industry

RECOMMENDATIONS

Career Readiness

- **Career readiness culture**
 - Leadership of the chair and department-wide support
 - Recognition of the value of career preparation
 - Valuing career preparation without compromising the academic mission

- **Use real-world problem solving**
 - Connect coursework and assignments to the real world

- **Teach students to advocate for themselves**
 - Help students understand the applicability of their skills and how they can be used in the workplace
 - Help students express themselves verbally and in writing

Revising Curriculum

- Identify the needs/gaps in respect to career readiness and determine the most critical ones to be addressed
- Identify existent departmental expertise
- Develop collaborations within the department and with other college departments, e.g., computer science, business
- Provide time for faculty to develop new curriculum, internships, research projects, industry partnerships, etc.
- Recognize the value of faculty's work in this area for tenure decisions
- Provide incentives to stimulate creativity and engagement in new activities

Advising Strategies/Practices

- Require/give students multiple ways to explore career options
- Provide early and continuous advising
- Establish joint faculty appointments between academic departments and schools
- Increase communication and collaborations between math departments and career service centers
 - Help advisors understand what math students are “*learning in their courses*”
 - Inform them about the multiple ways math students might use their skills in a range of industries/job titles

Professional Development

- Offer college and departmental support
 - Encourage/incentivize faculty developing new skills and knowledge

- Offer interdepartmental workshops and collaboration
 - Computer Science, Business, Engineering

- Recruit new faculty from industry

Working with Alumni

- Draw on faculty connections
 - Encourage faculty to maintain relationships with their former students – update contact information, invite them to attend departmental activities, alumni events, college programs and fundraising activities

- Host Events

- Actively network and communicate with alumni
 - Create a departmental newsletter for current students and alumni
 - Use social media, e.g., create a Facebook page or website
 - Encourage students to use Link-in
 - Invite alumni to departmental activities, e.g., speak with or mentor current students

Partnering with Industry

- Departments and faculty need to be creative with strategies and activities
 - Designate a single person to work with industry
 - Encourage faculty to participate in professional industry associations
 - Develop industry advisory boards to help inform curriculum
 - Identify alumni working in regional industry

- Encourage, value and support faculty's work with industry
 - Provide resources to faculty to partner with industry, e.g. course release

Integrating Career Readiness

- There are multiple strategies to enhance career readiness content without using extensive resources
- Minor changes can have big impact
- Institutions/departments should fully assess which career readiness strategies are most relevant and feasible
- Changes can be made over time
- Incorporating career knowledge and skills into higher education pathways is key to preparing students for careers in mathematics in the 21st century

Breakout Session

Introduce yourselves, then discuss the questions in the spreadsheet.

Find your breakout room number on your Zoom screen.

Use that tab number for your group's notes.

The screenshot shows a Google Sheet interface. The title bar reads "TPSE - Rutgers Webinar Brainstorming" with a star icon, a share icon, and a refresh icon. Below the title bar is a menu bar with "File", "Edit", "View", "Insert", "Format", "Data", "Tools", "Add-ons", and "Help". A status bar indicates "Last edit was 2 minutes". The toolbar includes icons for undo, redo, print, and a zoom level of 100%. The spreadsheet grid has columns A, B, and C, and rows 1 through 25. Row 1 contains the following text:

	A	B	
1	What is your /your department's current culture around career readiness and what practices are currently in use?	What practices could be added?	What would practices be?
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At the bottom of the spreadsheet, there is a tab bar with a "+" icon, a menu icon, and several tabs: "How To Use", "Grp1", "Grp2", "Grp3", "Grp4", and "Grp5". An arrow points from the text "Use that tab number for your group's notes." to the "Grp1" tab.

Breakout Session: Career Readiness Practices

- What is your /your department's current culture around career readiness and what practices are currently in use?
- What practices could be added?
- What would the process to successfully add these new practices and activities involve?
- What are ways to increase faculty's and departmental adoption of career readiness practices?

Concluding Thoughts

Thanks:

- Heather and the Rutgers EERC Team
- Carnegie Corporation
- You!



Coming Soon

- Topic-specific Workshops (for institutional teams)
- How to Support Quality Online Learning (Ithaca S+R)

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Report

www.tpsemath.org/mathmajors