

Twenty-First-Century Spaces for Twenty-First-Century Learners: Where We Are, How We Got Here, and What Next

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Abstract

Appropriately designed laboratory and classroom facilities are essential for facilitating high-quality original research experiences for undergraduate students. Project Kaleidoscope (PKAL)—an initiative funded by the National Science Foundation (NSF) that involved leaders of the Council on Undergraduate Research (CUR)—engaged faculty, administrators, architects, campus planners, and other key stakeholders in the intentional design of learning spaces for undergraduate research at primarily undergraduate institutions (PUIs). This article discusses nearly three decades of experience since the initiation of the movement to improve STEM facilities at PUIs nationwide. It poses questions for consideration at the beginning of a space-planning process and presents examples of planning processes from Monmouth University and Skidmore College. It also discusses the Learning Spaces Collaboratory (LSC) and a roundtable model for learner-centered facility planning based on lessons learned.

Keywords: *learning spaces, Learning Spaces Collaboratory, Project Kaleidoscope, science facilities, space planning*

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Background

In the mid-1980s, there was growing concern about the decreasing numbers of undergraduates who intended to pursue doctoral studies and become scientists. The problem was widely recognized but had not yet catalyzed action on campuses or at the National Science Foundation (NSF). In 1986, the National Science Board issued a report (NSB 1986) to NSF that clarified the problem

and expressed a national urgency that it be addressed. The report's authors called on NSF to gather the sense of the community as a prelude to considering new policies, programs, and budgets in support of undergraduate initiatives at NSF. In 1989, NSF invited Jeanne L. Narum to convene a working group representing primarily undergraduate institutions (PUIs) to draft recommendations for the future of undergraduate programs in disciplines funded by NSF. Funding an effort that became Project Kaleidoscope (PKAL) was one step toward gaining that "sense of the community." PKAL's charge from NSF was clear from the start: "Don't point the finger; point the way." Fortunately for PKAL, evidence was starting to emerge about the best measures for achieving success on what works. Data and stories from the pioneering efforts of PUI faculty who had founded the Council on Undergraduate Research (CUR) were beginning to validate the power of undergraduate research in sparking students' passion for becoming research or academic scientists among many other benefits.

Many faculty in the early days of PKAL were also CUR leaders. Together with a diverse group of faculty and administrative leaders from PUI campuses across the country, this leadership group set about establishing a vision for undergraduate learning in science and mathematics. This vision was presented to the community at a PKAL National Colloquium at the National Academy of Sciences in 1992. It defined the following as crucial to undergraduate learning in STEM:

- Learning is experiential, hands-on, and steeped in investigation from the very first day.
- Learning is personally meaningful for students and faculty, makes connections to other fields of inquiry, is