



RETOOLING EMERGING RESEARCH INSTITUTIONS

by Earnestine Psalmonds

STRENGTHENING

the science and engineering enterprise is critical to ensuring that the United States remains globally competitive. Engaging entrepreneurial faculty and providing more opportunities for student participation in research at the university level can help achieve this goal, since research is known to spawn innovation and extremely effective in preparing students for graduate school and science and engineering careers. It seems reasonable, then, to expect that all higher education institutions will be able to optimize their productivity given the slippage of the nation's competitive edge in science and technology. However, that is not the case with a large segment of institutions that are the topic of a recently released National Academies report entitled *Partnerships for Emerging Research Institutions: Report of a Workshop*.

Emerging research institutions (defined in the report as master's colleges and universities, baccalaureate colleges, and tribal colleges) constitute one-third (1,463) of 4,392 institutions of higher education that are listed in the 2005 Carnegie Classification System, and they enroll over 30 percent of the total student population. In addition, excluding the associate colleges, they enroll the largest number of undergraduates and the largest proportion of the minority student population. While the primary emphasis at these institutions is teaching, emerging research institutions (ERIs) can potentially contribute more significantly to research and must play a more prominent role in re-positioning the nation for global competitiveness.

Why can't emerging research institutions simply be transformed into robust research enterprises? For that matter, why can't their faculty successfully compete for research funding directly, thereby garnering the resources to encourage and sustain this significant

activity? How does one initiate research in an environment that is not necessarily research friendly?

The report responds to these questions by profiling emerging research institutions, examining the impact of research experiences on students at ERIs, and then exploring reasons why it is so difficult to cultivate a research climate in these institutions. The major barriers discussed in the report are that teaching loads at ERIs are usually double or triple that of research universities, and many ERIs are limited in the administrative support they can offer their faculty. In addition, the faculty reward system does not compensate adequately for the burdens that ERI researchers must bear or for the full scope of their efforts. The term "partnerships" was chosen to encourage ERIs to align with research universities and other organizations to remedy infrastructure shortfalls and to leverage existing resources.

The report presents a number of approaches to overcome resource and infrastructure barriers facing ERIs:

FACULTY TIME. ERI teaching loads are high, typically three to four courses per semester. Moreover, because these institutions try to maximize student access to courses, classes often are distributed across day and evenings and include both Monday-Wednesday-Friday and Tuesday-Thursday slots. This means that there are no blocks of uninterrupted time to perform research. The combination of high teaching load, high advising load, extra administrative duties and limited institutional capacity for release time creates an unmanageable situation for many ERI faculty who would otherwise take an active interest in research. This phenomenon is supported by a 2002 Research Corporation study on the role of research in the natural sciences at undergraduate institutions where faculty concur that the major

barrier to research participation is workload. The problem is that the percentage allocation of faculty time for teaching and research at ERIs has not changed over time, although both are more time intensive today than in the past. Research must be continual in order for it to be sustained; it can no longer just be a summer activity.

Proposed solutions to the faculty time issue include: (1) consolidating many small classes into fewer large ones; (2) formulating a research project as an undergraduate class to leverage the resources allocated for teaching; (3) consolidating teaching schedules to provide time blocks for research; (4) providing "reassigned time" for faculty, especially new faculty, with institutional funds or through aggregated teaching replacements among multiple institutions; (5) collaborating to implement faculty sabbaticals at research universities; and (6) capitalizing on internal faculty development activities, such as proposal development groups and peer mentoring.

TARGETED INVESTMENTS. Developing a research enterprise is difficult and expensive, but good strategic planning and investment can optimize the results and minimize the liabilities. Internal funding should support activities such as research initiation grants, summer salaries for young investigators, laboratory space, and travel. Also, establishing research niches and cultivating research experts can enhance competitiveness and attract quality faculty and students. Realistic estimates of expenditures needed for research support personnel, materials, and equipment will help guide decisions about research investments.

The University of Texas at El Paso (UTEP) is exemplar in this respect, having grown from a research funding base of about \$4 million per year in 1989 to more than \$45 million in 2006, largely through the activities of the Colleges of Education, Science, and Engineering where investments were targeted to a few faculty within a subset of departments. Those researchers' ability to generate research revenue paved the way for the next generation of researchers to enter a more research-intensive environment with more robust resources. This approach allows emerging research institutions to focus on areas in which they are uniquely suited by virtue of geography, access to special populations,

prominent alumni, or unusual faculty expertise, thus making success more likely.

INSTITUTIONAL RESOURCES. The infrastructure requirements that enable ERIs to participate more fully in research are an office of sponsored research, office of technology transfer, efficient business support services, and centrally supported information resources such as information technology and journal subscriptions. Many ERIs have very limited research support units with professional staff who can provide comprehensive pre- and post-award services to faculty and too few persons with delegated signatory authority.

Institutions with more research revenue can possibly support at least one grants officer, whose full time responsibility is managing the institutional administrative responsibilities related to federally funded research programs, an allowable cost under OMB Circular A-21. The report stresses that having even one trained person to support the faculty can make an incredible difference.

Some ERIs consider technology transfer beyond their purview, although they concede that establishing an office of technology transfer is a core element of a viable research infrastructure. However, they are challenged by a culture that is risk averse and not entrepreneurial, with limited research expenditures, hiring and promotion policies that do not reward technology transfer activities, and a lack of administrative support.

An NSF study entitled "Technology Transfer and Commercialization Partnerships" prepared by Innovation Associates, Inc. argues that ERIs indeed can be successful in this area. The study presents case studies of smaller colleges and universities, including one community college, with modest research expenditures that have been successful in licensing their innovations and starting new companies. Their success was attributed to a commitment to research, concentrated on specific research niches, hired faculty with expertise in those areas, and cultivated partnerships with local industries. Some participated in state-funded collaborative research centers and leveraged those funds to attract federal funds. The study cites the need for technology transfer and commercialization mentoring for emerging research institutions.

Partnerships with other institutions and organizations for economies of scale can enable ERIs to provide services such as

sponsored research administration, technology transfer, and grants management. The report mentions the GrantsPlus program at the Research Foundation of the City University of New York as an alternative to establishing a post-award administrative office. The web-based systems facilitate fiscal management and reporting, sponsor liaison and compliance management, payroll, fringe benefit administration, vendor payments, time and leave tracking, and more. The fee for the service is a small percentage of grant expenditures and can be written into a grant as a valid direct or indirect cost.

There also are initiatives for journal subscriptions and faculty sabbaticals funded by state systems of higher education. Examples include the Georgia Library Learning Online (GALILEO) project and Faculty Development Program. GALILEO is a statewide virtual library and an initiative of the Board of Regents of the University System of Georgia that provides access to its 8,000 journal subscriptions to practically every library in the state. The Faculty Development Program, no longer operational, enabled ERI researchers to spend a semester or year at the Georgia Institute of Technology to position themselves to compete for grant awards. Both institutions reported reciprocity in the knowledge exchange and anecdotes about extended research collaborations and continuing publication streams. The ERI researcher received start-up funding to launch a research program upon return to his or her institution.

The Federal Demonstration Partnership (FDP), a membership organization dedicated to streamlining the administrative burden related to research, also is a valuable resource for ERIs. Because the FDP counts federal agency representatives among its members, its meeting agendas offer very timely insights into upcoming changes in federal grant requirements and procedures. The FDP has an emerging research institutions membership category, which is an excellent environment for ERI research administrators to network with federal program officers and peer administrators from research intensive as well as emerging research institutions.

FACULTY REWARD SYSTEM. The faculty reward system at ERIs reflects the values they assign to scholarly activity consistent with their mission. In *Scholarship Reconsidered*, Boyer challenged universities to adopt a broader paradigm for defining scholarly activity, replacing the

traditional definitions of research. Thus, as ERIs shift to a greater emphasis on research, they must institute faculty reward structures that affirm that commitment while recognizing the synergy of teaching and research. ERIs are urged to place greater emphasis on "scholarly activity" in faculty evaluations and provide rewards for faculty-directed (non-sponsored) and undergraduate research. The rewards and incentives should include laboratory space; more flexible teaching loads; consistent faculty evaluation, tenure and promotion policies and practices; start-up packages for new faculty; returned overhead to principal investigators, and strong advocacy for the researchers themselves.

ADMINISTRATIVE LEADERSHIP. Leadership at all levels is pivotal to transforming the institution by publicly embracing a research culture, stimulating internal collaboration to leverage resources, and providing research access and opportunities for more students. In addition, administrators should encourage researchers to share their findings and promote more interdisciplinary activities. ERIs can develop "learning communities" especially for junior faculty where there is not a critical mass of disciplinary expertise in one department, thus helping young faculty members find the synergy needed to incubate and nurture innovative ideas.

In conclusion, partnerships among ERIs, research institutions, and other organizations can offer solutions to the impediments to research. The National Academies report reinforces the notion that research and education are not mutually exclusive, particularly in the context of academic quality, and that ERIs should exploit the resources that can propel them into more competitive enterprises. In closing, and as one National Academies workshop participant stated:

"The rest of the world is shifting bases. And I think that faculty, both in research universities and small institutions, will have to undergo what amounts to a paradigm shift in the way they work and think. And we have to start with research behavior."

Earnestine Psalmonds, a Senior Program Officer at the National Academies, is a visiting scholar from the National Science Foundation. This work was supported by the National Academies and NSF, but the opinions expressed are solely those of the author and the workshop participants and do not necessarily reflect the views of the National Academies or NSF.