MAA CRAFTY Survey on DS in First Two Years

Victor Piercey

Ferris State University
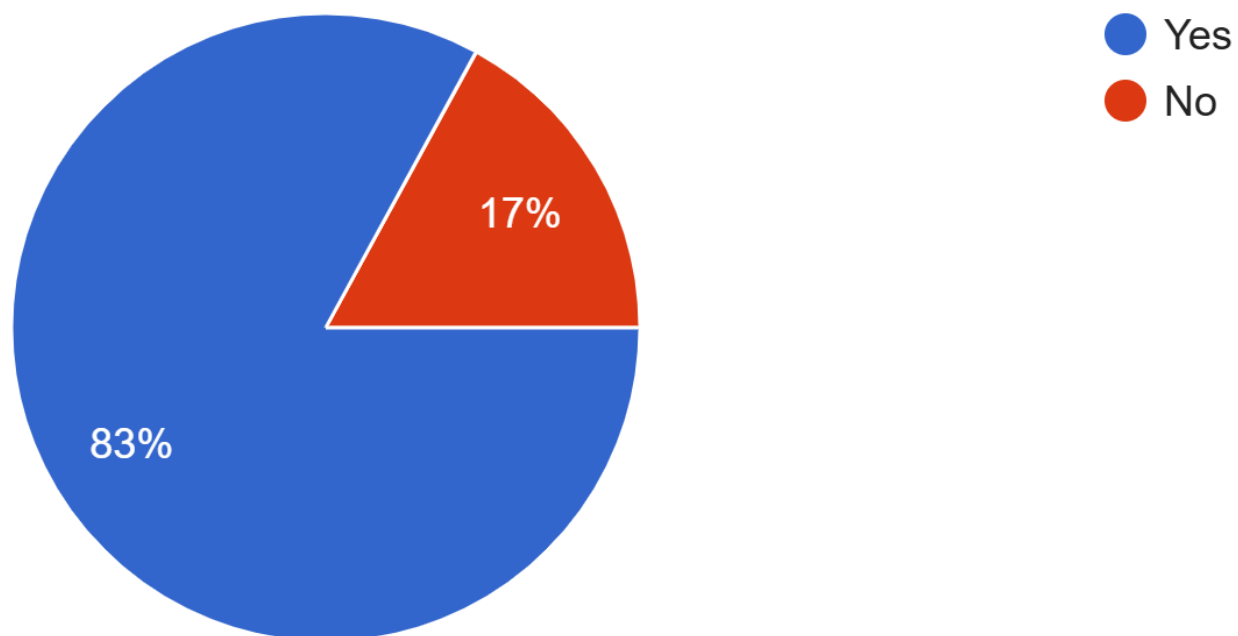
JMM 2025 Panel on Navigating the Frontier: Stats, DS, and AI in the First Two Years

MAA CRAFTY Task Force on DS in First Two Years

- Victor Piercey, Ferris State University (former CRAFTY chair)
- Amanda Beecher, Ramapo College (current CRAFTY chair)
- Judith Canner, Cal State Monterey Bay
- Andrew Bennett, Kansas State University
- Kelly Fitzpatrick, County College of Morris
- Kate Kozak, Coconino Community College
- Michael Dorff, Brigham Young University
- Tim Chartier, Davidson University
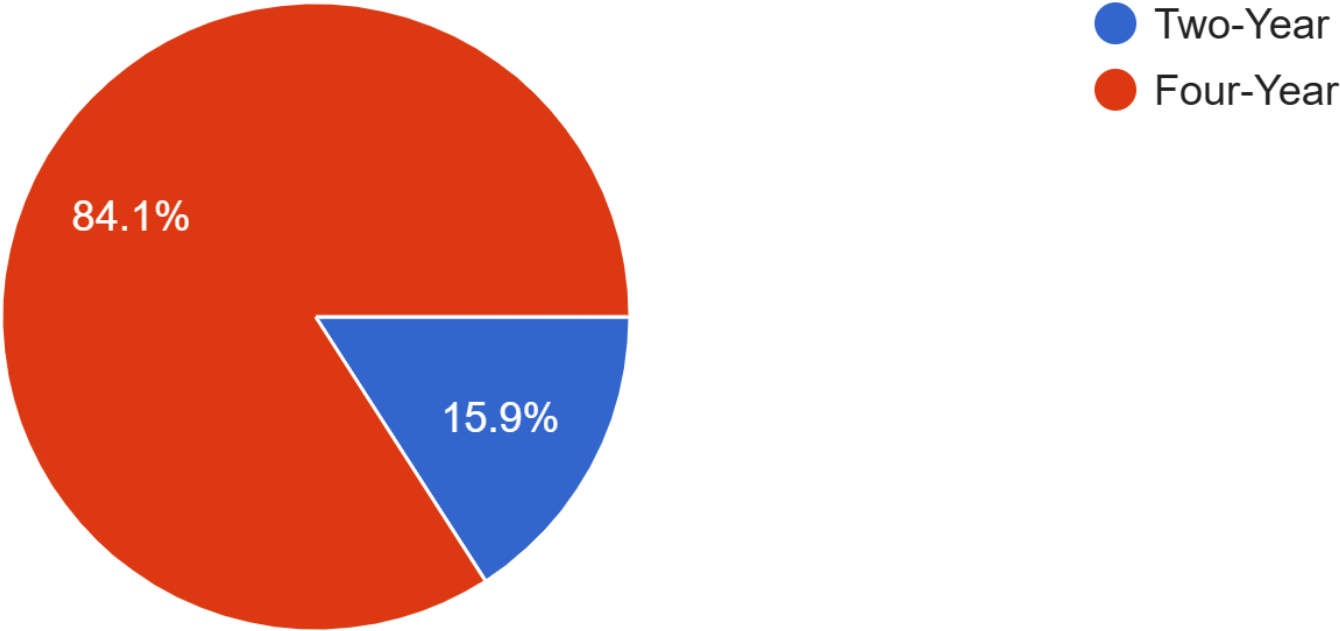- Rachel Saidi, Montgomery College

Does your institution have any data science programs? (If programs are currently being developed, select "yes")

88 responses

- Yes
- No

83%

17%

Which of the following best describes your institution?
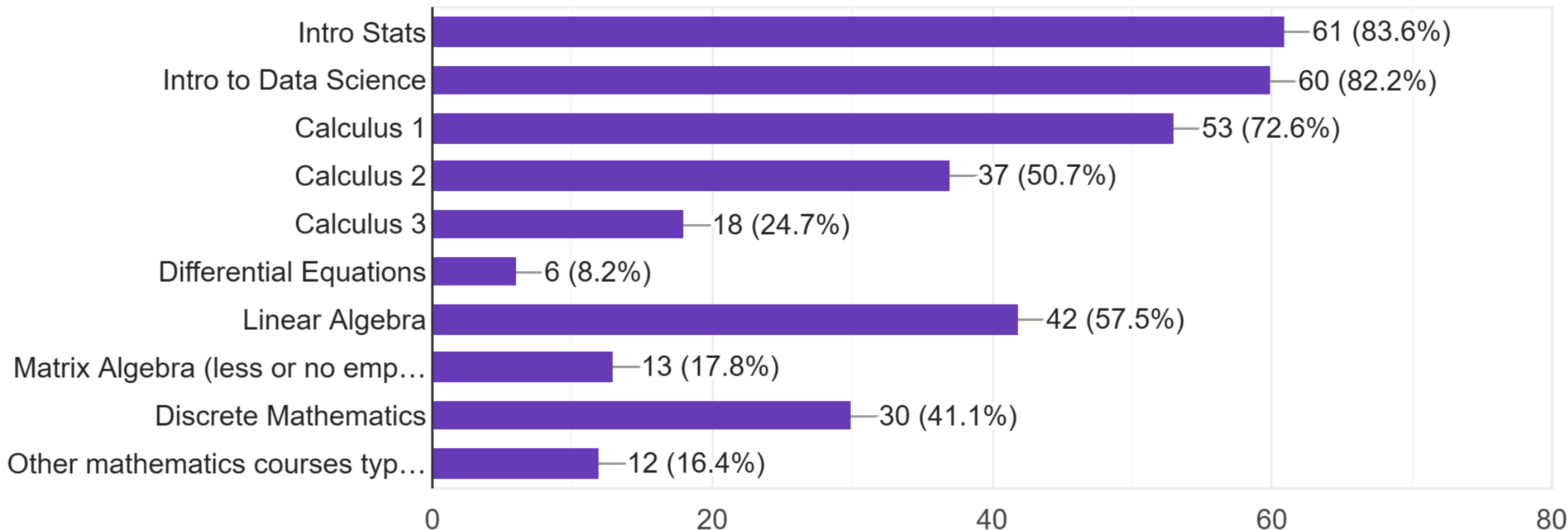
88 responses

How does your institution define "data science"? (optional: 25 responses)

Themes among definitions in responses:

- Interdisciplinarity (math, stats, comp. sci, + domain area)

- Methodology (like scientific method) with datasets

- Making meaning/insights from datasets (sometimes for decisions)

- Two replies included ethics
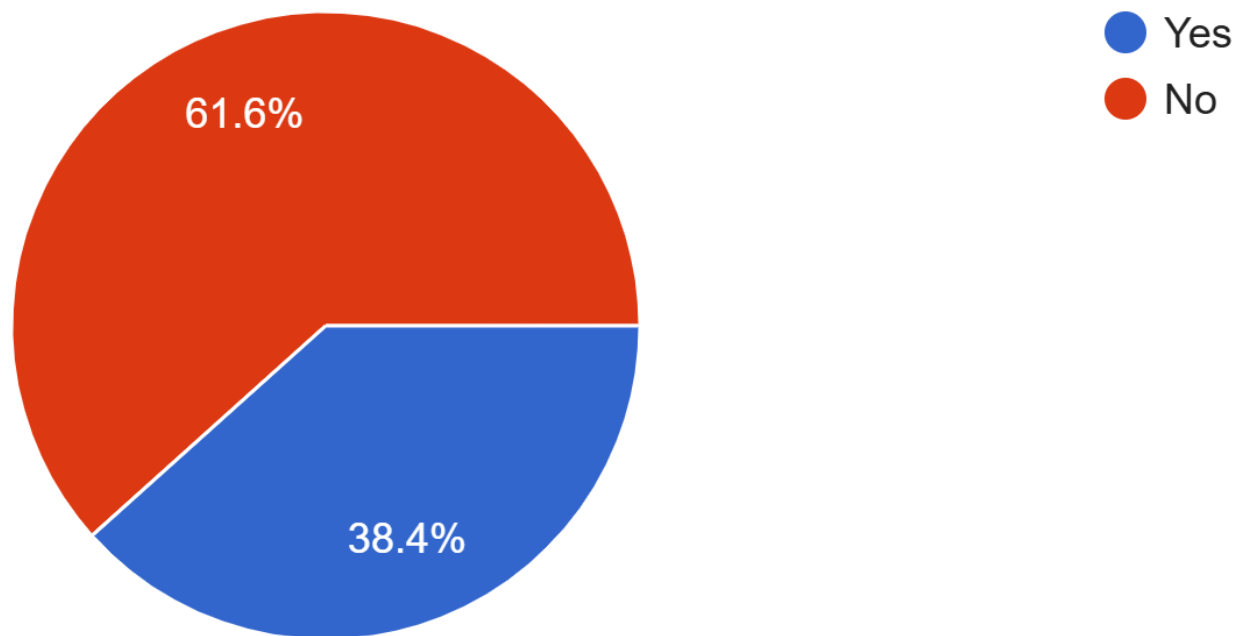
- Two replies – don't know

Which of the following courses do your data science students typically take (mark all that apply):

73 responses

Course	Count (Percentage)
Intro Stats	61 (83.6%)
Intro to Data Science	60 (82.2%)
Calculus 1	53 (72.6%)
Calculus 2	37 (50.7%)
Calculus 3	18 (24.7%)
Differential Equations	6 (8.2%)
Linear Algebra	42 (57.5%)
Matrix Algebra (less or no emp…	13 (17.8%)
Discrete Mathematics	30 (41.1%)
Other mathematics courses typ…	12 (16.4%)

Have you modified or modernized any mathematics classes to better serve data science students?

73 responses

If modernized/modified courses, describe. (optional, 28 responses)

Themes in responses:

- Made courses more applied (calculus, linear algebra)

- Created foundation courses ("Intro to Data Science")

- Integrated coding into courses (calculus, linear algebra)

- Created new courses (optimization, algorithms)

- Incorporated simulation-based approaches into intro stats
- Modified prereqs for linear algebra

What new courses would you like to develop? (optional, 36 responses)

Themes:

- Math modeling
- Machine learning
- Intro course (for various student audiences)
- AI
- Ethics
- Capstone/Project
- Joint Course with Partner Discipline(s)
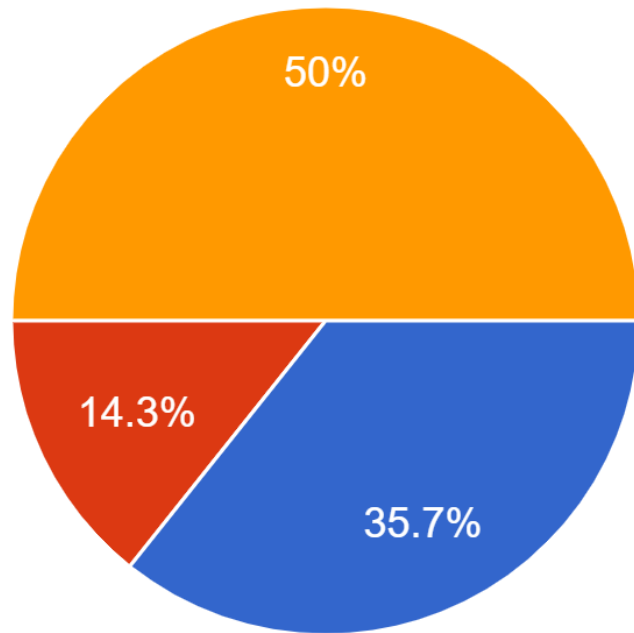- Specific topics (ex: causal inference, neural networks, …)

How is ethics covered in your program(s)? (optional, 48 responses)

Themes:

- Integrated throughout the curriculum

- In one or two DS courses (ex.: Intro to DS, Capstone)

- One or more externally offered ethics courses

- One DS course dedicated to ethics

- In one unit/module in some specified DS course

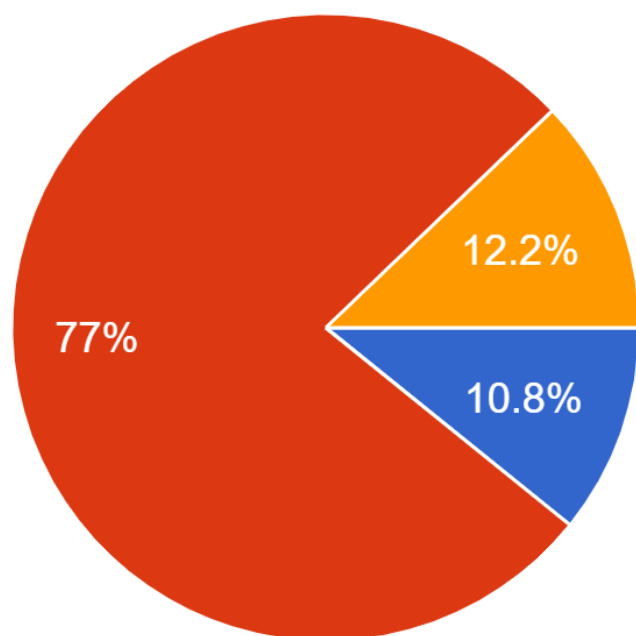# Are you coordinating with one or more four-year institutions to implement your data science program(s)?

14 responses

- 🔵 Yes
- 🔴 No
- 🟠 We don't have any data science programs

50%

14.3%

35.7%

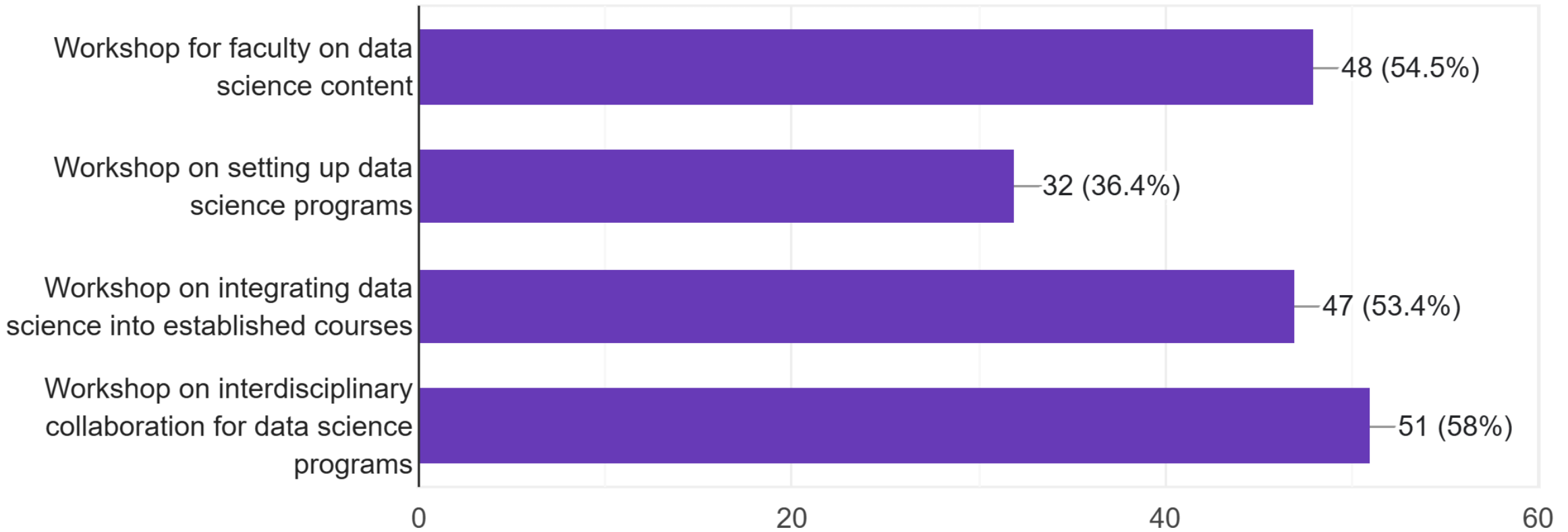# Are you coordinating with one or more two-year institutions to implement your data science program(s)?

74 responses

- ● Yes
- ● No
- ● We don't have any data science programs.

77%

12.2%

10.8%

What would help you improve your data science programs or establish a data science program? (mark all that apply)

88 responses

Take-Aways

- Stable core of mathematics courses in first two years
- Lots of interesting opportunities to modernize existing courses and create new ones!
- We need more coordination/communication between two-year and four-year institutions
- Lots of opportunities for professional development (though the data predates some existing PD offerings)

ACM-ASA-MAA-SIAM
Joint Taskforce on Undergraduate
Data Science Competencies

Competencies Survey

- Label each knowledge area with your opinion of whether it should be a
  - Required (Tier 1)
  - Recommended (Tier 2), or
  - Elective
- What knowledge areas are missing?