

College of Engineering Advisory Council Meeting

INDUSTRIAL INTERACTIONS AND CAPSTONE DESIGN

New Mexico State University

College of Engineering

The logo for New Mexico State University, featuring the letters "NM" stacked above "STATE" in a white serif font, enclosed within a white square that is itself centered within a larger maroon square.

NM
STATE

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New Mexico State University



Aggie Engineering Capstone Design Program

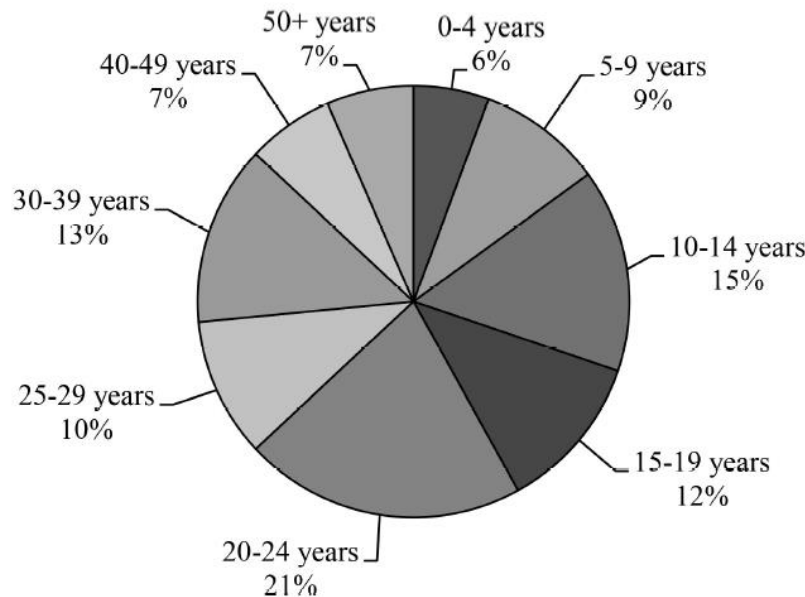
Aggie Engineering Capstone Design Program

COE Capstone Design Program Started Fall 2018

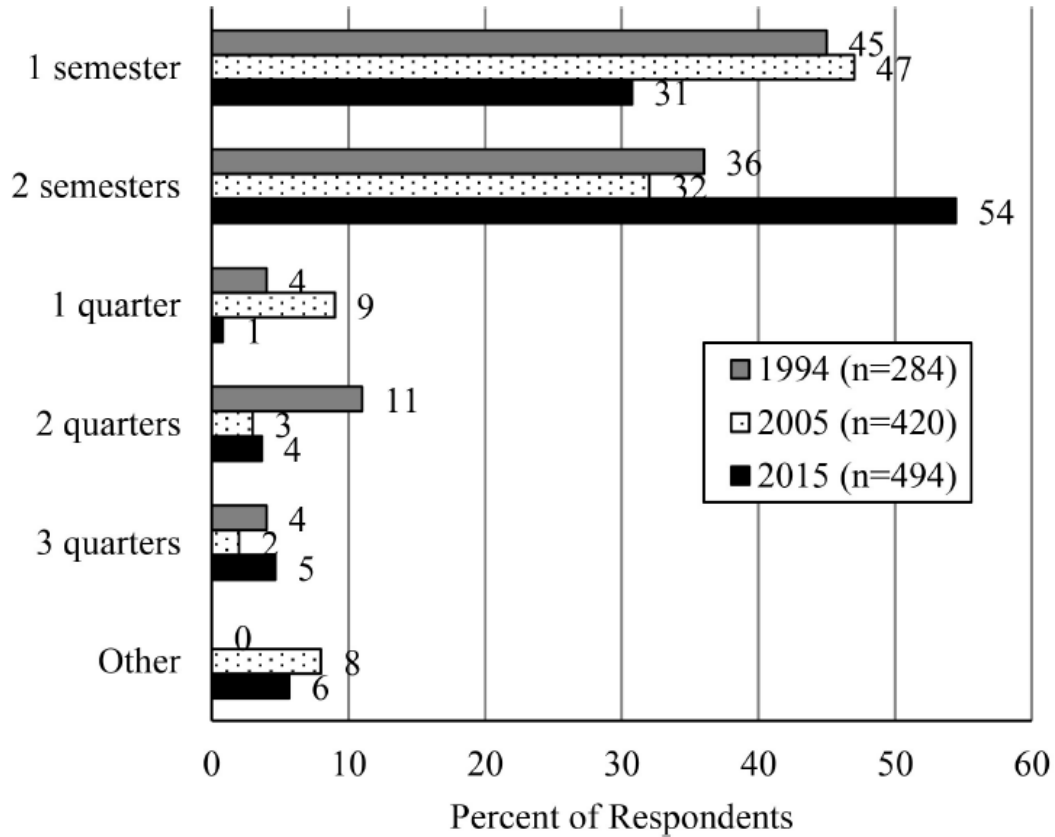


COE Capstone Design Program

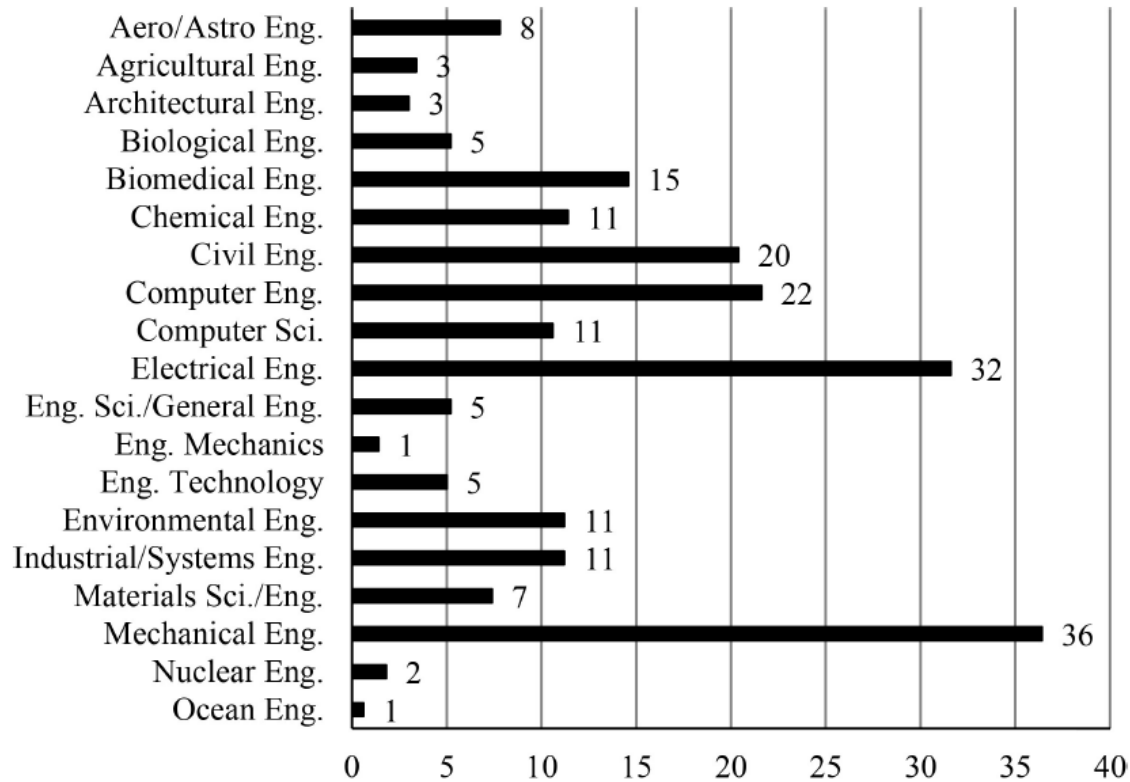
- Creation of the program started with a literature review of what other college of engineering programs were doing.
 - 2015 Capstone Design Survey of over 522 engineering programs at 256 institutions. This study looked at many different aspects.



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Table 4. Top Five Topics Covered in Capstone Design (Longitudinal Data)

1994	2005	2015 Lecture	2015 Overall
Oral communication	Written communication	Engineering ethics	Written communication
Concept generation	Oral communication	Project planning and scheduling	Project planning and scheduling
Teamwork	Engineering ethics	Concept generation/selection	Oral communication
Planning/scheduling	Project planning	Standards and regulations	Concept generation/selection
Engineering ethics	Decision making	Decision making	Team building/teamwork



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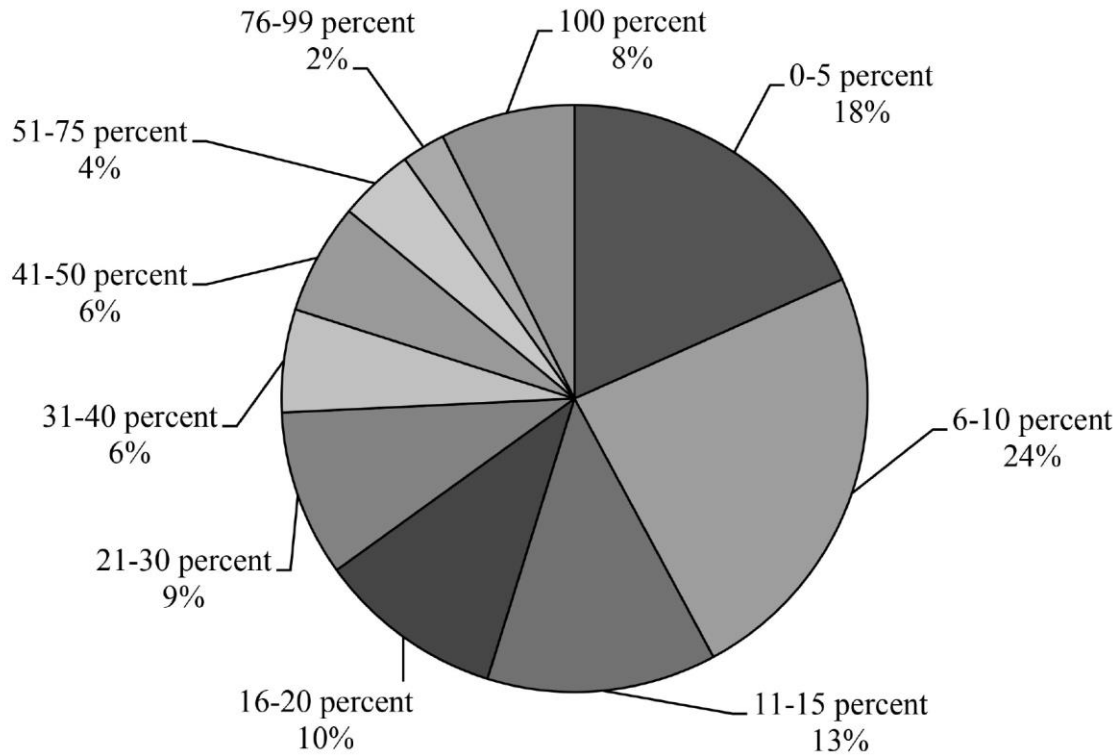


Fig. 9. Percent of Faculty in Department Receiving Teaching Credit for Capstone (2015 Data, n = 458).

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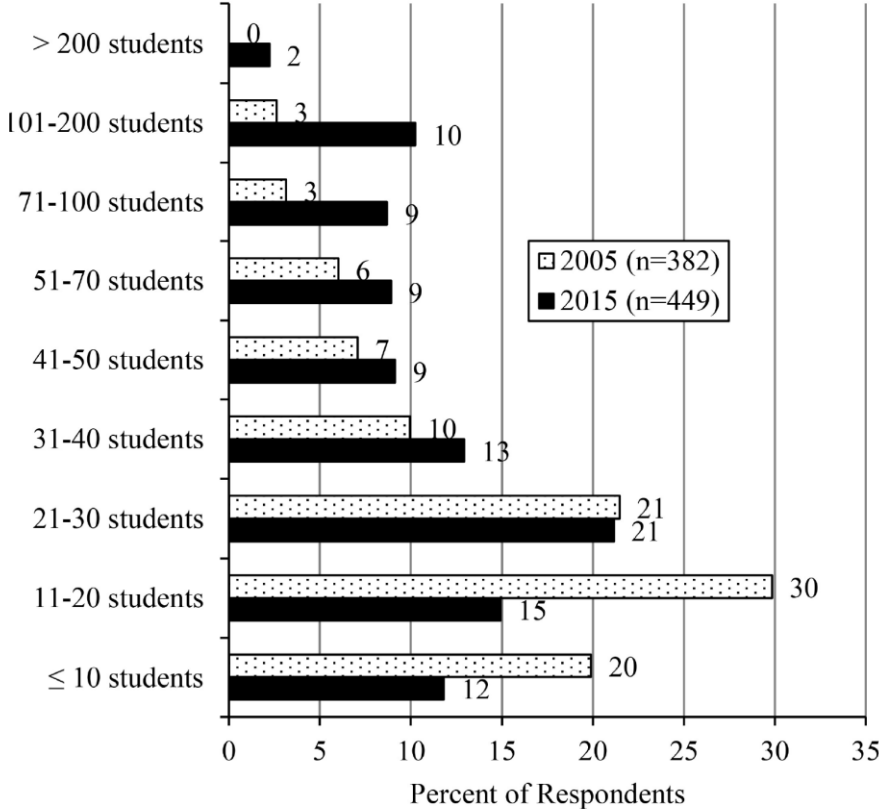


Fig. 10. Number of Students per Capstone Course Cycle (Longitudinal Data)



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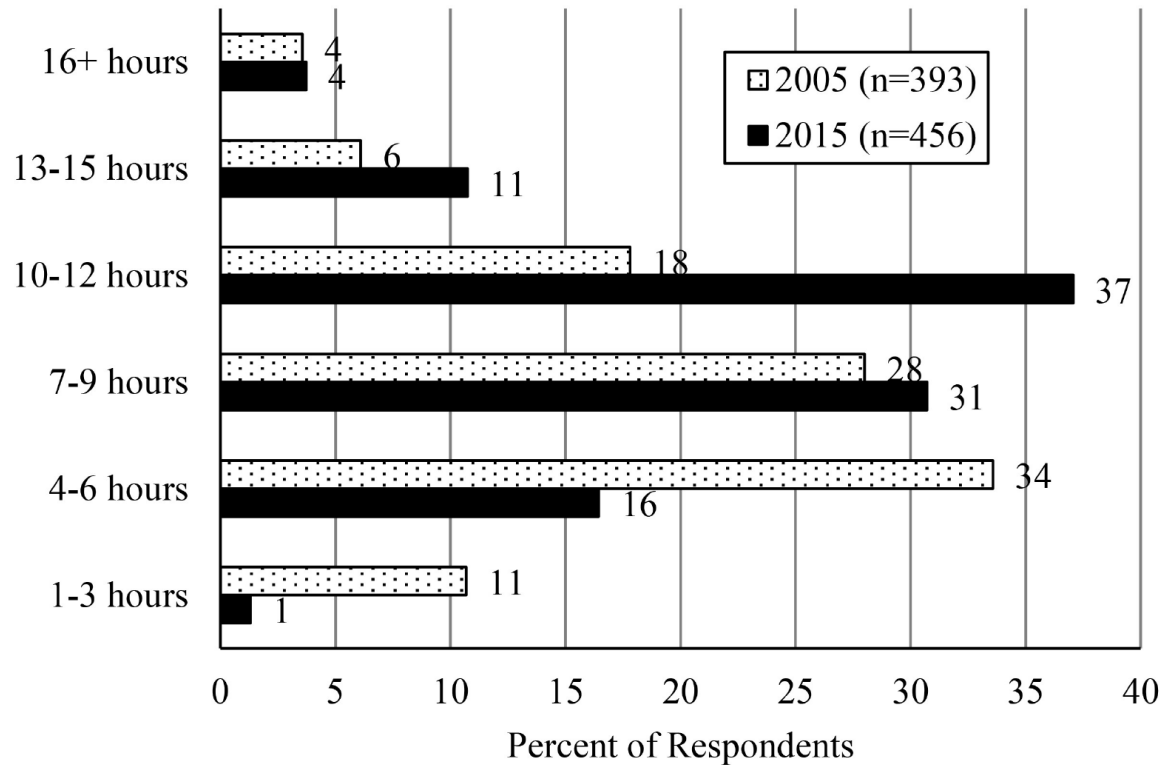


Fig. 12. Average Expected Student Hours per Week Working on Project (Longitudinal Data).

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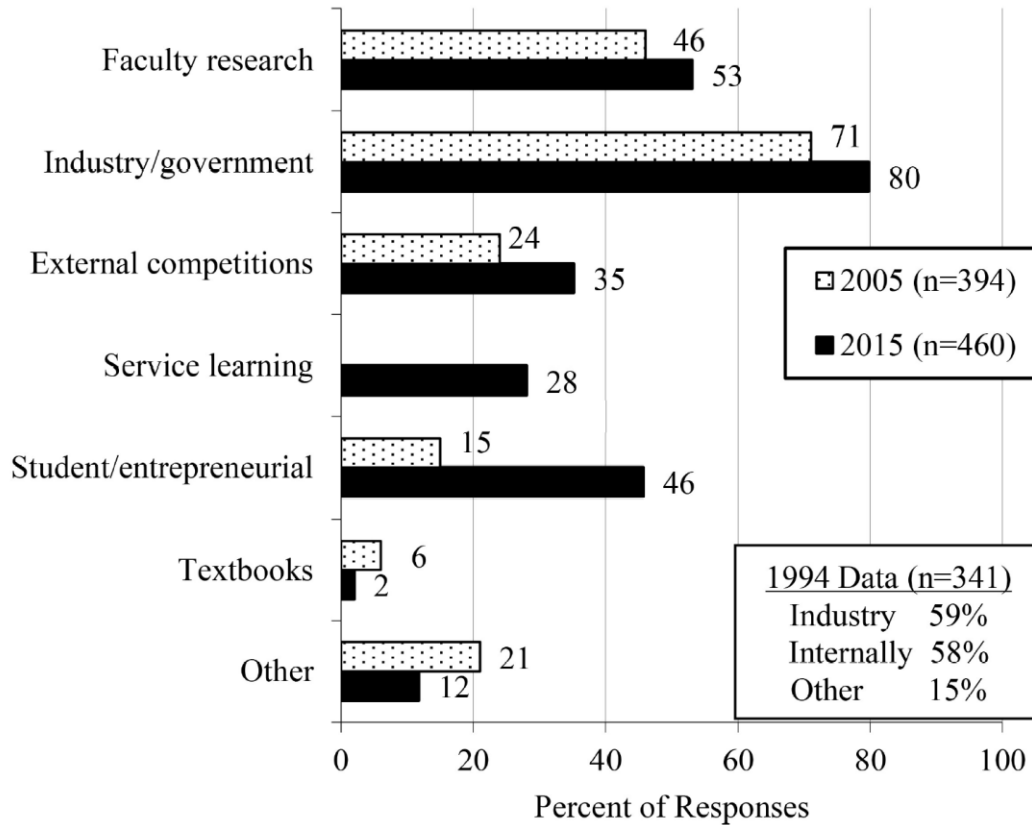


Fig. 14. Sources of Capstone Projects (Longitudinal Data).

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Table 12. Strategies for Finding Capstone Projects (2015 Data)

Project Source	Percent of Respondents* (n=321)	Content Themes
External Contacts	54	local and regional industries; alumni; industrial advisory board; previous sponsors; connections in general; personal contacts of capstone instructor; faculty and department contacts; development office; word of mouth; student contacts; co-op and internship contacts; clinicians; other university's capstone project sponsors
Internal Sources	28	student-proposed; faculty research and ideas; brainstorming; on-campus projects
Marketing	26	solicitation and networking; advertising; internet searches
Prefab/ready to go	9	competitions; repeat previous projects; textbooks
Criteria-based	7	global trends and industry needs; multidisciplinary groups
Magnet	5	approached externally; reputation
Who Finds	4	dedicated capstone personnel; leave to faculty mentor
Development/grants	3	departmental/institutional support (business incubator, development office, university relations)
Extreme	3	no coordinate strategy; anything and everything
Events-based	2	demo day or project day; attend career day; conferences

* Greyscale shading increases in 12% increments.



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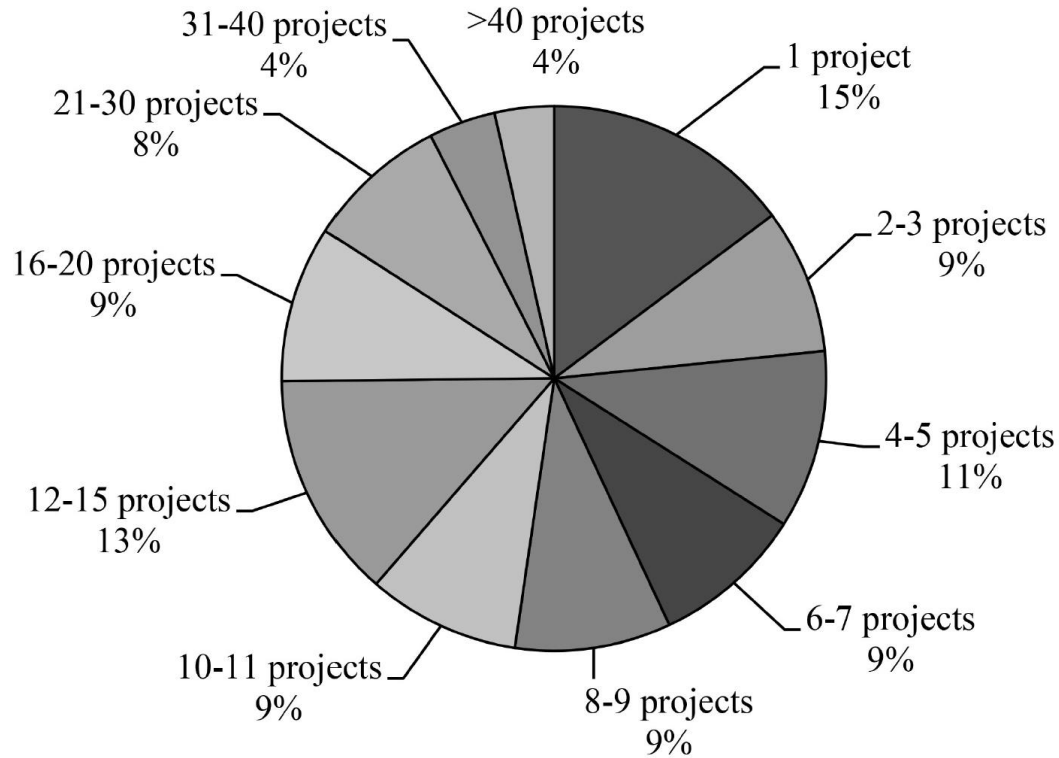
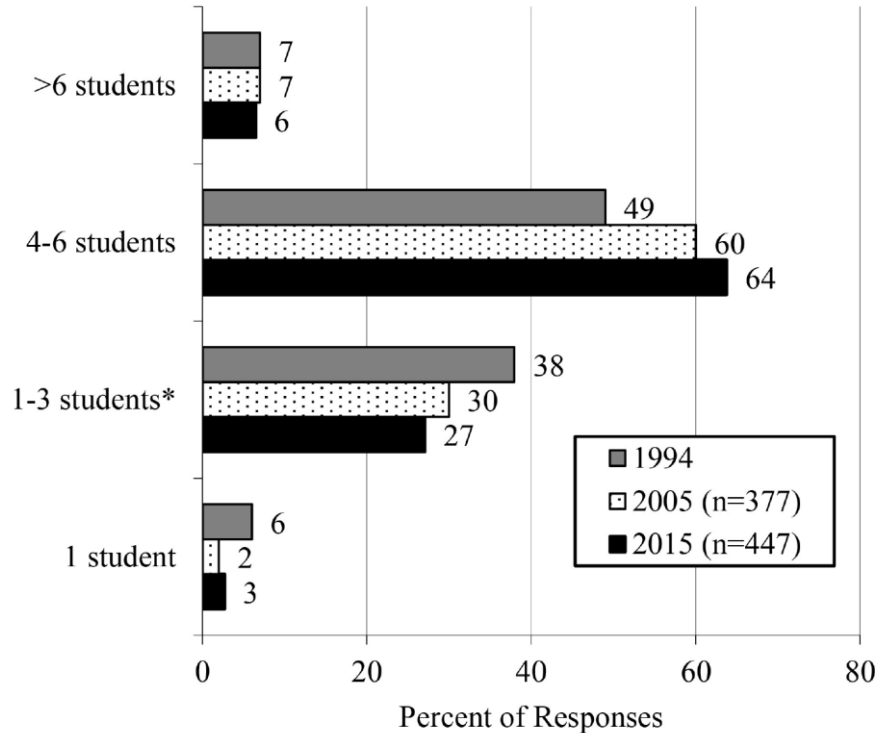


Fig. 15. Number of Projects per Capstone Course Cycle (2015 Data, n = 453).

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* In 1994, "1-3 students" was a specific choice.

In 2005, "1-3 students" refers to all responses > 1.5 and <3.5 students.

In 2015, "1-3 students" refers to an average of 2 or 3 students.

Fig. 18. Number of Students per Capstone Team (Longitudinal Data).

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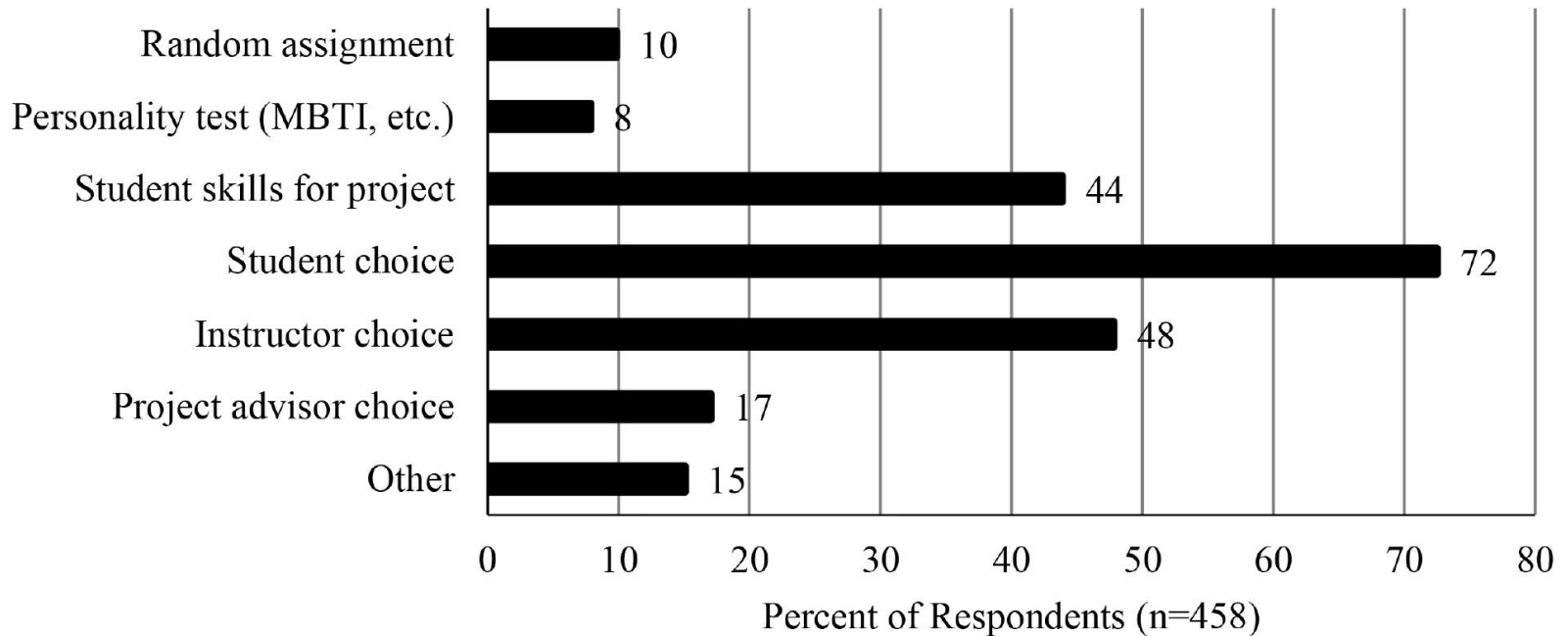


Fig. 19. Methods for Assigning Students to Capstone Teams (2015 Data).

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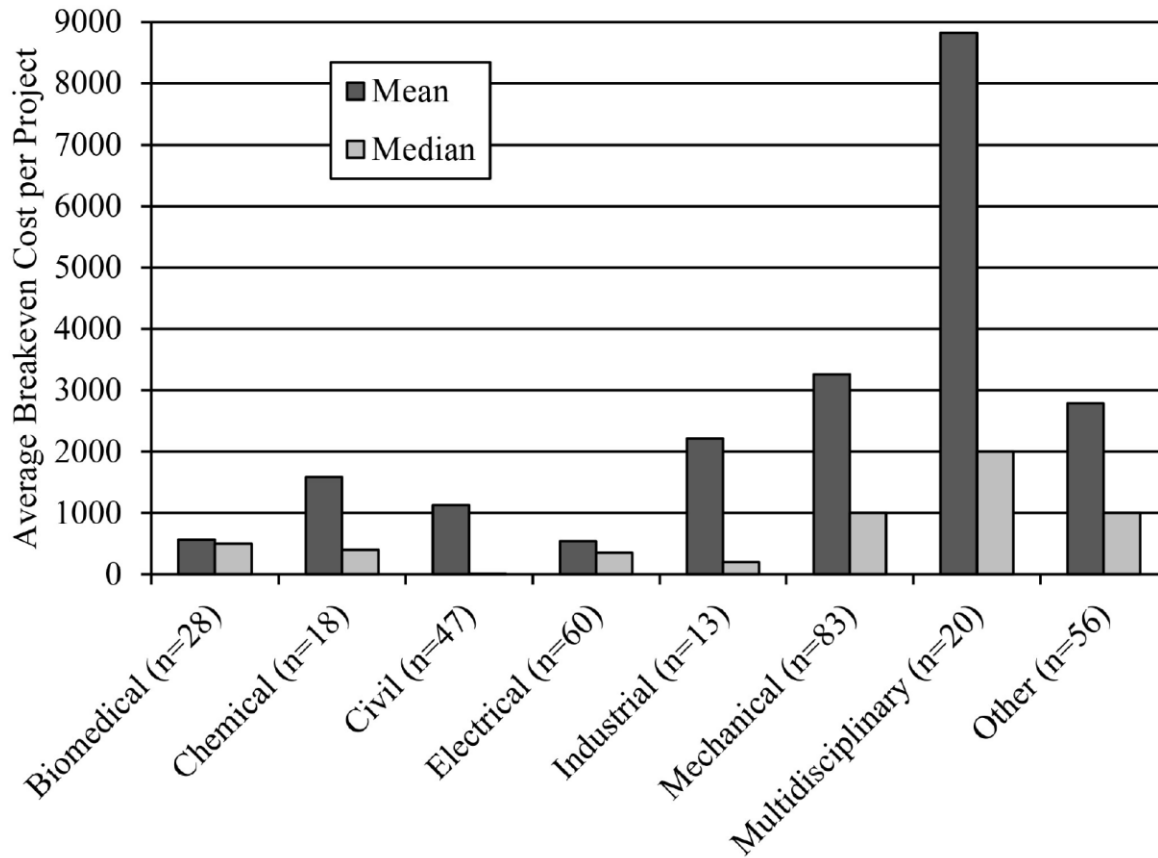


Fig. 22. Mean and Median of Average Breakeven Cost per Project by Discipline (2015 Data).

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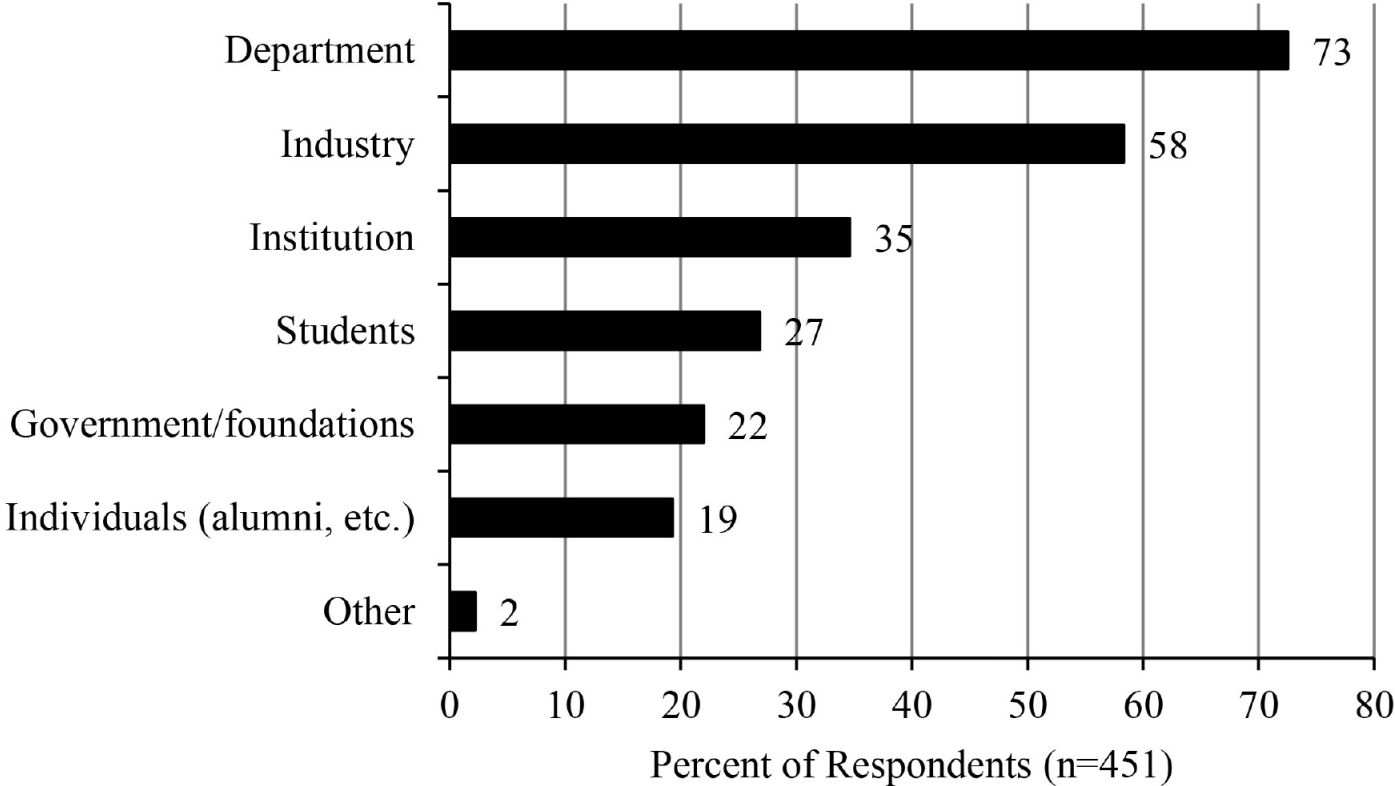


Fig. 23. Funding Sources (2015 Data).



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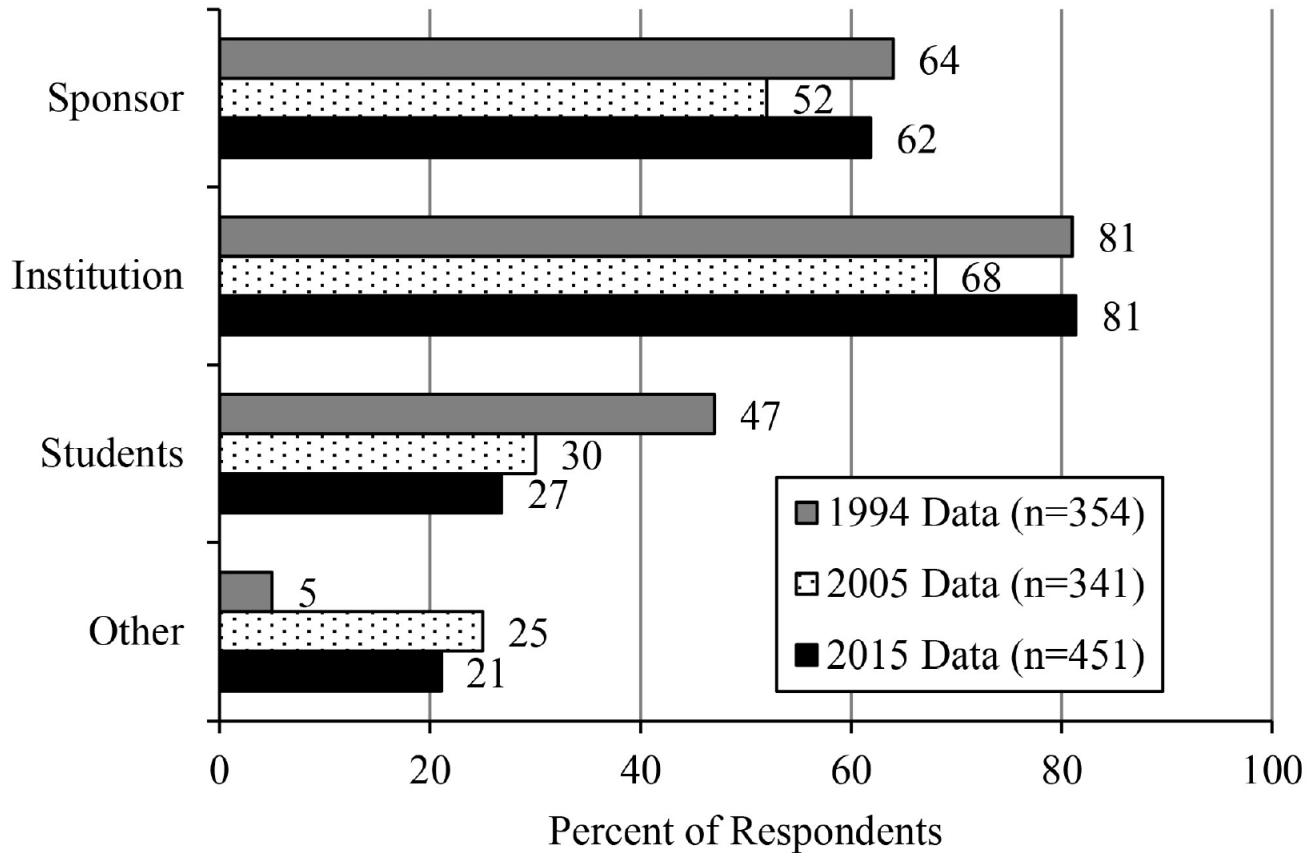


Fig. 24. Funding Sources (Longitudinal Data).

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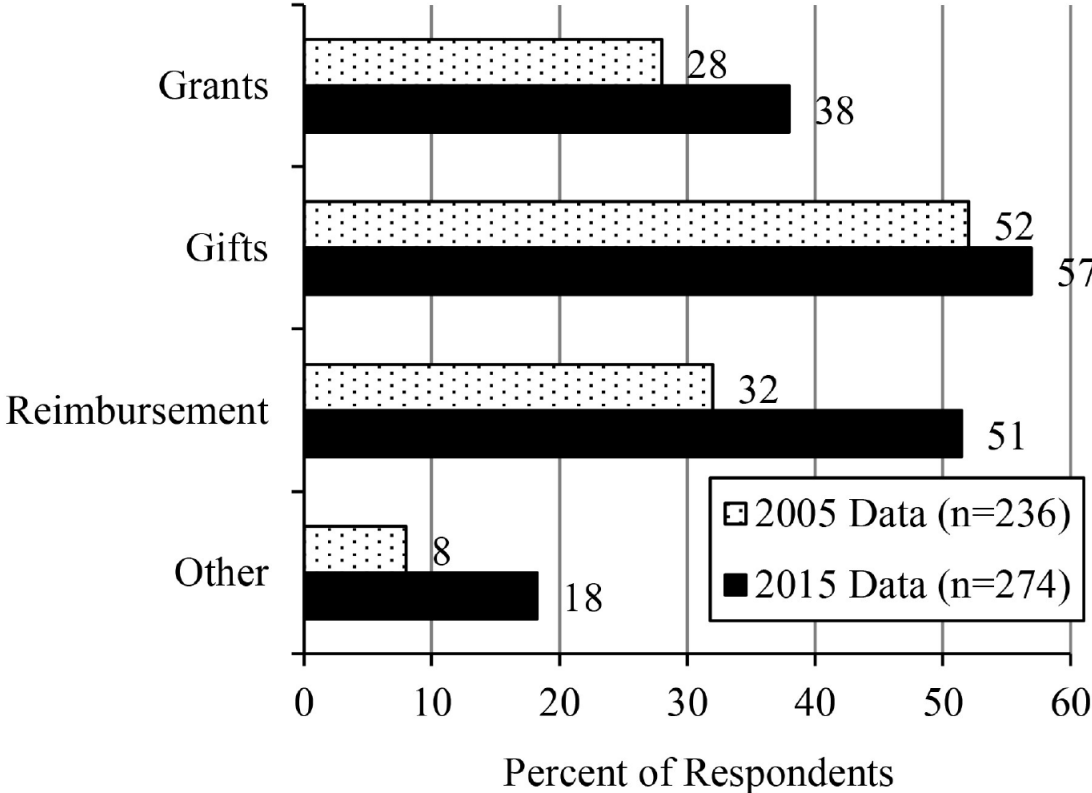


Fig. 25. Forms of Funding (Longitudinal Data).



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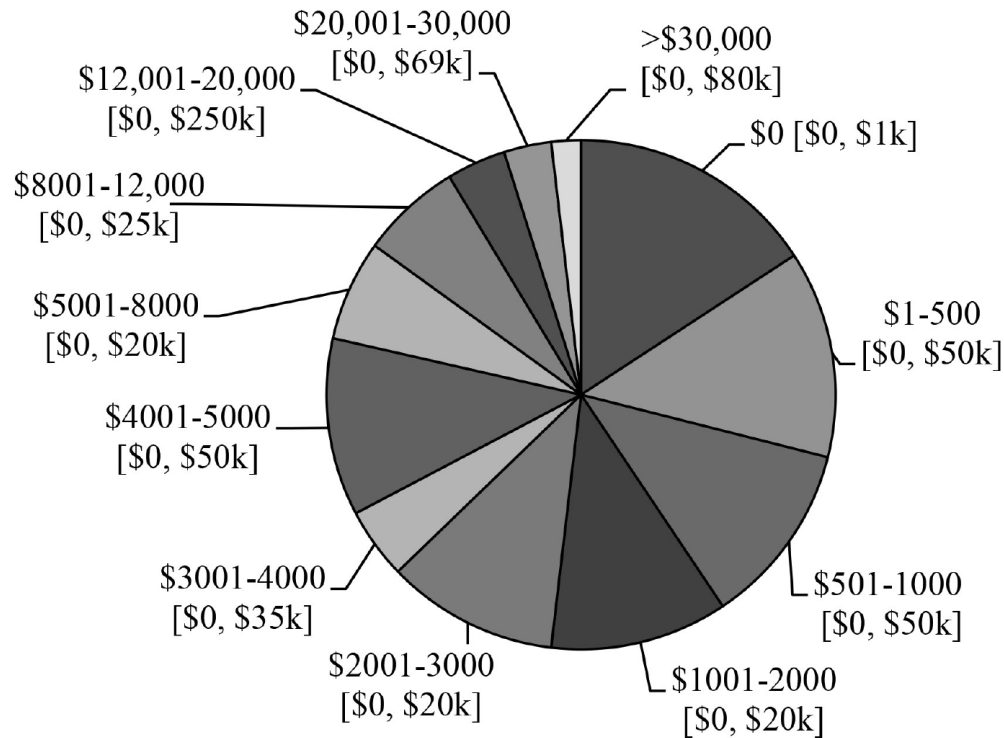


Fig. 26. Average Financial Support Provided by External Sponsors (2015 Data, n = 266, with [min, max] for respondents in given support range).

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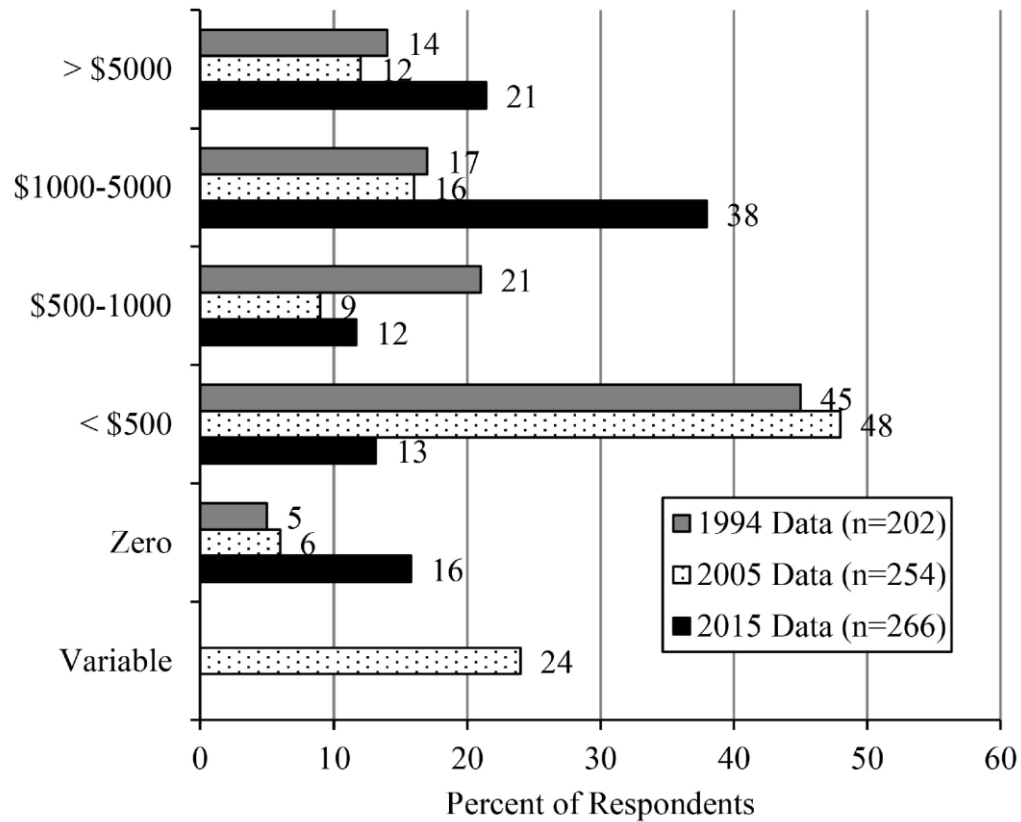


Fig. 27. Average Financial Support Provided by External Sponsors (Longitudinal Data).

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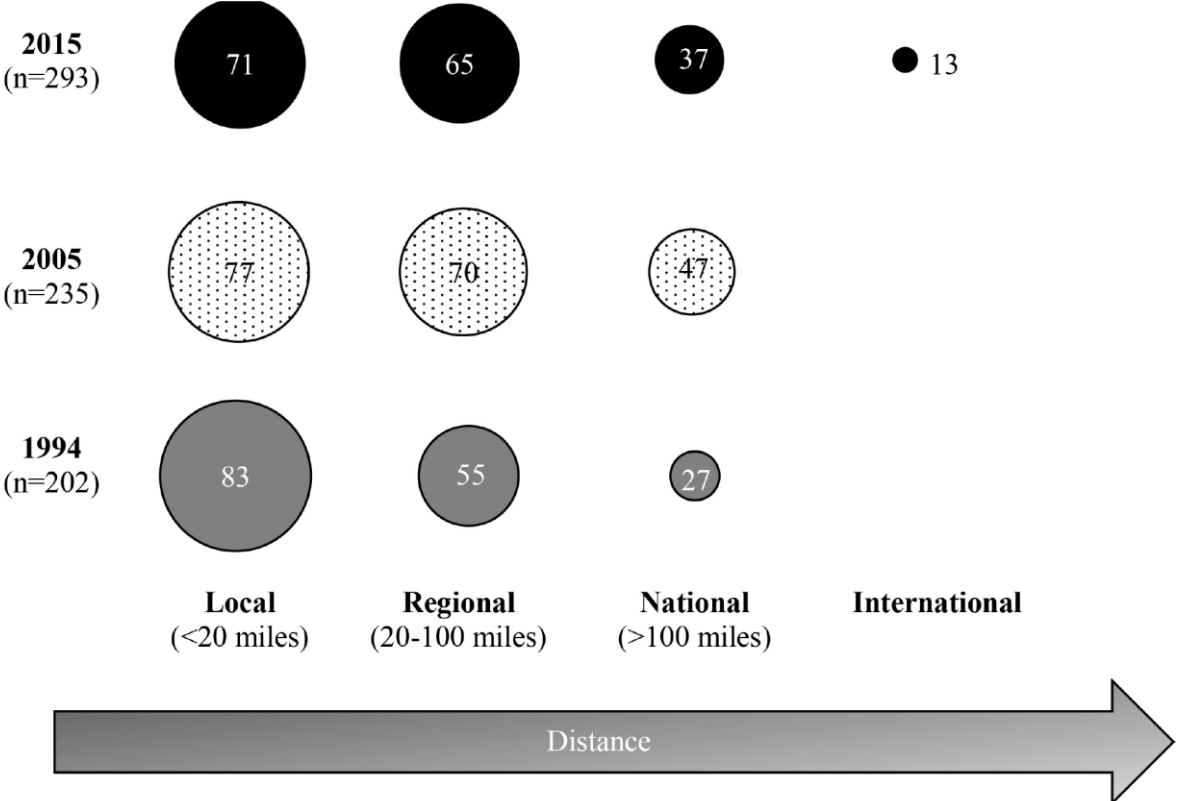


Fig. 28. Sponsor Location (Longitudinal Data, Percent of Respondents).



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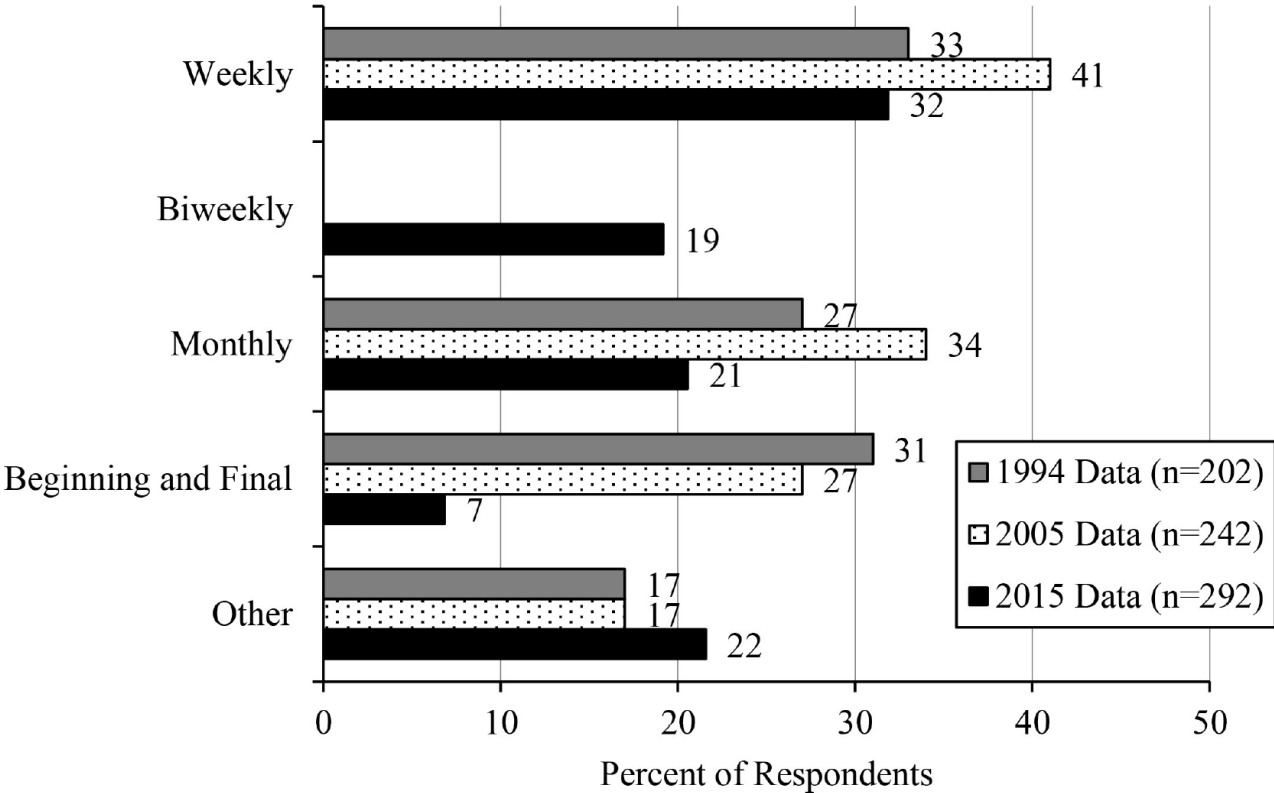


Fig. 29. Frequency of Student Contact with Sponsors (Longitudinal Data).



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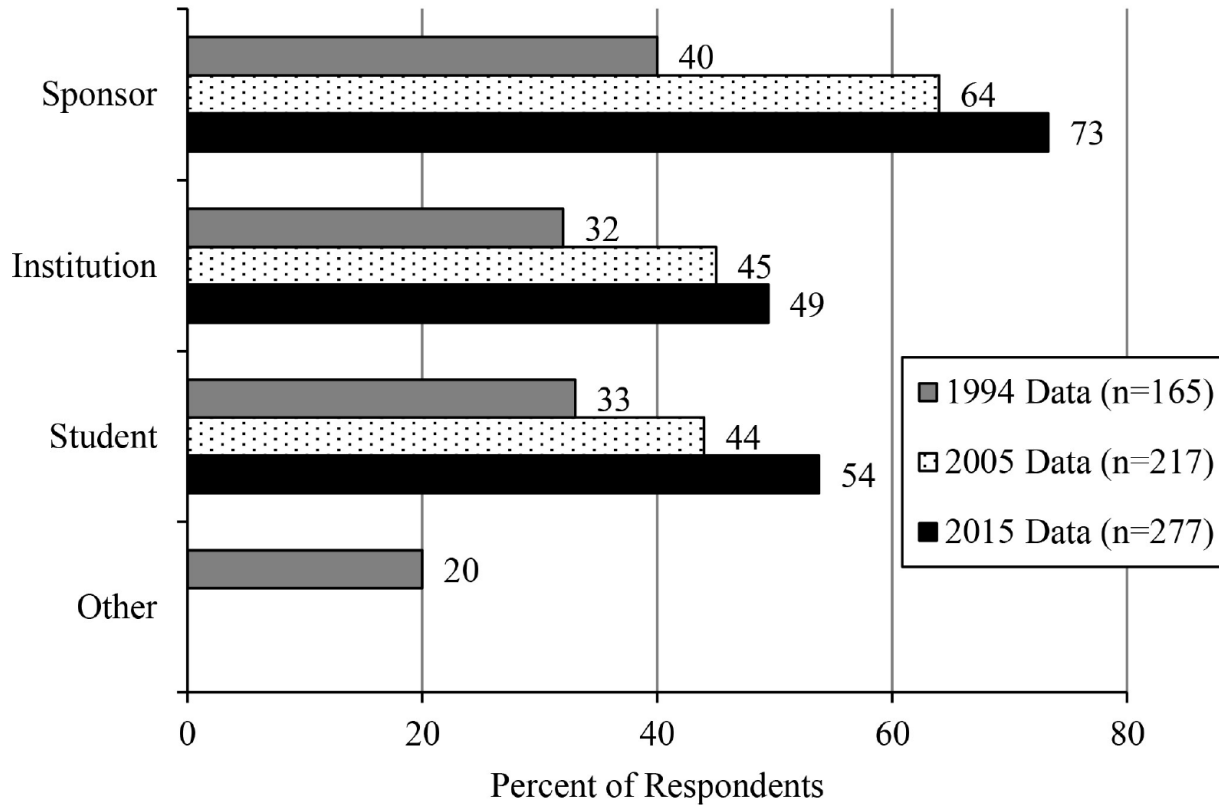


Fig. 31. Intellectual Property Ownership (Longitudinal Data).

COE Capstone Design Program

Fall 2018 – Spring 2019

- 17 project
- ~80 students
- 12 company sponsored projects
- 0 competitions
- 4 faculty research
- 1 entrepreneurial
- 5 projects funded



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Fall 2022 – Spring 2023

- 29 project
- ~150 students
- 15 company sponsored projects
- 6 competitions
- 3 faculty research
- 5 entrepreneurial
- 16 projects funded



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Spring 2023 – Fall 2023

- 11 projects
- 53 students
- 3 company sponsored projects
- 0 competitions
- 6 faculty research
- 2 entrepreneurial
- 4 projects funded



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- Fall – Spring cohort
 - 66% of projects
 - Over 50% directly funding
- Spring – Fall cohort
 - Mostly faculty supported projects
 - Few projects are funded
- Team issues
 - 21 projects from Fall-Spring cohort lost students
 - ~ 25% of ECE students are now 2 semester capstones
 - ET students still on 1 semester catalogs



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- Working with a local company to promote capstone
 - Increase number of funded projects
 - Increase number of projects with local companies
 - Currently working out funding mechanism
- Increase Quality of Projects
 - Might need to work with psychology department
 - Some groups are superstars and other groups that you have high expectations for don't reach potential
 - Need to work more on group dynamics
 - Trying to get companies to be more proactive in indicating when progress isn't being made.
 - Consider eliminating Spring-Fall cohort.

