

A Survey of Alumni of the Entrepreneurship Program
Of Case Western Reserve University

FINAL REPORT

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Introduction and Executive Summary

As originally conceived the goal of this project was to assess the impacts of entrepreneurship programs at six Universities across the United States to learn about entrepreneurial experiences, income and other key post graduation outcomes. Kauffman Foundation staff assumed responsibility for recruiting participation from these programs, while University of Kansas researchers developed the survey instrument. In the end, only Case Western Reserve University's Science & Technology Entrepreneurship Program (STEP) agreed to participate in the study.

The limitation of data to a single program and the small size of the sample of respondents, especially among the control group, limits the strength of the conclusions that can be drawn from this study. Nonetheless, the survey results show that STEP program alumni were much more likely to engage in a broad range of entrepreneurial activities during enrollment in, and after completing, their education, than they had been before entering the STEP program. In contrast there is no parallel increase in these activities among members of the control group.

STEP program alumni also experienced more positive economic rewards from completion of their program. They earned higher salaries than the control group members and they were more likely to increase their incomes.

We cannot of course rule out the possibility that some of these differences are due to sample selection. That is that students enrolling in the STEP program are different from students enrolling in the parallel masters degree programs from which the control group was drawn. Indeed the survey documents some important differences, such as

undergraduate major. But there is considerable evidence that suggest that the STEP program is successful in preparing its students for careers in entrepreneurship

Survey Data Collection

The on-line survey instrument was developed in consultation with Kauffman Foundation staff and the Director of the STEP program at Case Western Reserve University. Once the instrument was finalized it was implemented as an on-line survey. A list of unique coded identifiers was generated and provided to the Director of the STEP program, who sent invitations to participate in the survey to 37 alumni of the program and to an equal number of alumni of Masters Degree programs in science paralleling those involved in the STEP program.

The first invitations to participate were sent in early December 2007, and the survey remained active through mid-February 2008. During that time several reminder e-mail messages were sent to those who had not yet begun the survey. In the end a total of 25 people (19 from the STEP Program; and 6 from the control group) began the survey, and 22 (16 STEP program, 6 control group) completed the survey.

Demographic Characteristics of the Sample

Survey respondents from the STEP program appear to be similar in most dimensions to the population of alumni of the program (Table 1). The average ages of the two groups are very close, 29 and 29.7 respectively, as are the male/female ratios. The distribution of both groups across the different science programs is also quite similar. There are greater discrepancies in the data on year of program completion, with higher response rates for the more recent years of graduation.

In comparison to the STEP program alumni, survey respondents from the control group are somewhat older, more likely to be female, and differ considerably in their degree program. While the bulk of STEP graduates were in the Physics Entrepreneurship track, the control group alumni were spread more evenly across disciplines.

Data on race and nationality are only available for the survey respondents. STEP program graduates were less likely to be White or Caucasian and fewer were U.S. citizens than in the control group.

Experiences Before Entering Program

Students who select an entrepreneurship focused graduate program demonstrate, by this choice, a different set of interests and goals than do students who select other graduate education tracks that do not include explicit training in entrepreneurship. This fact complicates efforts to distinguish the impacts of entrepreneurship training from more basic differences in personal characteristics and abilities that would have manifested themselves in any case.

To gauge the extent of the measurable differences in experiences before enrolling in the STEP program or parallel non-entrepreneurship masters program the survey included a number of questions intended to illuminate prior work and educational background. This information can also be used to assist in identifying those types of applicants that are most likely to seek out entrepreneurship training. Responses to these questions are summarized in Tables 2 and 3.

Table 2 compares prior educational backgrounds. The highest degree attained by most respondents in both the STEP and control groups was a Bachelors degree. The educational backgrounds of STEP program alumni are more varied, however, including several individuals with MBA or Masters level training, and on Ph.D. Major subjects or degrees differed more substantially between the two groups. Paralleling the difference in science tracks shown in Table 1, the bulk of STEP program alumni had concentrated in physical science or mathematics, while half of the control group had majored in biological sciences.

Table 3 describes responses of the STEP and control group respondents to several questions about prior employment. All responses refer to the position held immediately prior to enrolling at Case Western Reserve University. For the most part these prior work experiences look quite similar. Both groups had spent an average of 3.6 years in their positions before enrolling, and the distribution of types of employers appears relatively similar, although control group alumni appear more likely to have been employed by government than do STEP program alumni. The types of positions held were also similar, with most alumni in each group reporting working in technical/analytical, managerial, or instruction/training, positions. Only one respondent (in the STEP alumni) reported an entrepreneurial position.

STEP alumni were distinguished from the control group with 22 percent indicating that they had held an ownership stake in the company where they had worked, compared to none of the control group alumni. On the other hand both groups had approximately similar shares involved in developing new products, services or processes, and having responsibility for technology commercialization.

In many respects the control group and STEP alumni appear to have similar backgrounds. The most striking differences are the concentration of STEP alumni with backgrounds in the physical sciences and mathematics, and the more diverse prior educational experiences of the STEP alumni. But given the small sizes of both groups caution should be used in extrapolating from these findings.

Satisfaction with Program, and Career

One important outcome of any educational program is how satisfied its alumni are both with their educational experiences and with the preparation they received for their current jobs and careers. Table 4 reports results of several questions asked to gather these perceptions.

In general all of the respondents expressed considerable satisfaction with their education at Case Western Reserve University. Only one respondent (in the control group) reported being unsatisfied. Almost all of the survey respondents indicated that they were somewhat or very satisfied with their current positions and with their careers. But STEP program alumni were more likely to report being very satisfied than were members of the control group. STEP alumni also appear to be more likely to feel that their education prepared them effectively for their careers than the control group alumni. Close to two-thirds of STEP program alumni reported that their program had assisted them a great deal in their career, while only one-third of the control group alumni evaluated their programs this highly.

Program Impacts

The survey included questions to assess a number of observable impacts of the education received in the entrepreneurship program and in the programs of the control group alumni. These included characteristics of current jobs, changes in earnings and a number of direct measures of entrepreneurial activity.

Employment Characteristics after Program

Table 5 summarizes the characteristics respondents reported for the positions they held at the time of the survey (or the last position held, if not currently working). The information here parallels that reported in Table 3, and reveals a number of notable differences in employment experiences between the STEP alumni and the control group alumni. The number of entrepreneurship alumni working for private firms increased substantially (from 5 to 10) and one member of this group reported being self-employed in his/her own business.

The share of STEP alumni reporting an ownership stake increased slightly, to 28.6 percent, while none of the control group alumni reported holding an ownership stake. More dramatically, All of the STEP program alumni reported that their current positions involved developing new products, services or processes, an increase from 40 percent before the program.

Change in Earnings

Figure 1 plots the distribution of earnings before and after completing the STEP program, while Figure 2 plots the distribution of earnings for control group alumni before and after completing their programs. These figures clearly indicate that STEP program alumni earned higher incomes after completing their course work than did the control group alumni. Almost half of the STEP alumni reported earnings in the \$60,001 to \$75,000 range while none of the control group alumni had earnings in this range.

To some extent the higher post-graduations earnings of the STEP alumni reflects higher earnings of this group before entering the program. But among those reporting earnings

both before and after their programs, STEP alumni were more likely to report an increase in earnings. Of the 11 individuals who reported both earnings figures, all but one had moved to a higher income category after completing the STEP program. By comparison, in the control group, of the 5 individuals reporting their incomes in both periods, 2 reported moving to a higher income category, but 2 reported dropping to a lower income category, while 1 remained in the same income category.

Entrepreneurial Activity before and after Program

The final set of outcome indicators is a set of questions focusing directly on a range of entrepreneurial activities. The survey asked respondents about these activities before, during, and after completing their respective educational programs. Table 6 reports their responses.

These direct measures of entrepreneurial activity show the clearest differences between the groups. Among the STEP alumni, one had been a founder or co-founder of a new business venture or start-up even before entering the program, compared to none of the control group alumni. But four of the STEP group alumni reported being founders or co-founders during their time at Case Western Reserve University, and four reported a similar involvement after graduating. Only one of the individuals reporting founding a new venture after graduation had also founded one during his/her educational program. This individual was also the one STEP program entrant to have founded a new venture prior to entering the program. In total then 7 STEP program alumni have founded or co-founded a new venture, 6 of them having done so first while enrolled in or after graduating from the STEP program. In contrast, none of the control group alumni reported being a founder or co-founder.

STEP program alumni were similarly much more likely to be involved in the early stages of a company for which they are not the founder or co-founder, with their rate of participation increasing during and after completing their education at Case Western Reserve University.

Less dramatic, but nonetheless noticeable increases are apparent for the STEP program alumni in seeking intellectual property protection, working as consultants for early stage companies, and working as consultants for venture capital firms or other early stage investors. Similarly completion of the STEP program appears to be associated with increased investment in early stage technologies or companies.

Table 1: Demographic Characteristics, STEP Alumni and Control Group Alumni

| | STEP | | CONTROL |
|-------------------------|------|--------|---------|
| | ALL | Survey | |
| Number | 37 | 16 | 6 |
| Average Age | 29.0 | 29.7 | 31.2 |
| Percent Male | 70.3 | 73.3 | 66.7 |
| Percent US Citizen | NA | 75 | 100 |
| Percent White/Caucasian | NA | 56.3 | 83.3 |
| Year of Graduation | | | |
| 2001 | 0 | 1 | 0 |
| 2002 | 5 | 2 | 2 |
| 2003 | 4 | 3 | 0 |
| 2004 | 5 | 1 | 0 |
| 2005 | 10 | 3 | 1 |
| 2006 | 9 | 3 | 1 |
| 2007 | 3 | 3 | 2 |
| Degree Program | | | |
| Physics/ Physics | | | |
| Entrepreneurship | 22 | 10 | 2 |
| Statistics/Statistics | | | |
| Entrepreneurship | 5 | 1 | 1 |
| Chemistry/Chemistry | | | |
| Entrepreneurship | 5 | 3 | 1 |
| Biology/Entrepreneurial | | | |
| Biology | 5 | 2 | 2 |
| Math /Math and | | | |
| Computation | | | |
| Entrepreneurship | 0 | 0 | 0 |

Table 2: Prior Educational Experience

| | STEP Program | Controls |
|--|-----------------|----------|
| Highest Degree completed prior to entry | | |
| BA/BS | 12 | 6 |
| MBA | 1 | 0 |
| MA/MS | 2 | 0 |
| PhD | 1 | 0 |
| JD | 0 | 0 |
| Major Subject of Degree | | |
| Physical Science/mathematics | 13 | 2 |
| Computer Science | | |
| Biological Sciences | 2 | 3 |
| Social Sciences | | |
| Humanities | 1 | |
| Professional Degree | | |
| No Response | | 1 |

Table 3: Prior Employment Characteristics

| | STEP Program | Controls |
|--|--------------|----------|
| Average Years worked at position | 3.6 | 3.6 |
| Type of organization | | |
| Self-employed/own business | 0 | 0 |
| Self-employed/consultant | 2 | 0 |
| Family business | 0 | 0 |
| Private firm | 5 | 1 |
| Government (including educational institutions) | 2 | 3 |
| Non-profit | 0 | 0 |
| Not employed | 7 | 2 |
| Type of Position | | |
| Managerial | 2 | 1 |
| Tech/Analytical | 7 | 2 |
| Marketing | | |
| Buy/Sell/Trade | | |
| Entrepreneurial | 1 | |
| Instruction/Training | 2 | 1 |
| No Response | 4 | 2 |
| Ownership and Responsibilities | | |
| % with ownership stake* | 22.2% | 0.0% |
| % involved in developing new products, services or Processes* | 50.0% | 40.0% |
| Position Responsibility somewhat or highly related to technology Commercialization | 55.6% | 33.3% |

Table 4: Satisfaction with Education and Career

| STEP Program | | | | |
|---|--------------|-----------|-------------|------------------|
| | Very | Some what | unsatisfied | very unsatisfied |
| To what extent are you satisfied with the education you received at Case Western Reserve University | 12 | 4 | | |
| How satisfied are you with your current position | 10 | 6 | | |
| How satisfied are you with your career at this point | 11 | 4 | | 1 |
| | A great deal | Some what | not at all | |
| How Well do you think your education at Case Western Reserve University has assisted your career | 11 | 3 | | 2 |
| Controls | | | | |
| | Very | Some what | unsatisfied | very unsatisfied |
| To what extent are you satisfied with the education you received at Case Western Reserve University | 4 | 1 | | 1 |
| How satisfied are you with your current position | 2 | 4 | | |
| How satisfied are you with your career at this point | 3 | 3 | | |
| | A great deal | Some what | not at all | |
| How Well do you think your education at Case Western Reserve University has assisted your career | 2 | 4 | | |

Table 5: Employment Characteristics after Program

| | STEP Program | Controls |
|---|-----------------|----------|
| Same Employer as before program | 18.8% | 16.7% |
| Average Years worked at position | 2.2 | 1.4 |
| Type of organization | | |
| Self-employed/own business | 1 | |
| Self-employed/consultant | | |
| Family business | | |
| Private firm | 10 | 2 |
| Government (including educational institutions) | 2 | 3 |
| Non-profit | 2 | |
| Not employed | 1 | 1 |
| Type of Position | | |
| Managerial | 3 | |
| Tech/Analytical | 4 | 3 |
| Marketing | 2 | |
| Buy/Sell/Trade | | 1 |
| Entrepreneurial | 3 | |
| Instruction/Training | 4 | 2 |
| No Response | | |
| Ownership and Responsibilities | | |
| % with ownership stake* | 28.6% | 0.0% |
| % involved in developing new products, services or Processes* | 100.0% | 50.0% |
| Position Responsibility somewhat or highly related to technology Commercialization | 62.5% | 33.3% |

Figure 1: STEP Program Alumni, Salaries before and after program

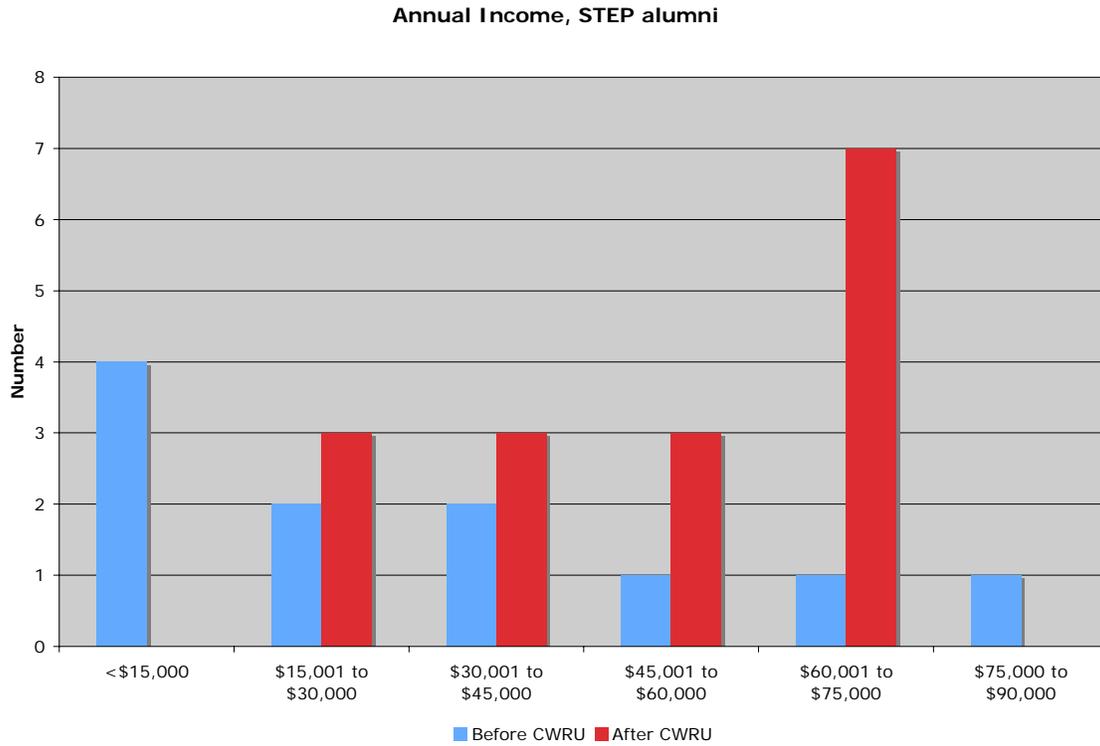


Figure 2: Control Group Alumni, Salaries before and after program

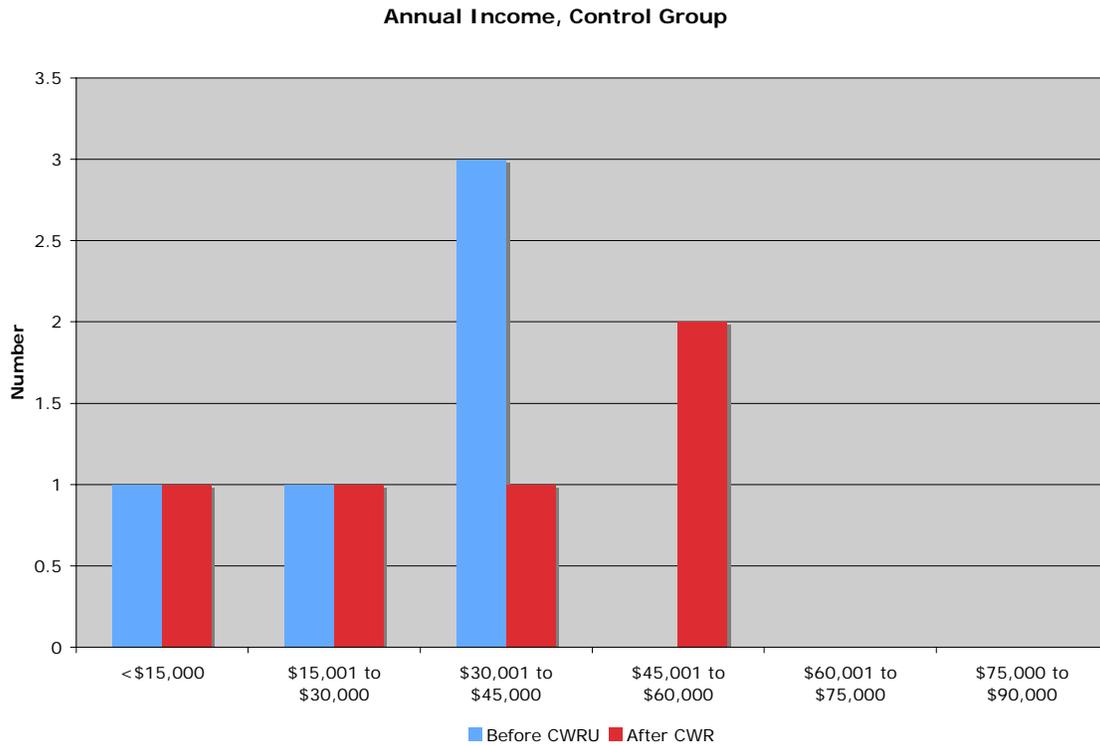


Table 6: Entrepreneurial Activity, Before, During and After Program

| | Before | | During | | After | |
|--|--------|---------|--------|---------|-------|---------|
| | STEP | Control | STEP | Control | STEP | Control |
| Founder or co-founder of a new business venture or start-up | 1 | 0 | 4 | 0 | 4 | 0 |
| Involved in early stages of a company for which not a founder or co-founder | 2 | 0 | 12 | 1 | 9 | 2 |
| Filed for Intellectual Property protection in the form of a patent or provisional patent | 0 | 1 | 4 | 1 | 3 | 0 |
| Worked as a consultant for early stage companies | 1 | 0 | 7 | 1 | 7 | 2 |
| Worked as a consultant for a venture capital firm or other early stage investor | 0 | 0 | 2 | 0 | 4 | 0 |
| Served on the board for a new venture | 0 | 0 | 1 | 0 | 2 | 0 |
| Invested own funds in early stage technologies or companies | 0 | 0 | 2 | 1 | 3 | 0 |
| Managed investment of funds in early stage technologies or companies | 0 | 0 | 1 | 0 | 3 | 0 |
| Licensed any university-developed technology | 0 | 0 | 3 | 0 | 1 | 0 |
| disclosed any inventions | 0 | 0 | 0 | 0 | 2 | 0 |