

Summit on the Future of Undergraduate Geoscience Education

Sponsored by



National Science Foundation
WHERE DISCOVERIES BEGIN

Held at

Jackson School of Geosciences

University of Texas at Austin

January 10-12, 2014

Summit on the Future of Undergraduate Geoscience Education

Goals:

- **Begin developing a collective vision for undergraduate geoscience education**

Topics:

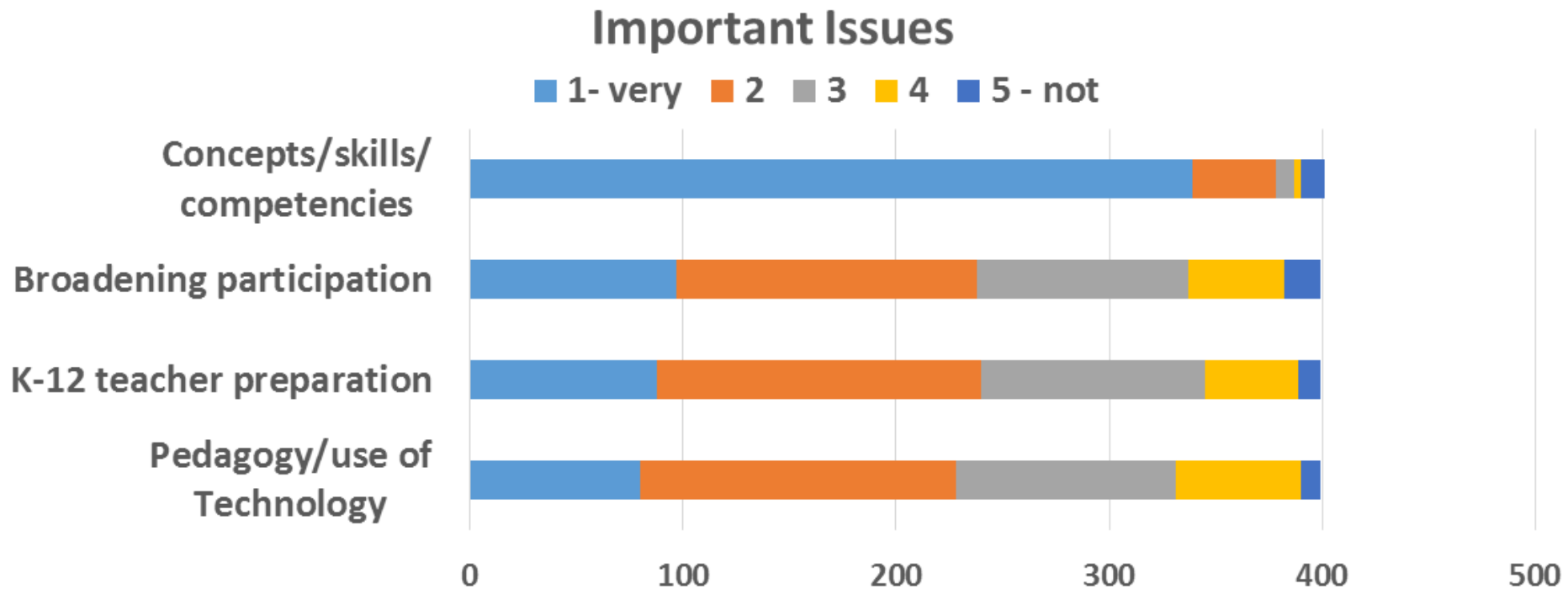
- **What do undergraduates need to know to be successful in graduate school and the future workforce?**
- **What are the best ways of teaching and using technology for student learning?**
- **How can we broaden and increase participation in the geosciences?**

Summit

- **~200 educators representing broad spectrum of undergraduate geoscience education community**
 - R1 research universities with undergraduate programs, 4-year and 2-year colleges
 - Faculty, heads & chairs, education researchers
 - Industry & professional society representatives
 - Working in small groups with collective presentations
- **1st step in development a high-level community vision for the geosciences**
 - Surprising collective agreement
- **Community Survey: 407** respondents so far
 - 345 were not participants; 62 were
 - 338 academics; 69 not
 - ongoing community process

- **What are the most important issues in terms undergraduate geoscience education?**

- **Survey Responses:**

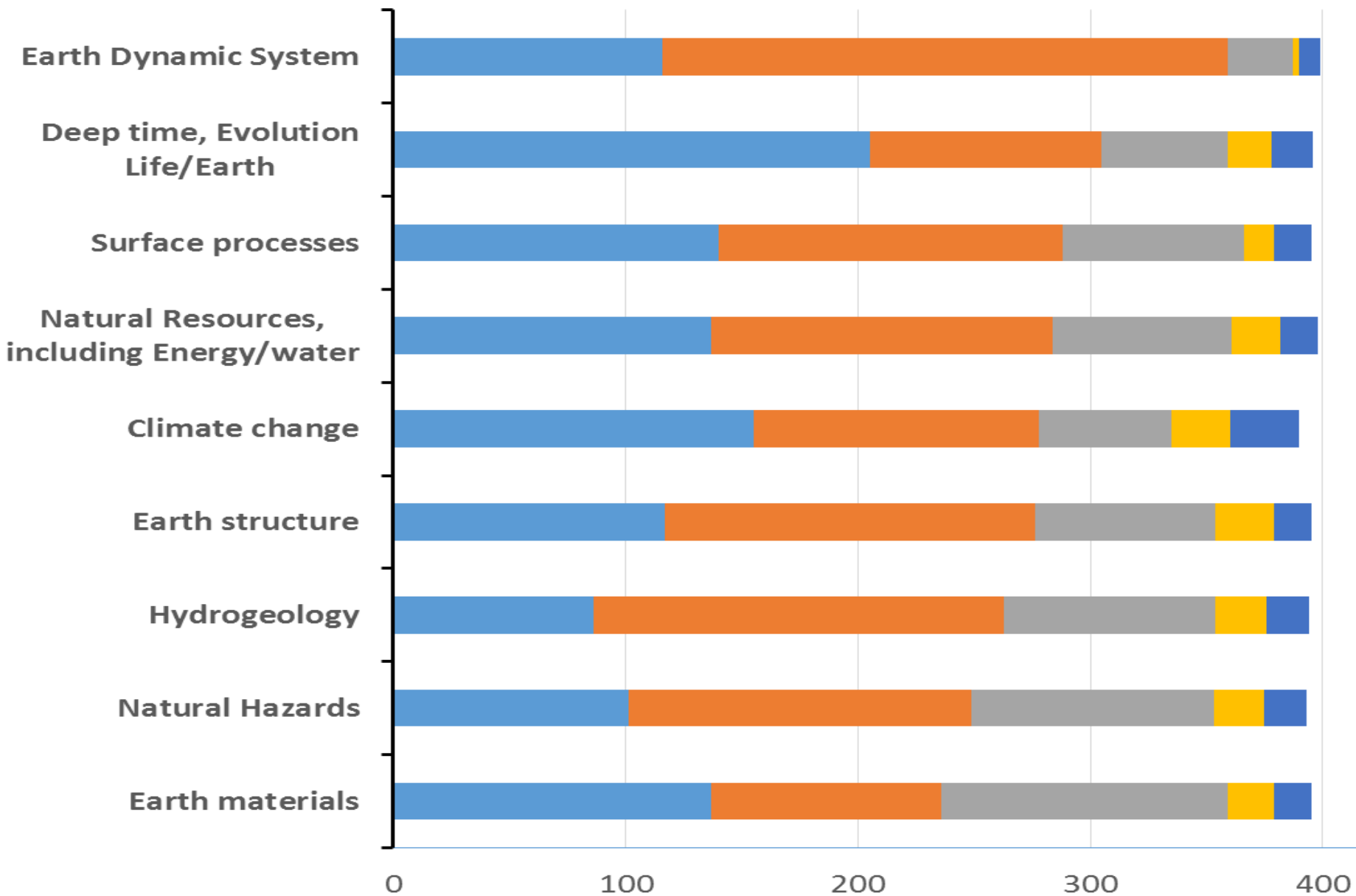


Concepts, Skills, Competencies

- **Major conclusion of Summit**
 - Developing competencies, skills, and conceptual understanding
 - More important than taking specific courses
 - **Survey: 314 Yes, 75 no**

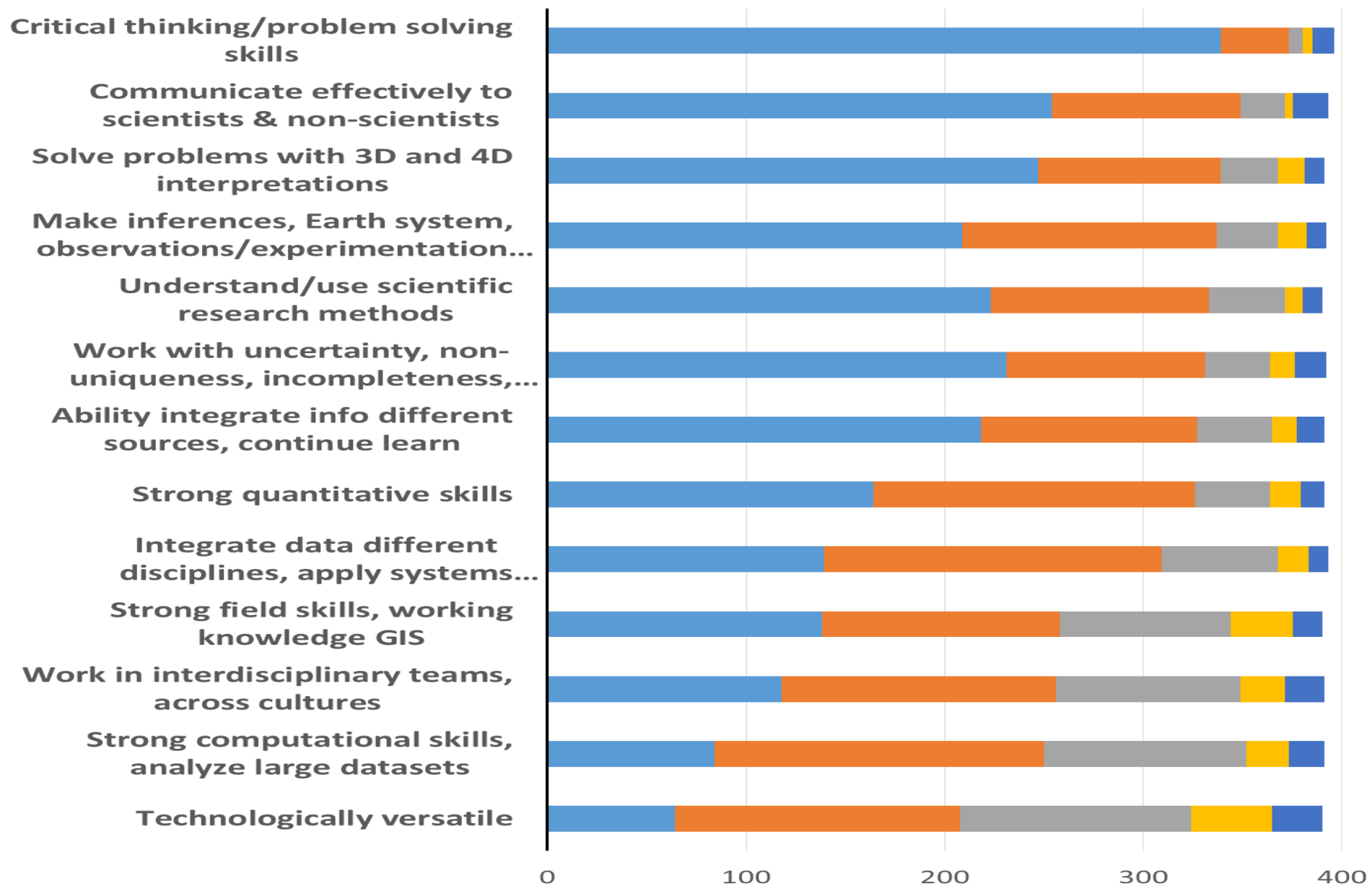
Importance of Concepts

1- very 2 3 4 5 not



Importance of Skills

■ 1-Very ■ 2 ■ 3 ■ 4 ■ 5 not

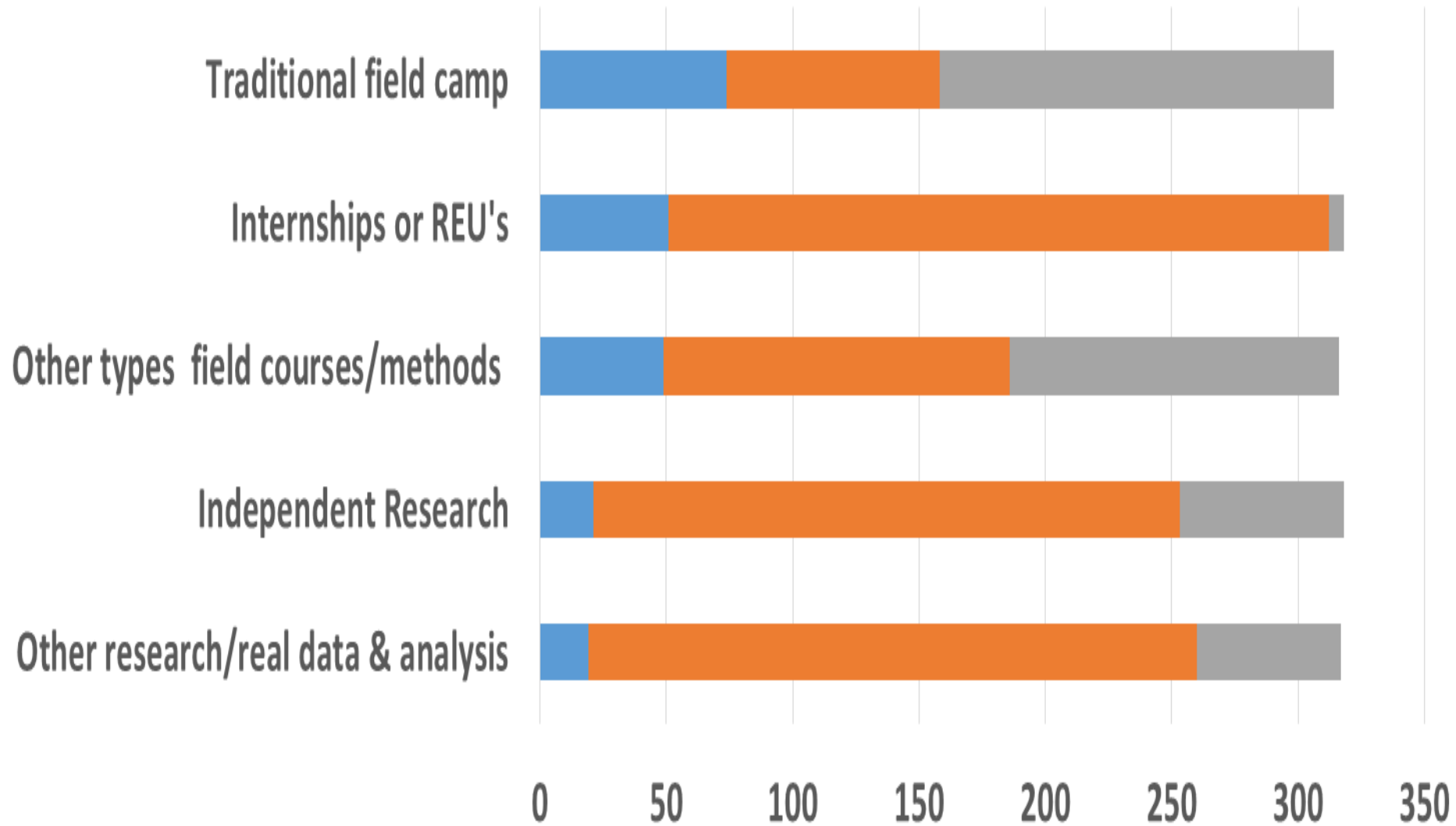


Effective Ways of Developing Skills/Competencies

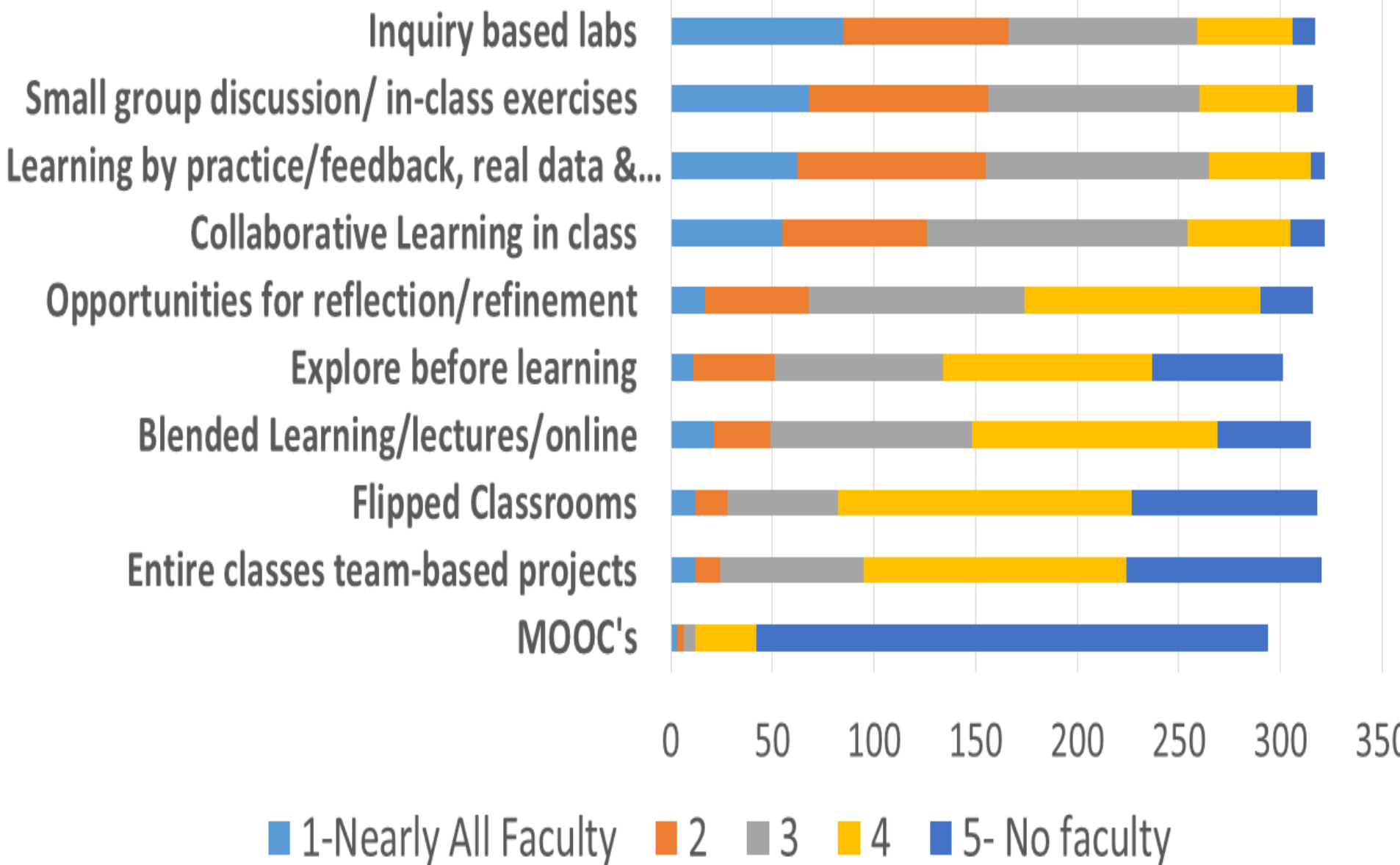
- **Experiential learning**
 - Collaborative, integrative team projects
 - Interdisciplinary projects
 - Exercises using and analyzing real data
 - Fieldwork
 - Internships or REUs
 - Research experiences/projects
 - Flipped classrooms
 - Integration and interactive use of technology
 - Visulation, simulation, modeling, use of real data

Undergraduate Opportunities

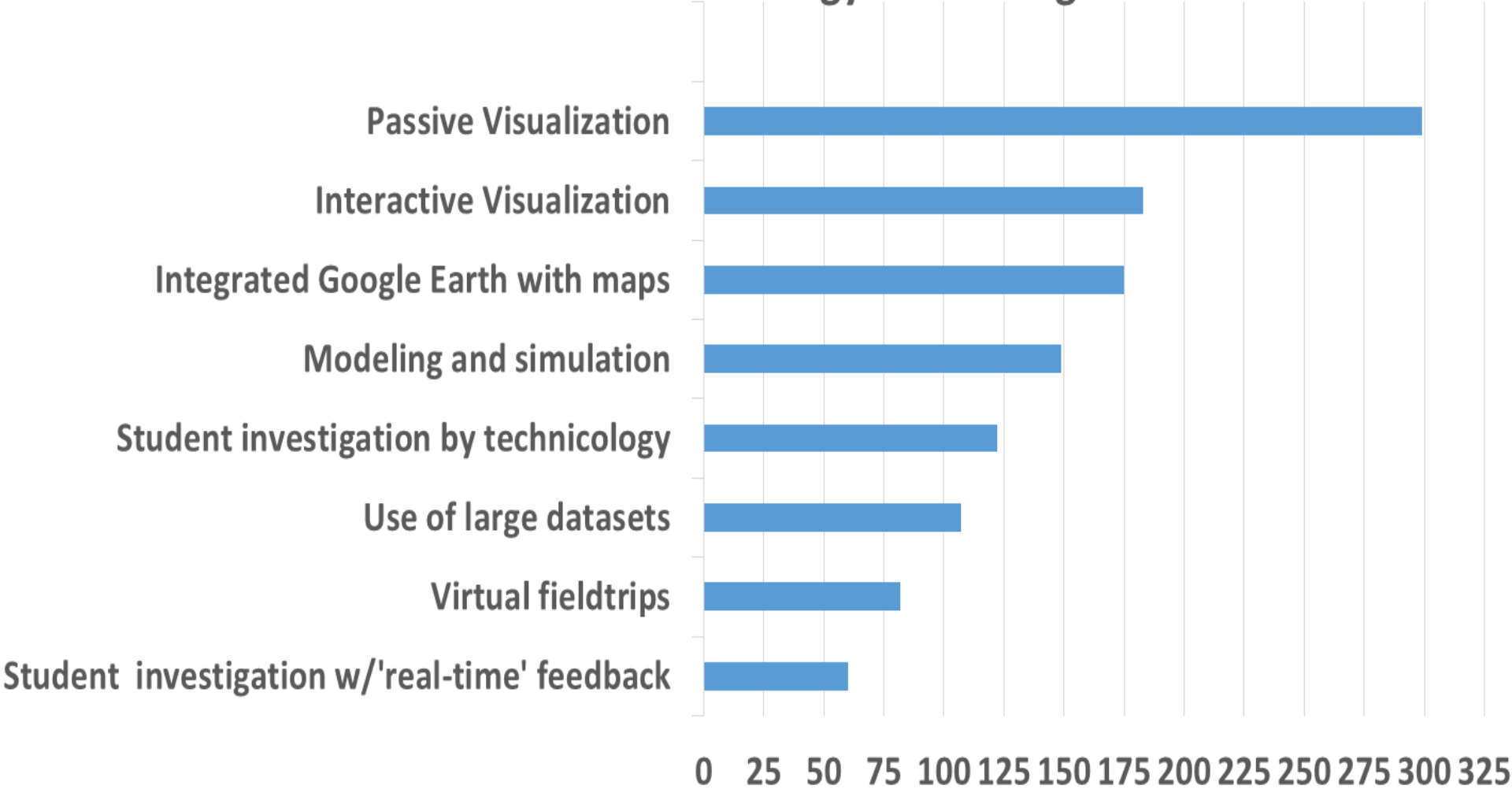
Required Optional No



Department Teaching Methods



Use of Technology in Teaching

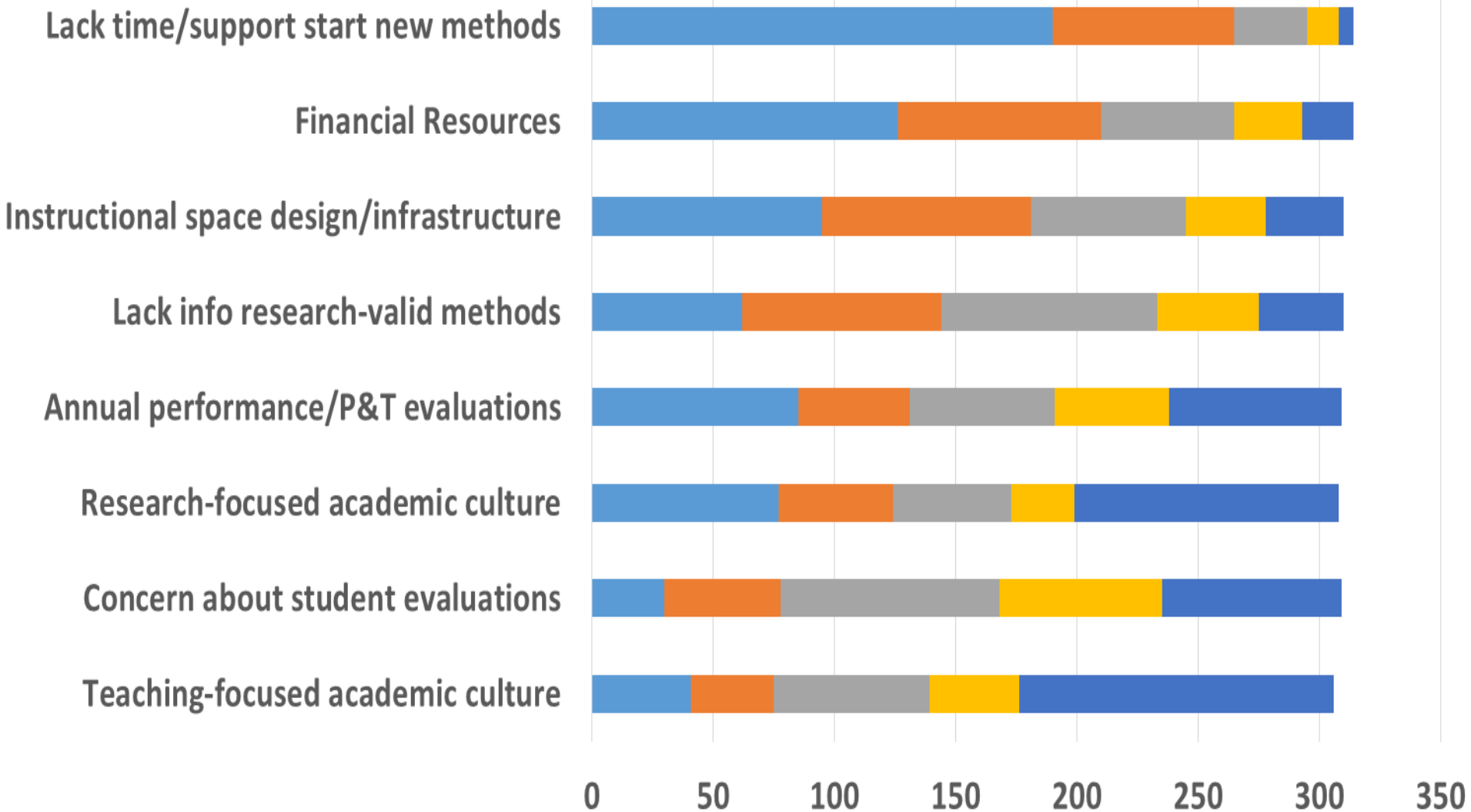


Pedagogy & Use of Technology

- **Use proven active learning methods and pedagogy**
 - Disseminate information, encourage use
 - Illustrate benefits
 - Increase current knowledge base
- **Find ways to remove barriers**

Barriers & Obstacles: New Pedagogies & Use of Technoogy

■ 1-Very impt ■ 2 ■ 3 ■ 4 ■ 5 - not



Preparation of Future K-12 Teachers

- **Integrate Next Generation Science Standards into undergraduate curricula**
 - Prepare future teachers to do the same
- **Integrate math & basic sciences into introductory course content**
 - Provide geologic examples that can be used in teaching those subjects

More information on outcomes in report

Broadening Participation of Under-represented Groups

- **Emulate & develop successful recruiting programs**
 - Provide financial support
 - Reach out to students in their communities
 - Involve members of the community (families, high school teachers, guidance counselors)
 - Incorporate role models
 - Include mentoring
- **Address geosciences image**
 - Emphasize societal relevance & career prospects
- **More information on outcomes in report**

Next Steps

- **Disseminate Summit Outcomes**

- Increase awareness of Summary Report & Survey results
- Obtain more community input through survey
 - Wider audience: Industry, Government, less traditional geological sciences
 - Further refine community vision
- Advocate for a community vision for undergraduate geoscience education – encourage participation

- **Follow-up workshops**

- Industry, government agencies, geoscience societies
 - Define and assess needs from demand side
- Geoscience academic administrators
- Earth Educators Rendezvous workshops

Develop plan for implementation of community vision

- **Sustained change in geoscience undergraduate education**
 - Combined, coordinated efforts of departments and programs
 - Administrators, individual faculty innovators
 - Geoscience professional societies & future workforce employers
- **Affect culture change - administration down to student level**

- **Outcomes:**

- Links on**

- <http://www.jsg.utexas.edu/events/future-of-geoscience-undergraduate-education/>

- **Summary Report**

- **Survey,**

- **Archived Summit webcasts,**

- **AGI/AGU Heads/Chairs Webinar**

Contact smosher@jsg.utexas.edu