

# INSIGHTS

A KAUFFMAN  
RESEARCH SERIES

## IMPACT OF ENTREPRENEURSHIP EDUCATION

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## ● The Researchers

### Alberta Charney

**Alberta Charney** is a researcher in the Economic and Business Research Program at the Eller College of Business and Public Administration. She has been with the University of Arizona since receiving her Ph.D. there. Her academic publications cover a wide range of topics, including transportation, taxation, econometric model building, forecasting accuracy, input-output analysis, water issues, migration and manufacturing location. She is a member of the American Economics Association, the Regional Science Association and the International Regional Science Association.

### Gary D. Libecap

**Gary D. Libecap** is the Anheuser Busch Professor of Entrepreneurship and Director of the Karl Eller Center at the University of Arizona. He is also Research Associate at the National Bureau of Economic Research. He received his Ph.D. in 1976 from the University of Pennsylvania. Libecap has served in numerous board and leadership positions, including the Economics Panel, National Science Foundation; Board of Directors, Western Economics Association; Board of Trustees, Economic History Association; and Co-Editor, *Journal of Economic History*. Widely published, Libecap has received research support from the National Science Foundation, World Bank, Earhart Foundation, Center for Energy and Mineral Resources, Seagrant and the Pacific Institute. He has held faculty positions at the University of Arizona, CalTech, USC, Texas A&M, University of New Mexico and the Free University of Berlin. He is also a member of the American Economics Association, Economic History Association, Western Economics Association, Mont Pelerin and Cliometrics Societies, National Bureau of Economic Research, American Law and Economics Association, and International Society for the New Institutional Economics.

### The Kauffman Center for Entrepreneurial Leadership

**The Kauffman Center for Entrepreneurial Leadership** is the nation's largest organization focused solely on developing, supporting and encouraging entrepreneurship education and research. The Center's nationally recognized staff works with high-growth entrepreneurs, government policy makers, entrepreneurial support organizations and leaders in entrepreneurship education to develop and disseminate innovative, effective programs and informational resources that enhance entrepreneurial skills and abilities at all levels. The Center is fully funded by the Ewing Marion Kauffman Foundation and was founded by Ewing Marion Kauffman, a successful entrepreneur whose vision and values led to the creation of a \$1 billion pharmaceutical company from a start-up operation in the basement of his home. For more information, visit the Center's web site at [www.entreworld.org](http://www.entreworld.org).

# Entrepreneurship Education: Is the Impact as Impressive as the Demand?

*“Entrepreneurship has become one of the most sought-after areas of study among collegiate business students. Graduates of these programs are not only increasing in number, they are reshaping our understanding of market, technology and management leadership. Bent on realizing their own perceived opportunities, they continue to define the standard for business innovation – and, by doing so, will forever alter the competitive landscape for future enterprise.”*

— Michael Camp,  
Director of Research,  
Kauffman Center for  
Entrepreneurial Leadership

**Today, no matter where you turn,** stories abound of the enormous social, economic and educational benefits of entrepreneurship. As a result, entrepreneurship education programs are proliferating in colleges and universities around the country. Whereas 15 years ago only a handful of schools offered courses in entrepreneurship, today more than 1,500 colleges and universities offer some form of entrepreneurship training. There are currently more than 100 active university-based entrepreneurship centers in the U.S. and more than 270 endowed positions in entrepreneurship, an increase of 120 percent in just the last five years.

Despite the growing number of new and expanding educational programs in this area, many schools have been slow to respond to the increasing student and community interest. The growing number of students shunning traditional employment opportunities to become entrepreneurs has caught some business school faculty and administrators off guard. Many are still questioning whether entrepreneurship is worth the investment, whether entrepreneurship training enhances their students’ abilities to compete in today’s job market, and whether their entrepreneurship students make stronger and more successful business leaders.

In 1999, Alberta Charney and Gary Libecap pondered these questions as well. By all appearances, the Berger Entrepreneurship Program at the University of Arizona was highly successful. But how had the Program affected the entrepreneurship students it had graduated over the years? Where were they now, what were they doing, and were they faring better than other business school graduates? Charney and Libecap further wondered how the entrepreneurship program had impacted the University’s Eller College of Business and Public Administration. What kind of return had the business school received for its 16 years of investment in entrepreneurship education?

This report shares the findings from Charney and Libecap’s comparison of University of Arizona business school graduates who *completed* the

Berger Entrepreneurship Program to other University of Arizona business school graduates who were *not* involved in the Berger Program. In short, the results of the investigation are stunning. Whether you are a *college dean* seeking justification for the allocation of limited resources ... an *alumnus* considering a donation for university development opportunities ... a *professor* redesigning your course curriculum ... or a *student* considering various majors and their prospects for your professional career, you will find the results impressive.

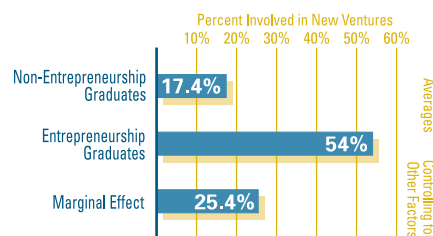
## ● Key Findings

**The findings estimate that** the Eller College of Business and Public Administration at the University of Arizona received 34 percent more outside funding – nearly \$12 million – due to the existence and activities of the Berger Entrepreneurship Program and its opportunity-oriented, practical approach to business education. Surveys of deans, department heads and development officers at the University of Arizona also indicate that pedagogical innovations in entrepreneurship have significantly improved the curriculum in other business disciplines, including the MBA program.

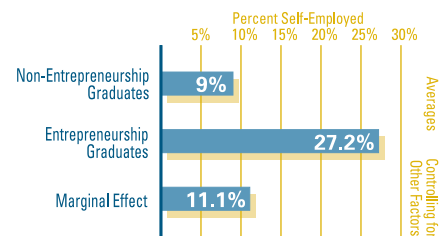
**Entrepreneurship education attracts substantial private-sector financial contributions.**

On average, graduates of the Berger Entrepreneurship Program were *three times* more likely to be involved in the creation of a new business venture than were their non-entrepreneurship business school cohorts. Controlling for the personal characteristics of the graduates and various environmental factors, entrepreneurship education increased the probability of an individual being instrumentally involved in a new business venture by 25 percent over non-entrepreneurship graduates (Figure 1). More specifically, entrepreneurship students were 11 percent more likely than were non-entrepreneurship students to own their own businesses after graduation (Figure 2).

**Entrepreneurship education produces self-sufficient enterprising individuals.**



**Figure 1.**  
Entrepreneurship education increases the formation of new ventures



**Figure 2.**  
Entrepreneurship education increases the likelihood of self-employment

Entrepreneurship education produces successful business and industry leaders.

Entrepreneurship education contributed to the growth of firms, especially smaller emerging firms. On average, emerging companies that were owned by or employed entrepreneurship graduates had greater than *five times* the sales and employment growth than those that employed non-entrepreneurship graduates (Figure 3). In addition, larger firms paid entrepreneurship graduates significantly more than they paid non-entrepreneurship graduates. Controlling for individual factors, entrepreneurship graduates working for large firms earned approximately \$23,500 more per year than did other business school graduates.

Entrepreneurship education enhances a graduate's ability to create wealth.

Entrepreneurship graduates received an average annual income that was 27 percent higher than the average annual income of non-entrepreneurship graduates. Controlling for personal characteristics, entrepreneurship education at the University of Arizona increased annual graduate income by \$12,561. In addition, and perhaps more significantly, entrepreneurship graduates accumulated 62 percent more in personal assets after graduation than their non-entrepreneurship counterparts (Figure 4). Entrepreneurship graduates who were employed with other companies were more likely to be employed full-time, were generally more satisfied with their employment opportunities and were less likely to be employed in a government or non-profit organization.

Entrepreneurship education produces champions of innovation.

Entrepreneurship graduates were significantly more apt to be involved in developing new products than non-entrepreneurship graduates. Entrepreneurship graduates spent more time in R&D related activities, worked with products that had shorter life spans and were more often employed full-time in high-tech industries. Controlling for other

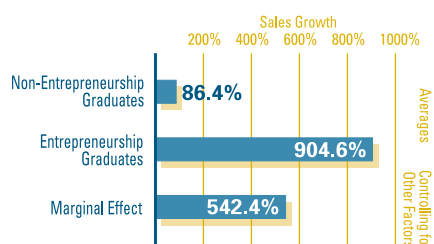


Figure 3. Entrepreneurship education of employee increases the sales growth rate of emerging firms (<100 employees)

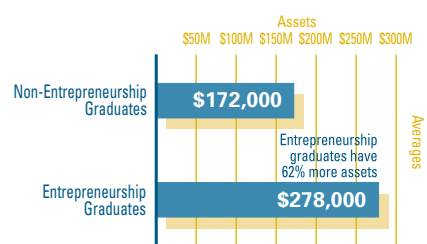


Figure 4. Entrepreneurship education increases graduates' assets

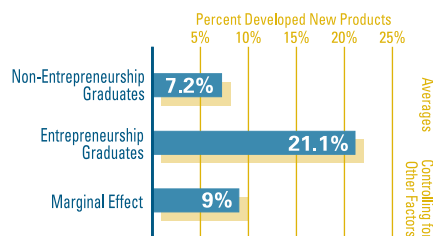
individual and environmental factors, entrepreneurship education increased a business school graduate's probability of being associated with a high-tech firm by nearly 13 percent and of developing new technological products by almost 9 percent (Figure 5).

Entrepreneurship education also enhanced the transfer of technology from the University to the private sector, and promoted technology-based firms and products. On average, entrepreneurship graduates were more likely to be employed with firms that license new technology or that license technology to others. Among self-employed entrepreneurship graduates, nearly 23 percent owned a high-technology firm, compared to less than 15 percent of non-entrepreneurship graduates who owned their own firm (Figure 6).

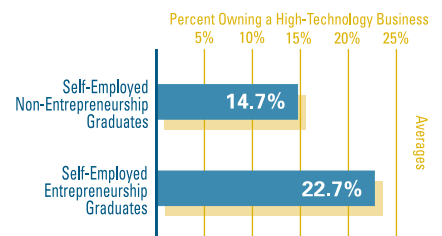
**Entrepreneurship education leads to greater opportunities with advancing technologies.**

**The Berger Entrepreneurship Program** was approved by the University of Arizona Board of Regents in 1983 and is one of the oldest entrepreneurship programs in the country. Housed in the Karl Eller Center at the Eller College of Business and Public Administration, the program has trained 339 undergraduates and 200 graduate students from the colleges of business, engineering, medicine, science and agriculture. At the time of this study, 262 of the graduates were employed by established companies, 106 operated their own companies, 31 worked for government or non-profit entities and 40 were engaged in further graduate study.

## ● The Berger Entrepreneurship Program: A Model of Excellence



*Figure 5.*  
Entrepreneurship education increases the likelihood of developing new products



*Figure 6.*  
Entrepreneurship education increases the likelihood of self-employed graduates owning a high-technology business

The curriculum for the Berger Entrepreneurship Program includes core courses in competitive advantage, venture finance, market research and business plan development. Additional courses in MIS, management, finance and marketing are recommended. A combination of tenure-track and business-adjunct faculty teaches the course offerings. Undergraduates are eligible for a major in entrepreneurship and MBA students can select entrepreneurship as an area of concentration. Most students select joint majors and areas of concentration, such as Entrepreneurship/MIS, Entrepreneurship/Marketing and Entrepreneurship/Finance. All students receive scholarships, and many are placed in internships with newly started firms or venture capital organizations during the summer just prior to entering their formal period of entrepreneurship study.

Approximately 70 students are accepted annually, 40 undergraduates and 30 graduates. The number of graduates has grown over the years from 30 in 1985 to 59 in 1999. Students, typically working in two-person teams, begin in the spring and summer with a feasibility study that is evaluated by the faculty in the fall. They develop the plan within the context of their courses during the fall and spring semesters. An internal business plan competition, where students must present and defend their plans, is the capstone of the program. Winning plans receive \$10,000 in prize money. All told, 289 business plans have been created as part of the Berger Entrepreneurship Program, and at least 81 of these ventures have been launched.

## The Research Approach: Opportunities for Further Evaluation

**This research**, sponsored by the Kauffman Center for Entrepreneurial Leadership at the Ewing Marion Kauffman Foundation, evaluated the impact of the Berger Entrepreneurship Program at the University of Arizona by comparing graduates of the program to a random sample of non-entrepreneurship University of Arizona business school graduates. The study design controlled for the socio-economic characteristics of the respondents so that the marginal effects of entrepreneurship education were observed and individual factors were held constant. The study also investigated the effects of the Berger Entrepreneurship Program on technology transfer from the University to the private

sector, private giving to the business college and pedagogy within the other disciplines of the business college. In order to address these issues, four groups were surveyed: a) entrepreneurship and non-entrepreneurship alumni; b) department heads and other college administrators; c) the college Dean, development officer and officials in the University of Arizona Foundation; and d) the staff of the University of Arizona Office of Technology Transfer.

The alumni survey questioned the students about their personal characteristics (e.g., birth, gender, high school graduation date and ethnicity), educational and employment history, new venture activity, experiences with technology transfer and perceptions of the Berger Entrepreneurship Program. *(A copy of the entire alumni questionnaire and final research report are available from the researchers upon request.)* The alumni questionnaire was mailed to 2,024 non-entrepreneurship business school graduates and 460 entrepreneurship graduates, all of whom graduated from the University of Arizona between 1985 and 1998. Of the non-entrepreneurship business graduates, 348 undergraduates and 58 graduate students returned a completed survey instrument. Of the Berger Entrepreneurship Program graduates, 68 undergraduates and 37 graduate students responded. Overall, approximately 21 percent of the survey questionnaires were returned and response rates were generally uniform across levels of degrees and types of programs.

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## ● A Promising Future

**In the past 15 years,** entrepreneurship education has grown dramatically as reflected in the increased student enrollment, proliferation of formal entrepreneurship centers, intercollegiate business plan competitions, new entrepreneurship curricula and programs, and endowed chairs and professorships. Approaches to entrepreneurship education have varied across colleges and universities from single course offerings in business plan preparation to integrated curricula that include marketing, finance, competitive analysis, new product development and technology. Many institutions have implemented concentrations in entrepreneurship as well as specialized programs for non-business majors.

*“During the last 30 years, America has unleashed the most revolutionary generation the nation has experienced since its founding in 1776. This new generation of entrepreneurs has altered permanently the economic and social structure of this nation – and the world – and has set the ‘entrepreneurial genetic code’ for future generations. It will determine more than any other single impetus how the nation and the world will live, work, learn and lead ... ”*

— Jeffrey A. Timmons,  
America’s Entrepreneurial  
Revolution: The Demise of  
Brontosaurus Capitalism, 1998

Entrepreneurship education has become popular for many reasons. First, the study of enterprise creation and the development of business plans allow students to integrate accounting, economics, finance, marketing and other business disciplines. As such, it offers an enriching, integrative educational experience. Second, it promotes the founding of new businesses by graduates and builds critical decision-making skills that enhance the success of graduates in the job market. Third, it increases technology transfer from the university to the market through the development of technology-based business plans and student involvement with technology licensing. Fourth, entrepreneurship education forges links between the business and academic communities. It is viewed by business leaders as a useful, applied approach to the study of business and the economy. As a result, established entrepreneurs are more willing to fund entrepreneurship programs and to endow professorships within them. Finally, because there is no set approach to entrepreneurship education and because entrepreneurship generally is outside traditional discipline boundaries, it has been possible to experiment with pedagogy and curricula. The learning gleaned from these experiments, in turn, has significantly enhanced other business school courses.

The value of the Berger Entrepreneurship Program to the University of Arizona (its students, business school and surrounding business community) has been clearly demonstrated in this study. Berger graduates receive superior financial rewards and express greater job satisfaction than their non-entrepreneurship cohorts. They also demonstrate more self-sufficiency and report better performance on behalf of the businesses that hire them. Additionally, the Eller College of Business and Public Administration has benefited from increased private sector donations and exposure to cutting-edge pedagogy. These compelling results suggest that the investment in entrepreneurship education in business schools throughout the country is paying important and substantial dividends to graduates, colleges and society.

