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Prepared for
the Texas
Higher Education
Coordinating Board



Managing the Expansion of **Graduate Education** in Texas

**EXECUTIVE
SUMMARY**

For more information on this publication, visit www.rand.org/t/RR1899z1

Library of Congress Cataloging-in-Publication Data is available for this publication.

ISBN: 978-0-8330-9759-0

Published by the RAND Corporation, Santa Monica, Calif.

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Preface

The Texas Higher Education Coordinating Board (THECB) recently adopted a new statewide strategic plan for higher education, the *60x30TX* plan. The plan calls for at least 60 percent of 25- to 34-year-olds in Texas to hold a higher education degree or certificate by 2030. Meeting this target will require significant expansion of higher education in Texas. While the plan does not set targets specifically for graduate education, the state recognizes the important role graduate education plays in advancing Texas's economic competitiveness by preparing a skilled workforce and spurring innovation.

To examine issues related to graduate education in Texas, the College for All Texans Foundation, which works to further the objectives of THECB, asked RAND Education, a unit of the RAND Corporation, to conduct this study. One goal of this study was to help THECB, higher education systems, and individual higher education institutions in Texas assess the need to expand their master's, doctoral, and professional programs. In addition, THECB expects to develop a strategic plan to align graduate education in the state with the goals of the *60x30TX* strategic plan. Findings from this study may be useful in framing issues that THECB should address in that strategic plan.

This research has been conducted by RAND Education, a unit of the RAND Corporation that conducts research on prekindergarten, K–12, and higher education issues, such as preschool quality rating systems, assessment and accountability, teacher and leader effectiveness, school improvement, out-of-school time, educational technology, and higher education cost and completion.

We circulated a draft of this report for public comment and peer review and have addressed the comments we received in this final report.

This document is a summary of the full report. The full version of the report is available at www.rand.org.



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EXECUTIVE SUMMARY

Graduate education is a crucial factor in meeting national, state, and local workforce needs, and in Texas the number of master's, doctoral, and professional degrees has been growing—increasing by 40 percent over the past ten years. In 2014, Texas institutions awarded about 44,000 of these degrees.

The Texas Higher Education Coordinating Board's (THECB) adoption of the 2015 *60x30TX* strategic plan is also likely to affect the number of graduate degrees. The strategic plan calls for at least 60 percent of Texans ages 25–34 to hold a quality higher education certificate or degree by 2030 (THECB, 2015), which will require higher education institutions in Texas to increase their annual degree and certificate awards by about 80 percent over a 15-year period. Growth in annual degrees is also likely to lead to an increase in graduate education that at a minimum matches its growth rate over the past decade. Graduate education expansion needs to be well managed and directed toward the fields that need advanced skills the most; otherwise graduate programs could become misaligned with state needs and resources.

Both public institutions and private colleges offer higher education in Texas. However, Texas's higher education relies much more heavily on its public institutions to produce graduates compared to some states such as California, Florida, and New York. Texas also has an unusually complex ecosystem of public higher education compared to many states. The higher education system includes 48 public universities, of which 38 are general academic and ten are health-related institutions. These institutions offer undergraduate programs and master's, doctoral, and professional degrees. Almost all of the universities belong to one of six different state university systems; only four institutions are not part of a system.

THECB, a state agency that oversees all public postsecondary education in Texas, is tasked with reviewing new degree programs. Programs that require more than \$2 million in new investment during the first five years, as well as all new engineering degree and doctoral program proposals, require an in-depth review. Other programs can be approved without an in-depth review.

Study Goals and Objectives

While the 60x30TX plan calls for a general expansion of higher education in Texas, this study looks at evidence from labor market data, comparisons with other states, and discussions with institution and system leaders to assess Texas's need to expand graduate degree production in particular. THECB expects to develop a strategic plan to align graduate education in the state with the goals of the 60x30TX plan. Findings from this study may be useful in framing issues that THECB should address in that strategic plan.

Specifically this study had three objectives:

1. Assess the need to expand graduate programs in Texas public higher education institutions.
2. Provide guidance to THECB and higher education institutions on how to prepare and evaluate graduate program proposals.
3. Recommend policies to manage any needed expansion of graduate programs in Texas.

Approach

We chose a mixed-method approach for this project. We used quantitative methods to assess (1) Texas's position in graduate education and research, and (2) Texas's labor market demand and need for graduate education. In addition, we conducted in-depth qualitative case studies at 12 Texas public institutions to understand what motivates institutions to expand graduate programs. In our analyses, we compared Texas to the three other largest states in the country: California, New York, and Florida. Each of these states has a significant number of universities with graduate education and research missions.

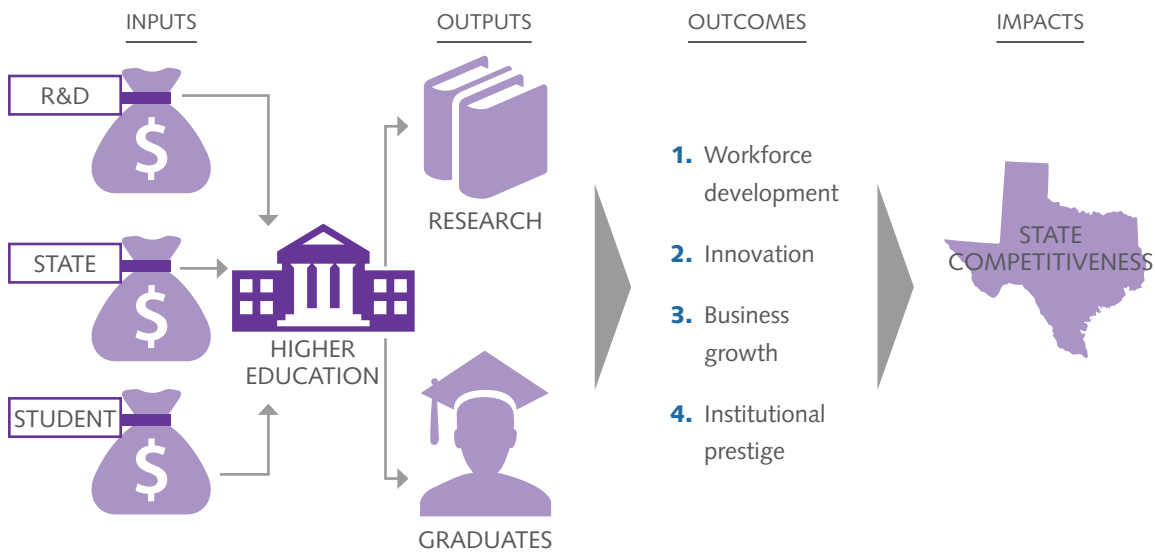
To guide the examination of the factors that influence graduate education, we first created a logic model depicted in Figure S.1 on the next page. The logic model shows the inputs, outputs, outcomes, and impacts of graduate education. While the logic model presents the factors sequentially, the reality is more complex. However, the logic model highlights critical factors for which information is available to examine the relationship from initial inputs into higher education institutions to the ultimate impacts of interest.

In this study, we focus on state competitiveness as the ultimate impact of interest for THECB and state policymakers. Inputs for public higher education institutions include research and development (R&D) obligations, state appropriations, and student tuition, which lead to high-quality research and well-prepared graduates. These outcomes help create a strong workforce, fuel innovation, promote business growth, and improve institutional prestige, ultimately strengthening the state's overall competitiveness. Students who earn graduate degrees are also likely to benefit from expanded career opportunities and higher incomes.



Stephen Coburn/Fotolia

Figure S.1. Logic Model



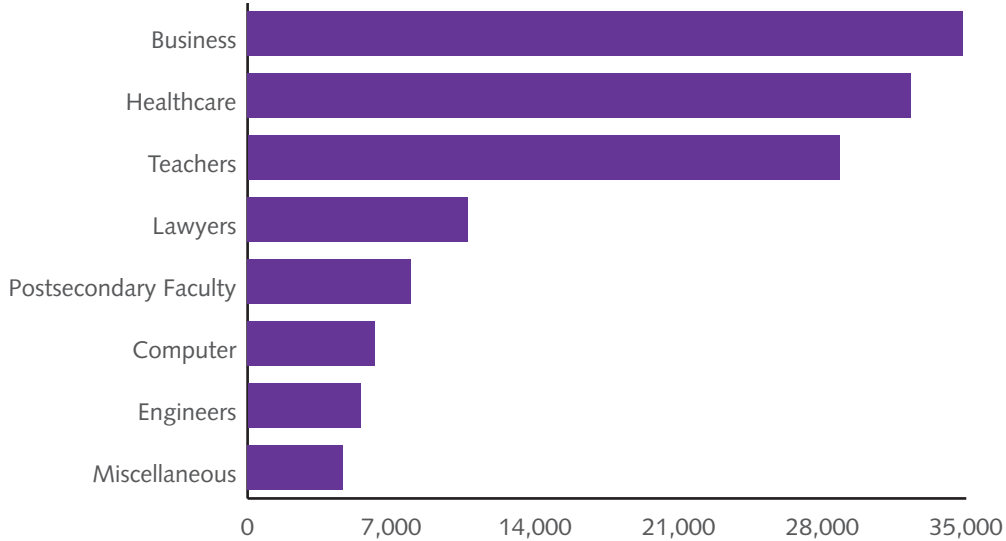
Labor Market Demand for Graduate Degrees

Labor market demand provides a critical signal about the level of education and type of skills employers are looking for, which informs the type of education universities should provide. But it is challenging for higher education institutions to measure and interpret labor market demand. They have difficulty because some graduate degrees, like undergraduate degrees, are a close match for particular occupations and others are much more generally applicable.

In this study, we examined labor market demand by estimating which occupations in Texas will likely see the largest increase in new jobs requiring a graduate degree over the next few years. Figure S.2 summarizes our projections. Across the top occupations for graduate demand, we estimate more than 120,000 new jobs requiring graduate education will be created in Texas between 2012 and 2022. As the chart shows, business, healthcare, and teachers are the groups with greatest demand.

The Texas Workforce Commission (TWC) data that we used to estimate labor market projections are based on economic forecasts and historical trends in employment. Thus projections for lawyers and perhaps other occupations may not reflect trends that have changed in these occupations since the forecasts were made.

Figure S.2. Occupational Groups with Highest Projected Graduate Demand in Texas, 2012–22



Note: Bars indicate the projected number of new jobs requiring a graduate degree created over the ten years between 2012 and 2022.

SOURCE: RAND calculations from TWC and ACS data.

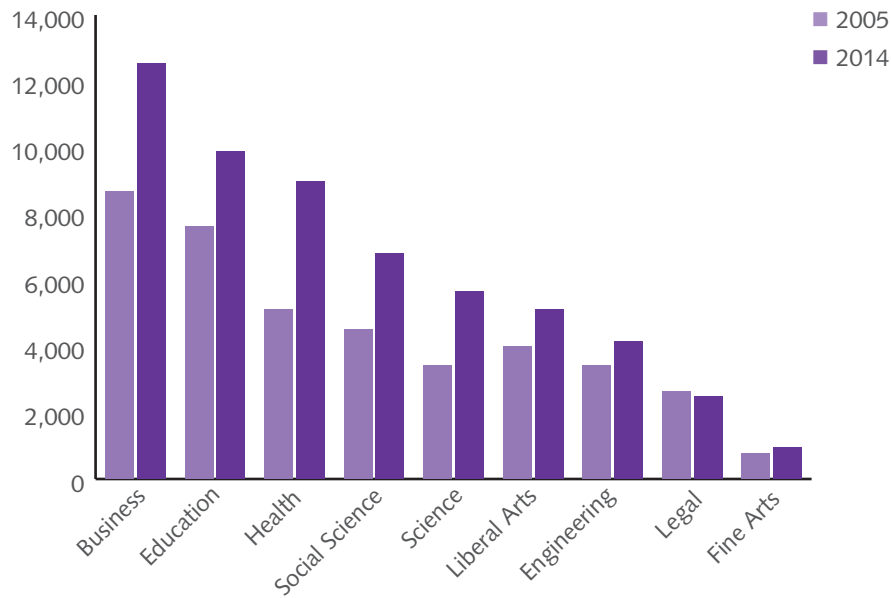
Growth of Texas Degree Production

We also examined graduate degree production by broad field to understand if Texas's recent growth in graduate degree production signals a potential for the state to match future demand. Figure S.3 indicates the number of graduate degrees for Texas in 2005 and 2014 for broad fields. These fields do not map directly to the labor market data in Figure S.2 but in some cases can be compared directly to the occupational groups shown in that figure.

The chart in Figure S.3 highlights that Texas's increased graduate degree production since 2005 has mainly been in business and health fields. Graduate degree production in business fields grew by about 48 percent and in health fields by about 75 percent. The strong projected demand shown for the related occupational groups in Figure S.2 may indicate a continued need for growth in business and health graduate degrees.

Given the projected increase in graduate demand, Texas appears to be better positioned than the comparison states to produce enough graduates in education. The situation is different in engineering, however. Over the ten-year period we examined, growth in graduate engineering degrees in New York (67 percent), Florida (62 percent), and California (40 percent) outpaced growth in Texas (21 percent). But even as engineering degree production in Texas has been slow to grow, engineering jobs in the state have increased an estimated 30 percent in ten years and are projected to grow two to three times as fast as these other three states, potentially leading to unmet demand. Of course, the high production in other states may allow employers to recruit engineers from these states to meet some of their demand.

Figure S.3. Graduate Degree Completions by Broad Field, 2005 and 2014

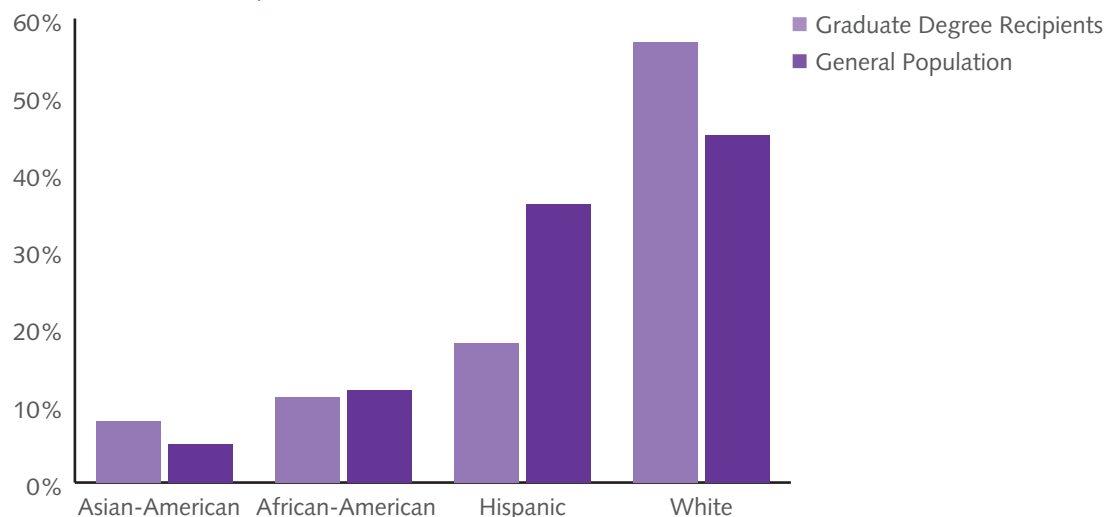


SOURCE: RAND calculations from IPEDS data.

Racial/Ethnic Composition of Graduate Degree Recipients

Texas has a large, diverse population, and its Hispanic population is growing particularly rapidly. However, Figure S.4 shows that Texas's graduate degree production does not fully reflect this reality. When looking at the racial/ethnic distribution of 2014 public institution graduate degree recipients (as a fraction of those who are citizens or permanent residents) compared to the general Texas population of 18- to 64-year-olds that year, whites and Asian-Americans are overrepresented, and Hispanics are significantly underrepresented. Public higher education institutions seeking to increase the representation of minorities in graduate education face a significant challenge, especially as Texas's population continues to grow and become more diverse.

Figure S.4. Percentage Race/Ethnicity Distribution of Public University Graduate Degree Recipients and General Population (18- to 64-Years-Old) in Texas, 2014



Note: Smaller racial groups omitted.

SOURCE: IPEDS and Current Population Survey.

Texas's Position in Graduate Education and Research

To this point, we have focused on historical trends to estimate how Texas's higher education ecosystem might meet a relatively straightforward concept of labor market demand, but other factors also play a key role in bolstering Texas's competitiveness and ability to attract employers. Employers who are making location decisions, especially in innovative industries that demand a base of R&D, consider a number of issues, including the broader and longer-term outcomes highlighted in the logic model in Figure S.1: workforce development, research performance, and institutional prestige. To understand Texas's standing in these areas relative to other large states, we compared Texas to California, Florida, and New York.

Graduate Degree Production

Texas has grown its graduate degree production by more than 41 percent over the ten-year period from 2005 to 2014. This increase represents the largest percentage growth of any of the states analyzed. However, Texas still remains behind California and New York in total graduate degree production. When controlling for population size, Texas's production is comparable to California's production, above Florida's, and below New York's. Unlike the comparison states, the vast majority of Texas's graduate degree production is supplied by public institutions.



Monkey Business/Fotolia

Graduate Attainment

We also examined the overall graduate attainment rates for each state's population of 25- to 64-year-olds to understand how degree production is influencing the overall workforce. While Texas's graduate attainment is growing, it remains behind comparison states.

Research

We examined the overall funding the federal government—the top funder of research to universities—has obligated to universities from 2004 to 2013 (latest data available) to better understand how Texas has performed in this area. Despite relatively stable overall funding, Texas's share of obligations has declined in recent years. In 2013, Texas received only 34 percent of the total level of funding provided to California. Adjusting for population differences, Texas reached about 49 percent of California's funding level, 44 percent of New York's, and 156 percent of Florida's.

Ranking

Institutions that admit the brightest students and produce the greatest research also are regarded as having prestige. Graduate degree production and research funding are good signals of institutional prestige, but at the state level, another way to directly measure prestige is the number of universities recognized by the Carnegie Classification of Institutions of Higher Education, which categorizes universities by research intensity. Texas is increasing its number of Carnegie-recognized research universities faster than the others states we analyzed.

Global competition, however, is increasing, as reflected in international ranking lists. On ShanghaiRanking's global top 500 list, Texas and Florida each lost one institution between 2005 and 2015, while California and New York maintained their numbers. Looking specifically at the most competitive range, only four of the ten Texas universities in the top 500 in 2015 were ranked in the top 100. By contrast, 11 of California's 13 ranked universities were in the top 100. New York had four in the top 100, and Florida had one. This result indicates that while Texas is broadly competitive internationally, competition is increasing, and Texas has less representation at the most-competitive levels compared to California.

Strategies for Raising Competitiveness

Texas's position compared to other states and countries is important to its state competitiveness. The ranking indicators we presented in the previous section show that Texas is increasing its number of Carnegie-recognized research universities at a fast rate but, especially compared to California, is not represented at the highest levels of international competition and does not attract the same share of federal research funding. If Texas desires to further increase the competitiveness of its universities, it will likely need additional investments in research capacity.

Research universities benefit from a concentration of resources and deliberate strategies to invest in research activity (see Brewer, Gates, and Goldman, 2002; Salmi, 2009). Since California separates public universities into two systems based on mission, it can direct higher levels of funding to the research-intensive University of California campuses compared to the California State University campuses. Texas, on the other hand, allocates funding for education based on semester credit hours, broad field, and level of education but with no higher funding rates based on the research mission of certain campuses. Instead, Texas provides some state funding specifically based on research activity, recognizing that public universities need investments in research programs to promote excellence.

We found that the basic design of these funding programs is sound in aiming to increase the research capacity of Texas public institutions. The programs generally concentrate additional state resources on institutions that have already developed a measure of success in building research programs. Furthermore, they allocate funding based on measured performance in attracting research funding or, in the case of the Governor's University Research Initiative (GURI), to campuses that can attract world-class researchers from out of state.

Recommendations

To enhance the competitiveness of Texas public higher education institutions, continue, and consider increasing, state research program funding. To continue to build the competitiveness of Texas public institutions, the state should continue its research funding programs and may wish to consider increasing funding. Such increased funding could provide a greater match rate to campuses, further accelerating the development of research infrastructure on campuses that have shown some success in building nationally competitive research programs.

To enhance institutional ability to recruit key researchers from other states, consider more flexibility in the GURI. Specifically with regard to the GURI, representatives of some emerging research universities with low endowments stated that while they might be able to attract notable out-of-state researchers who would qualify for this funding, they did not have sufficient flexible funds (like endowment income) to meet the local matching requirement with nonstate funds. The state may wish to consider a more flexible approach to matching requirements that allows a broader selection of universities the opportunity to attract these researchers to Texas.

Graduate Program Decisionmaking Process

The case studies focused on analyzing the decisionmaking process at the institution level, emphasizing factors both internal and external to the institutions. From our case study interviews, we identified a number of motivators that lead institutions to propose new graduate programs. Some motivators are concerned with institutional prestige—or how an institution is positioned (as a whole or within specific fields) relative to other institutions and how it views and understands its mission. Other motivators are closer to the departmental level because they focus more on expanding specific graduate programs as a result of student or labor market demand, increased competition among graduate programs within the field, or new requirements from professional organizations. Therefore, in Figure S.5, we classified these motivators across a continuum, representing different levels at the institution.

Figure S.5. *Institutional Motivators for New Graduate Degree Programs*



Seeking Research-Intensive Status or Concentrating in a Specific Field

Texas may wish to increase the number of public research universities that are nationally and internationally competitive. However, there are challenges associated with institutional movement. One challenge is that such movement might lead to changes in the mission of the institution and affect student access, especially since institutional ranking takes into account undergraduate admission and selectivity. Another challenge is that the pressure to become a research-intensive institution may lead to the expansion of graduate programs that are not essential in meeting student or labor market demand, such as academic Ph.D. programs. This is because to become research intensive, an institution would need to have a large number of Ph.D. programs covering multiple disciplines. Institutions might establish such programs even if there is not a clear need for them in Texas's labor market.

We provide two recommendations pertaining to institutional positioning and expanding research agendas. The first relates to proposal review, and the second addresses a broader issue related to changes in institutional mission and student access.

Recommendations

Place more emphasis on institutional support and policies in reviewing doctoral program proposals. Although THECB currently considers the institution's strategic plan in its review of doctoral program proposals, it could place more emphasis on links between proposed doctoral research programs and the availability of institutional support for research as well as institutional policies conducive to research.

If the doctoral program changes the institution's strategic plan or direction, THECB could require the institution to make changes to its strategic plan first to embody and support the proposed doctoral program. However, it is important that THECB not systematically exclude institutions from expanding into doctoral education, or expanding their doctoral offerings, provided the institutions have supportive missions, strategies, resources, and policies.

Review student access regularly and consider alternative pathways when needed.

Although institutions should be able to expand their research or Ph.D. programs, they and the state should also be sensitive to how such expansion could affect student admission to undergraduate programs. The institution or its system could periodically review any changes in student access. If changes in admission occur, we recommend that the institution or system explore alternatives for how to serve students who would no longer be admitted, for instance through expanding articulation with community colleges or even expanding their own student population to ensure access to less academically prepared students. THECB could provide general guidelines on how institutions could deal with student access issues if missions change.

Engaging in Positive Margin Activities

A critical objective for expanding master's programs is to generate revenue that could be used for strengthening and supporting doctoral programs. This objective is not a concern as long as the master's programs are meeting workforce and student demand and their quality has not been compromised. Although some departments have master's program accreditation review, many do not.

Recommendations

Ensure the quality of master's programs through accreditation or an alternative process.

While all graduate programs must be externally evaluated at least once every seven years, institutions may opt for a specific external review if the program is not accredited by a recognized body in the academic field. One option to ensure the quality of master's programs is for them to be accredited, if accreditation for the subject matter is offered by accrediting agencies. Another option is for institutions to implement a rigorous quality assurance process that uses independent experts to assess the quality of the programs on a set of criteria that are already established in the field. Obtaining accreditation or evidence of some review by external experts is likely to improve how employers and prospective students view the legitimacy of the program, which in turn would increase an institution's competitive edge.

Develop THECB criteria for evaluating online master's program quality. THECB could also provide guidance to institutions on how to evaluate the quality of their online master's programs. Many online programs are approved as simple changes of delivery mode from existing face-to-face programs rather than undergoing a full proposal review. The Learning Technology Advisory Committee and THECB could develop criteria for reviewing online master's programs, including those changing their delivery mode. Institutions could be involved in this process or asked to provide input regarding the criteria.

Competition

Competition can be healthy and lead to innovative and high-quality programs, but it can also have a downside. Competition may generate program duplication if similar graduate programs are vying for students within the same geographic area. To keep competing programs from closing down, institutions might change their standards to attract less academically prepared students, and the quality of the programs might be affected. Furthermore, online programs, especially in education and some of the health sciences, tend to be similar and have no geographic boundaries, resulting in both increased competition for student enrollment and duplication. However, engineering online programs often do not face the same issues since these graduate programs attract international students and the supply of international students is greater compared to domestic students.

Recommendation

Avoid program duplication by promoting collaboration rather than competition at the system level. University systems could use their periodic meetings of provosts to discuss how to best manage competition among their campuses, reduce redundancy, and encourage healthy competition and collaboration. This recommendation does not mean that there should not be similar graduate programs within the same system or across systems. As long as there is student and workforce demand and the programs are of high quality and are serving various regions in Texas, duplication is not a problem. However, in instances where the student and workforce demand are insufficient and not all institutions are equally equipped to implement high-quality research graduate programs, collaboration among institutions to provide graduate education benefits the institutions, system, and state. University systems could explore ways to incentivize collaboration. They also could provide resources and technical assistance to help institutions develop joint graduate programs that emphasize institutional strengths and build on their capacities.

Labor Market Demand

Reliable employment forecasting is very challenging. Demand for new skills depends on a number of factors, including technological progress, government policies, and global conditions. For some disciplines, such as humanities, assessing demand is even more difficult because there is no clear link to one occupation, but such disciplines could be preparing students in general skills that apply to many occupations.

However, institutions could improve their mechanisms for matching their graduate programs with workforce needs by engaging in ongoing research activities and surveying employers and graduates to assess demand for skills and the quality of graduates.

Recommendations

Support institutional access to labor market analysis tools. THECB currently encourages institutions to use national and state data to determine workforce needs when proposing new graduate programs. THECB could acquire licenses or facilitate joint licenses for commercial products that simplify the use of these government data and add real-time analysis of job postings.

Provide guidance on acceptable data sources beyond the Bureau of Labor Statistics (BLS) and TWC. THECB currently encourages institutions to use BLS and TWC data to determine workforce needs when proposing new graduate programs. But such databases have shortcomings because the datasets do not map specific degrees to workforce data.

To capture labor market needs, institutions should follow traditional methods for data collection and analysis, including primary and secondary quantitative and qualitative data. THECB could support institutions by identifying some of the acceptable approaches for continually obtaining data from employers and increase institutional engagement with industry.

Provide education and training to ensure that data and tools are used wisely and effectively. THECB could help build institutions' capacity to identify workforce needs by providing training and workshops on how to use available workforce datasets, how to solicit pertinent workforce information, and how to interpret the resulting data.

Track graduate job placement. Finally, THECB could require institutions to track student job placements during the program review to see if the graduate programs have placed students in the labor market as intended. This requirement will signify to institutions the expectation to track this information and to invest in efforts to analyze labor market data more systematically. Institutions are likely to need additional resources to be able to track graduate student placement, especially at the master's level. The state could explore options for providing resources to the institutions.

Student Demand

Appropriately using student demand information to inform the expansion of programs is challenging for institutions when there is no agreed-upon measurement metric.

Recommendations

Identify best practices for measuring student demand. THECB could identify best practices and provide institutions guidelines on how to measure student demand.

Provide guidance on balancing student and labor market demands. THECB could also clarify for institutions how to balance the needs measured by student demand and labor market demand, especially in instances when such needs are misaligned.

Emerging Multidisciplinary Fields

Certain fields need graduates with multidisciplinary skills, but whether the best way to develop those skills is through a master's degree or certification is likely to vary by field and proposed program.

Recommendation

Require institutions to demonstrate a need for multidisciplinary programs. When institutions propose new multidisciplinary programs, THECB could require them to conduct more rigorous analyses of labor market needs than they would normally do. THECB could set standards by requiring institutions to articulate the benefits of the multidisciplinary program in terms of the breadth and depth of the program, the skills it promotes, and why the need being met by the proposed multidisciplinary program cannot be satisfied by restructuring existing programs in the main field through the addition of new courses or certificates.

Professional Degree Upgrading

Graduate programs in nursing, physical therapy, and other fields propose new graduate degrees to respond to professional associations. These associations advocate for advanced, often doctoral, degree programs as entry to practice, usually to support and justify a greater level of professional responsibility for practitioners. The departments that we interviewed emphasized that their responsibility is to meet employer demand and make sure their graduate students are well placed; therefore, they see a need for such programs.

Recommendation

Consider professional association standards when they are likely to shape employer demand. When evaluating new graduate programs, THECB should take into account changes in professional association standards, where they exist, to the extent they are likely to shape student and employer demand.

Systemic and Process Aspects of Graduate Program Development

In this section, we examine the pipeline of students entering science and engineering graduate programs, the state funding approach for graduate programs, the proposal development process, and ongoing program review processes.

Strengthening the Pipeline of Domestic Students into Science and Engineering Graduate Programs

While major structural factors contribute to the low enrollment of domestic students in science and engineering graduate programs, institutions, systems, and the state could all adopt programs to strengthen this pipeline and increase the representation of domestic students in Texas graduate programs. Because minority groups, especially Hispanics, are underrepresented in Texas graduate degree awards, efforts to attract more domestic students should also aim to increase the number of underrepresented students entering these graduate programs.

Recommendations

Institutions and systems should consider programs to strengthen the pipeline of domestic students, including underrepresented minorities, into science and engineering graduate programs. We think institutions and systems have opportunities to collaborate to strengthen the exposure of domestic students, including underrepresented minorities, to graduate study in science and engineering. Institutions could formally collaborate by developing pipelines through articulation agreements to transition students from undergraduate to graduate degrees.

THECB should examine plans for student stipends in new research graduate programs. Stipends are important for supporting students, especially domestic students, in research graduate programs. THECB should continue to examine proposed stipend levels and plans to fund them to ensure that stipends are adequate and competitive with other quality research graduate programs.

The state (or other funders) should consider funding special stipends for domestic students in science and engineering doctoral programs. The state, or perhaps other funders like foundations, could provide special stipends for domestic students beyond what the institutions or departments could provide. Since domestic students have options to pursue a master's degree during their career, we suggest that any special stipends be targeted specifically to domestic students in doctoral science and engineering programs (either concurrent with a master's program or following one). A portion of state research funding could be devoted to funding these additional stipends to make doctoral study more attractive.

Funding

Stakeholders have little interest in fundamental changes to the formula funding methodology, although the state should consider increases to fund the ambitious student growth goals of the 60x30TX plan.

Recommendation

Consider increases in general fund appropriations to support growing enrollments and use the current formula funding method to allocate them. To meet the ambitious 60x30TX goals of increased student enrollment and completions, institutions will require resources. If the state provides increased general fund appropriations that keep pace with student enrollment growth, these increases will reduce the chance that students will become burdened with escalating fees. Whatever the level of general fund appropriations, we recommend that THECB continue to use the current formula funding methodology to allocate them, although it may be prudent to monitor whether highly scalable online master's programs are attracting an increasing share of formula funding over time and, if so, consider adjustments to the formula.

Proposal Development and Review Process

The proposal process could be improved through several strategies, focusing on providing earlier, informal reviews and sharing the practices that result in successful proposals.

Recommendations

Institutions should conduct their own preproposal reviews. Since proposal development takes significant time, institutions should conduct internal preproposal reviews to direct proposal development efforts in the most productive directions.

Institutions should consult informally with THECB staff early during proposal development. Similarly, institutions should seek early, informal consultation with THECB staff to understand the experiences of other similar proposal efforts and receive guidance on which aspects of a proposal are likely to receive the greatest scrutiny.

Provide guidance on the characteristics of successful proposals. To generalize and extend the consultation function, THECB could compile guidance on the aspects associated with the most successful proposals. This guidance could help institutions and departments as they prepare future proposals.

Ongoing Program Review Processes

THECB generally has limited powers to review programs after they have been approved, with two major exceptions: periodic doctoral program reviews and low-producing programs. Doctoral programs are required to report to THECB annually for five years and then at least every seven years after that. Under the recent revisions to its mandate, THECB no longer has the authority to order the closure of degree programs with low enrollment or production. Instead, the state now relies on an annual report from THECB on low-producing programs that identifies degree programs at each institution that have been operating at least five years and where the number of graduates has fallen below a specified threshold over a five-year period (25 for undergraduate, 15 for master's, and 10 for doctoral).

Recommendation

Continue policies and practices for program review and low-producing programs; review consolidation proposals closely. The doctoral program review and low-producing programs report seem to be helpful in managing graduate programs. One area we recommend for further scrutiny is proposed consolidations of graduate programs. Further scrutiny could prevent the funding of consolidations that do not entail meaningful integration of the academic programs.

Conclusion

Texas's higher education ecosystem is large and complex. Because Texas depends very heavily on its public universities to train graduates, produce research, and spur innovation, policies that affect the public university sector are even more important for maintaining and enhancing competitiveness in Texas than in other states that benefit from prestigious private universities.

Texas's 60x30TX strategic plan and our analysis of labor market projections point to a continuation of the past 10 years of strong growth in graduate education in the state. Generally, Texas has been increasing its production of graduate degrees in fields corresponding to the occupational groups that are expected to have the most job openings: business, healthcare, education, computers, and engineering. However, because growth in graduate engineering degrees has been slow compared to other states and to projected demand, THECB and institutions should consider expanding graduate programs in engineering. In addition, THECB and institutions should expand efforts to recruit domestic students and provide adequate financial support to motivate those with a bachelor's degree to pursue graduate education.

To be competitive, Texas needs to compare favorably to other states and countries. The number of research universities in Texas is increasing rapidly compared to other states, but too few of these institutions are ranked at the highest levels internationally. Texas's institutions also do not attract the same share of federal R&D funding as other states, especially California. To further increase the competitiveness of its universities, Texas will likely need to make additional public investments in research capacity for institutions at several stages of development. However, these investments must be focused on institutions that have shown at least some capability to develop research programs.

As Texas explores ways to increase graduate education production, it can look at increasing enrollments in existing programs, but new programs will likely be necessary as well. Developing new programs presents the state and institutions both opportunities and challenges. Proposals for new programs must be evaluated carefully to ensure that they maximize the benefits to Texas and the United States. While expanding graduate programs and research is an opportunity to build institutional prestige, it can also be unproductive if institutions expand in areas not related to state economic needs. Institutions may also seek to develop large-scale online programs to increase operating margins in the face of constrained state funding. These programs may expand access and increase revenue, but they may also dilute quality.



George Wada/Fotolia

If an institution seeks to shift to a research-intensive mission, it must make a widespread, sustained commitment, starting with developing a thoughtful strategic plan and then aligning its graduate program proposals with that strategic plan. Other universities may choose to focus on specific niches by proposing graduate degree programs that match their specific capabilities or context and that may not be available at other institutions.

Expanding graduate programs is important for meeting the goals of THECB's 60x30TX plan and for improving Texas's state competitiveness. However, this expansion must be managed well to ensure that the programs are high quality. While institutions are responsible for monitoring the quality of their graduate programs, THECB and accrediting agencies can support quality through their program approval and review processes. The recommendations presented in this report are intended as guidance for THECB on how to strengthen its current review and approval process and how to help institutions determine whether there is a need to expand their graduate education programs. Some of the recommendations also provide guidance for institutions and systems on how to manage competition and promote quality in graduate programs.



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Acknowledgments

The authors would like to thank the commissioner, staff, and board members of THECB for helpful guidance throughout the research process, with particular acknowledgment to Rex Peebles, Stacey Silverman, Allen Michie, James Goeman, Paul Turcotte, David Gardner, Julie Eklund, and Nina Wright.

We appreciate the members of the Graduate Education Advisory Committee interacting with us at several stages of the study, sharing their insights and feedback on drafts of our work. We also thank the participants in our interviews. Although we agreed not to name them or their institutions, we deeply appreciate their cooperation and the important information they shared with our research team. We appreciate the universities and systems that provided us comments on the draft report, which helped us improve this final version.

We thank RAND colleagues Chandra Garber and Erin-Elizabeth Johnson for helping us communicate our findings in a clear and engaging way. We greatly appreciate the thoughtful input of our external reviewer, Jonathan Gagliardi, and internal reviewers, Catherine Augustine and Susan Gates, on the drafts of this report and study briefings. We also thank Next Chapter Communications for designing and laying out this report.

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\$11.50

ISBN-10 0-8330-9759-8
ISBN-13 978-0-8330-9759-0

