

# S-STEM Programs: Recruiting and Retaining Students in Technology

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# Outline

1. Introduction
2. 1st S-STEM program and results
3. ROI
4. Conclusion

# Was S-STEM worth it?

Hoped to find easy to grasp, quantifiable, *ready-made* answer.

Google “**nsf s-stem roi**” turned up exactly two pages.

Questions:

- 1) What did taxpayers get for their money?
- 2) Was money well-spent?

We need parameters for investment formula:  $CAGR = (E / B)^{(1 / t)} - 1$

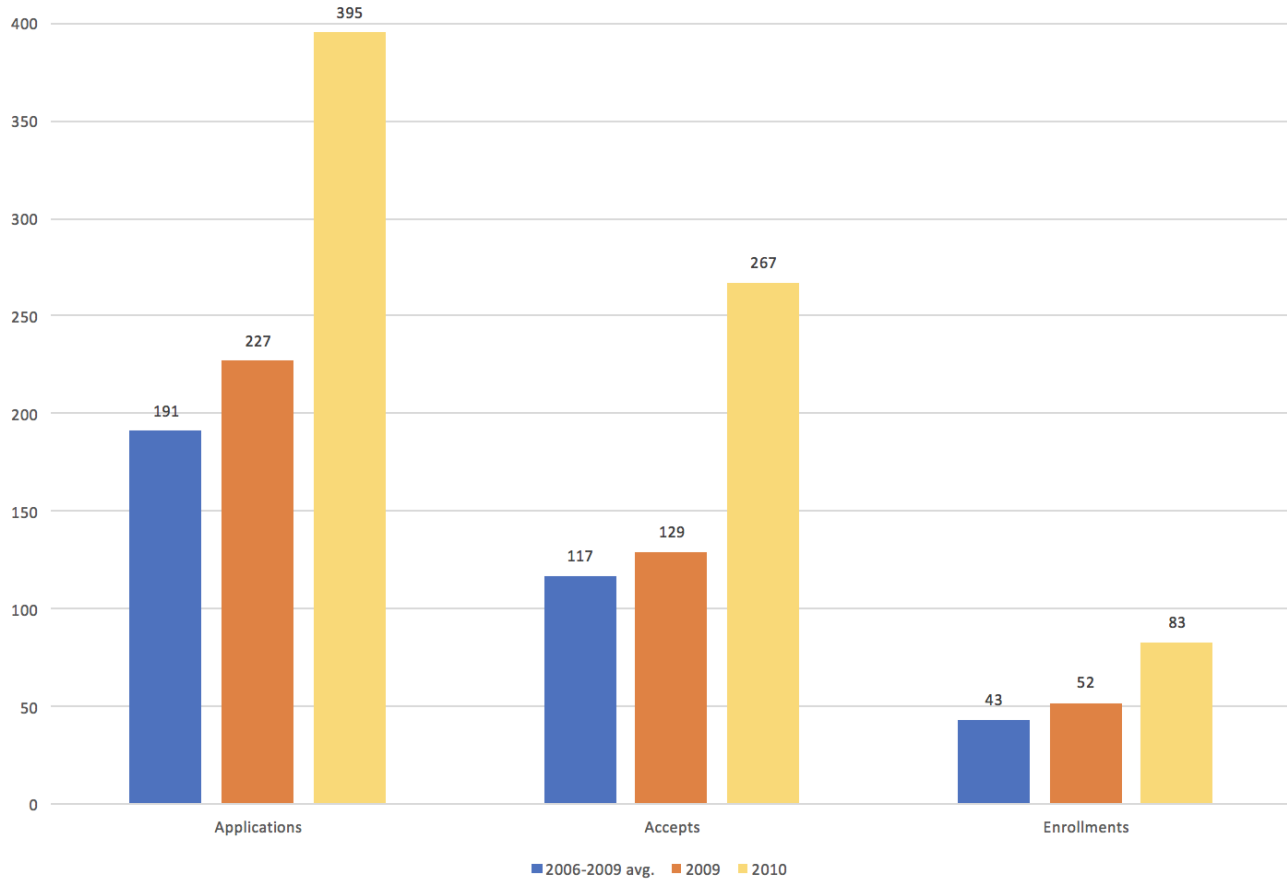
Fortunately, estimates of  $E$ ,  $B$ ,  $t$  are known or knowable.

# Our 1<sup>st</sup> S-STEM program <sup>1</sup>

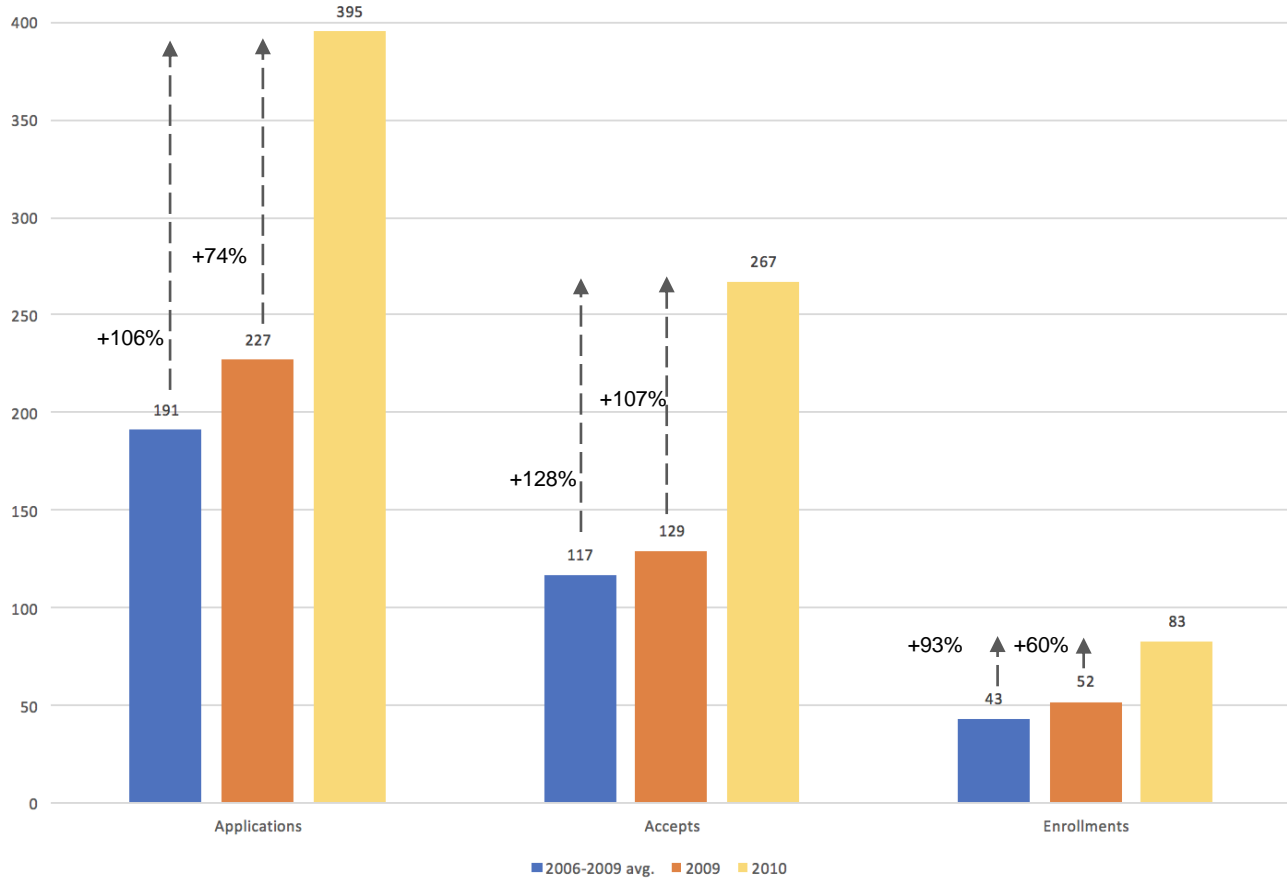
- In Sept. 2008, Marist College proposed \$552K, five-year initiative.
- Sought cohort 12 talented, underrepresented, Pell-eligible, CS / ITS majors
- Full scholarship included \$10 K / student / year from NSF
- S-STEM grant awarded in spring 2009
- Travelled w. Admissions to schools / college fairs in Poughkeepsie, Syracuse, South Central LA, Hawaii
- Admissions further reached out through additional channels

1. Coleman, R., Hoffmann, M., Berger, D., Norton, R., “Outcomes and Lessons from S-STEM Program,” unpublished, 5 Sep 2014

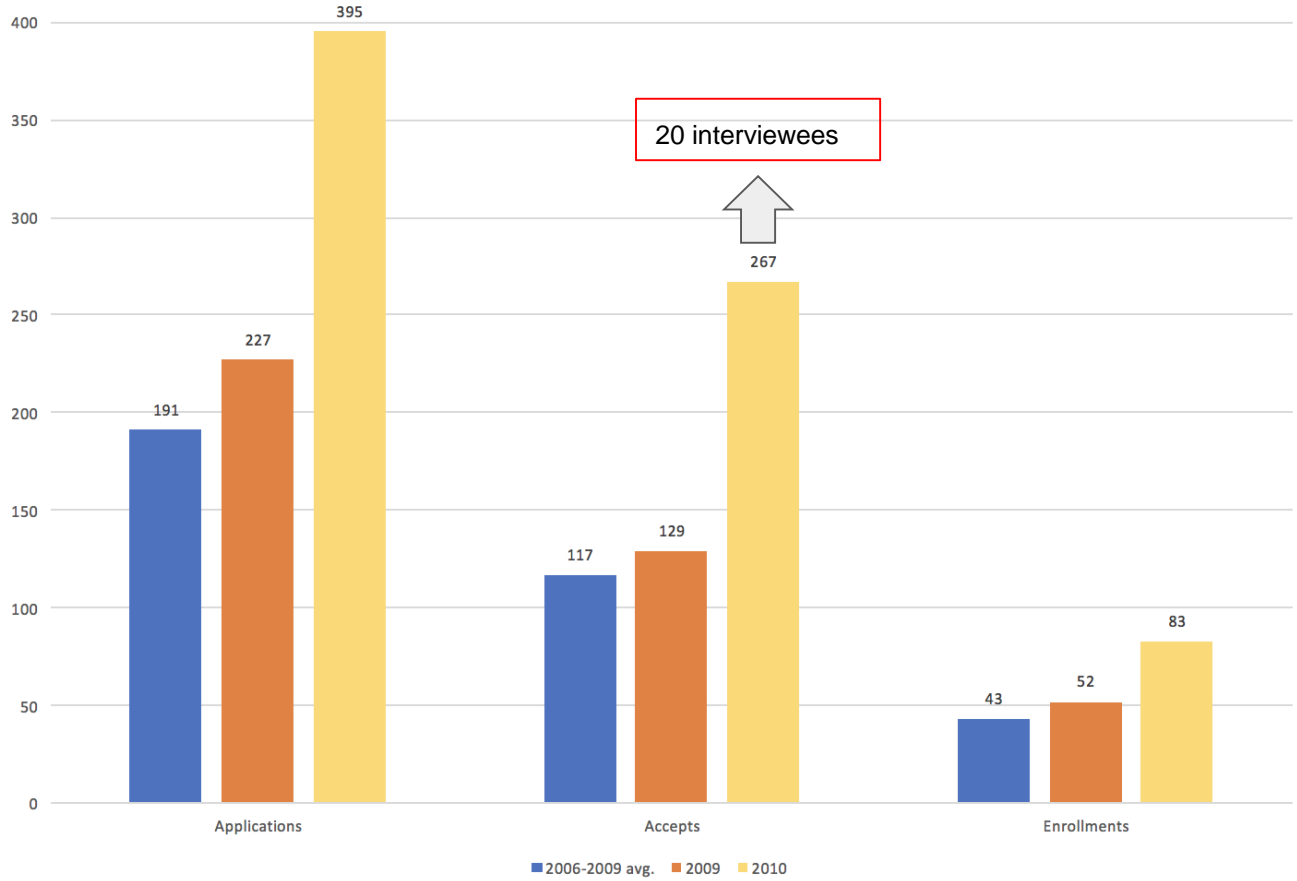
## 2010 Recruitment



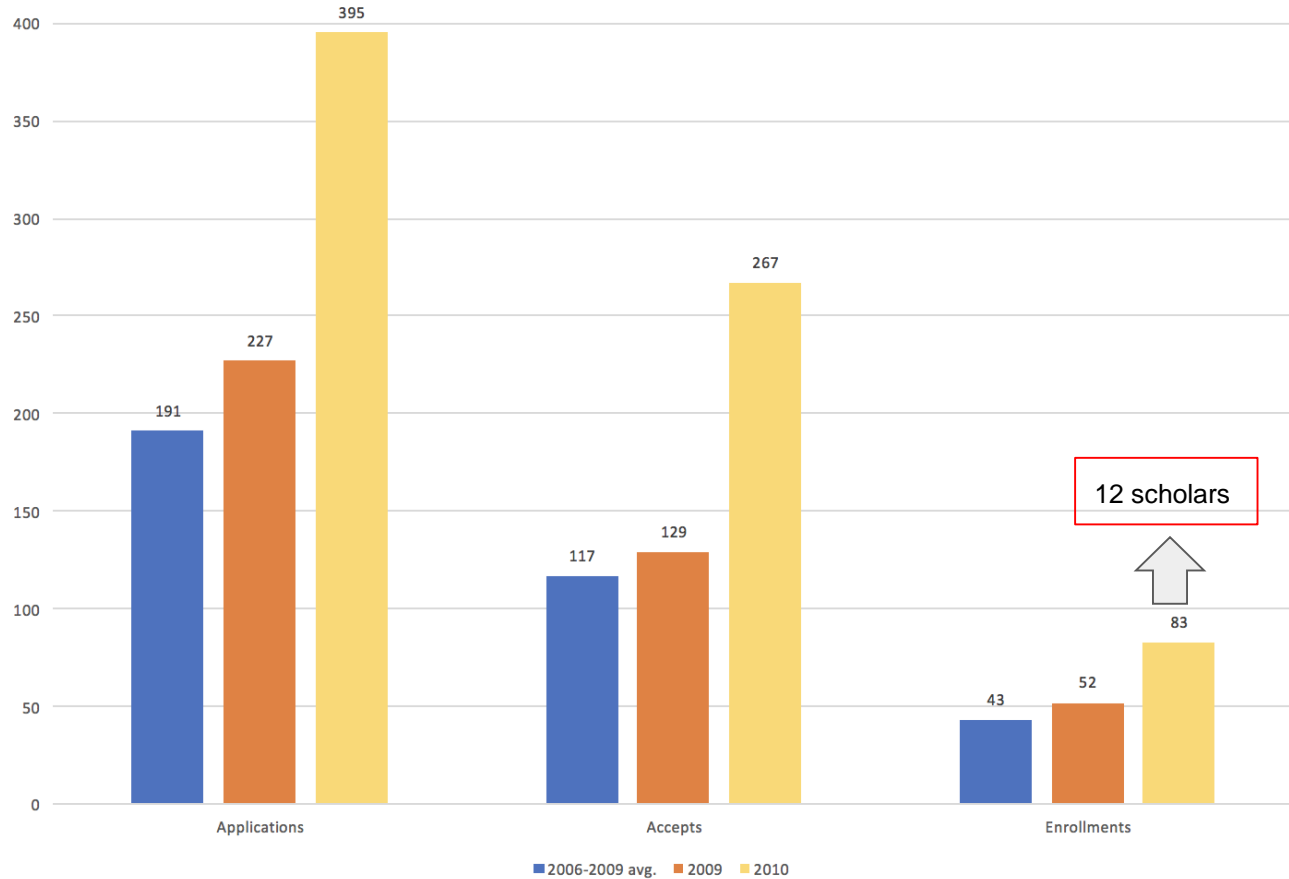
## 2010 Recruitment



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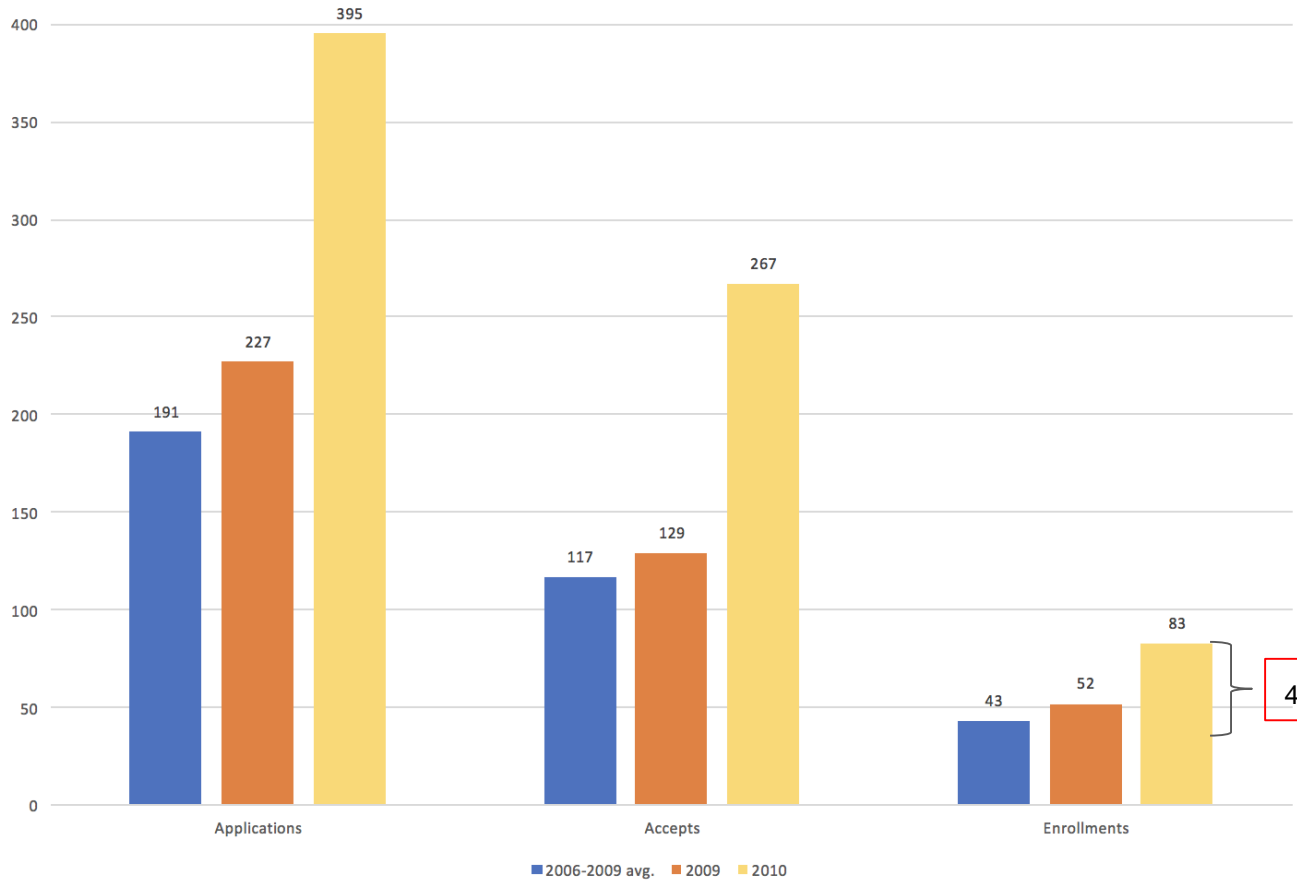


## 2010 Recruitment



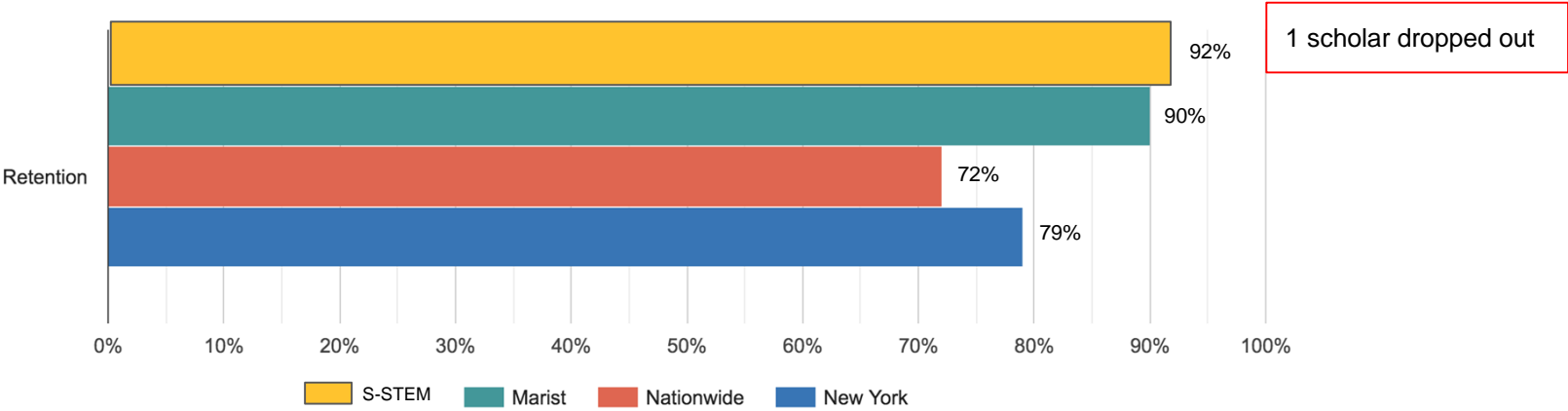


### 2010 Recruitment

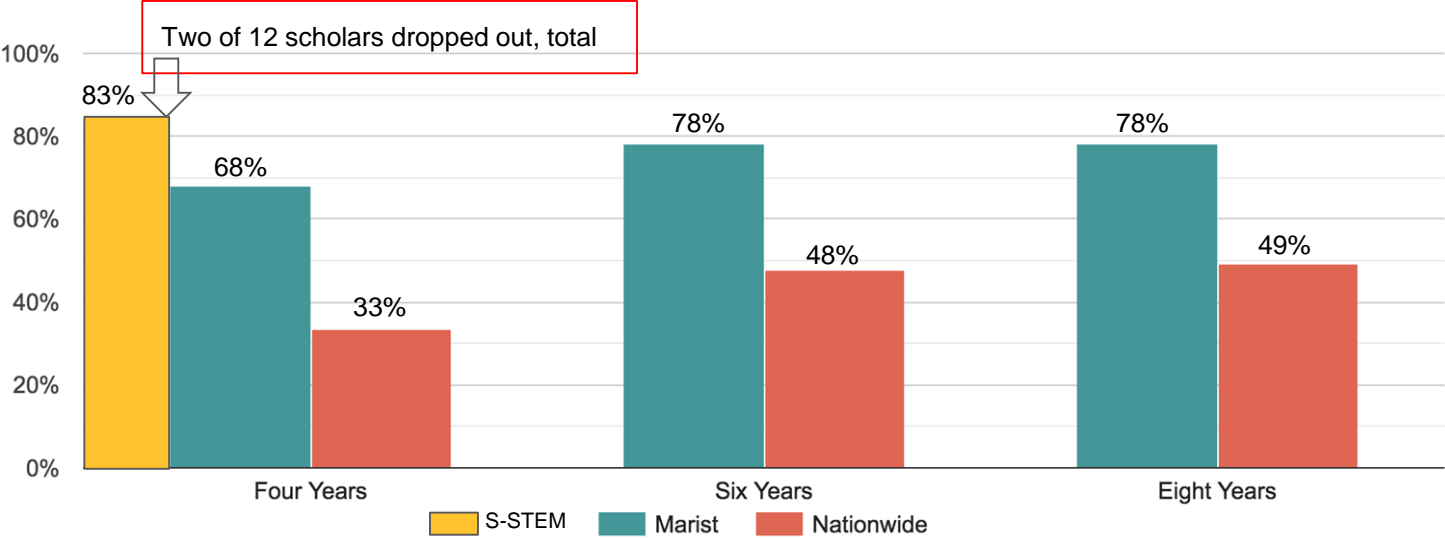


40 excess enrollments

# Freshman retention rate



# Graduation rates



# Compounded annual growth rate

$$\text{CAGR} = ( E / B )^{ ( 1 / ( W + D ) ) } - 1$$

$$E = S * M * W * N$$

E = expected tax receipts (i.e., return)

B = initial grant amount (i.e., investment)

S = expected lifetime salary

M = effective tax rate

W = expected working years to retirement

D = expected (delay) years to graduate

N = number of graduates

# Model assumptions

Excess enrollment: 40 students total -- how many graduated?

We know 10 scholars graduated.

Assume 75%<sup>1</sup> of in 6 years: 28 => 21 students graduated or  $N=31$  total

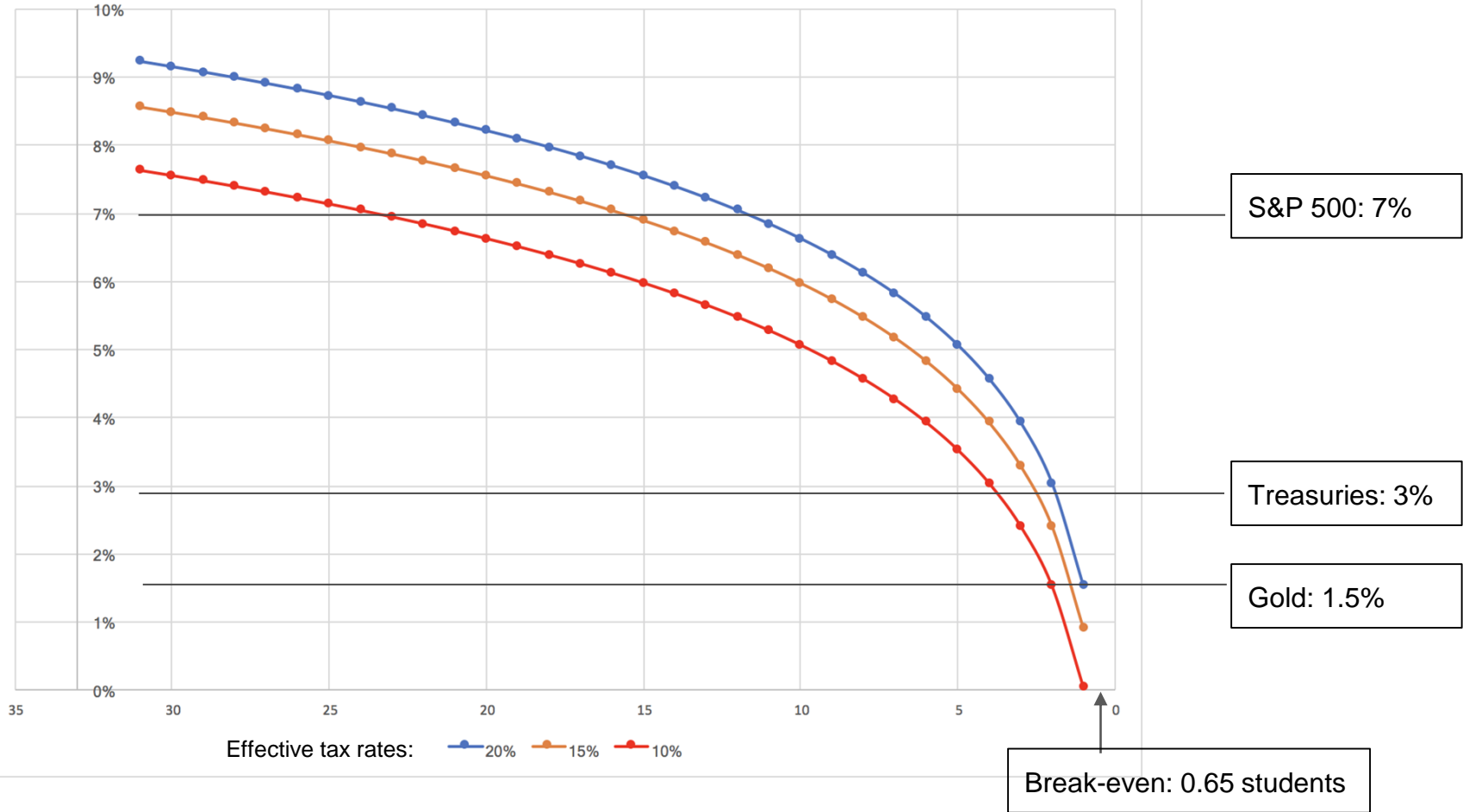
True investment with NSF 5.8%<sup>2</sup> overhead or  $E = \$584K$

Graduates fully employed  $W = 40$  years<sup>3</sup>

$S = \$151 K$ : assumes 3% for  $W$  years given entry-level \$70K

$M = 10 - 15\%$

Number graduates vs. ROI

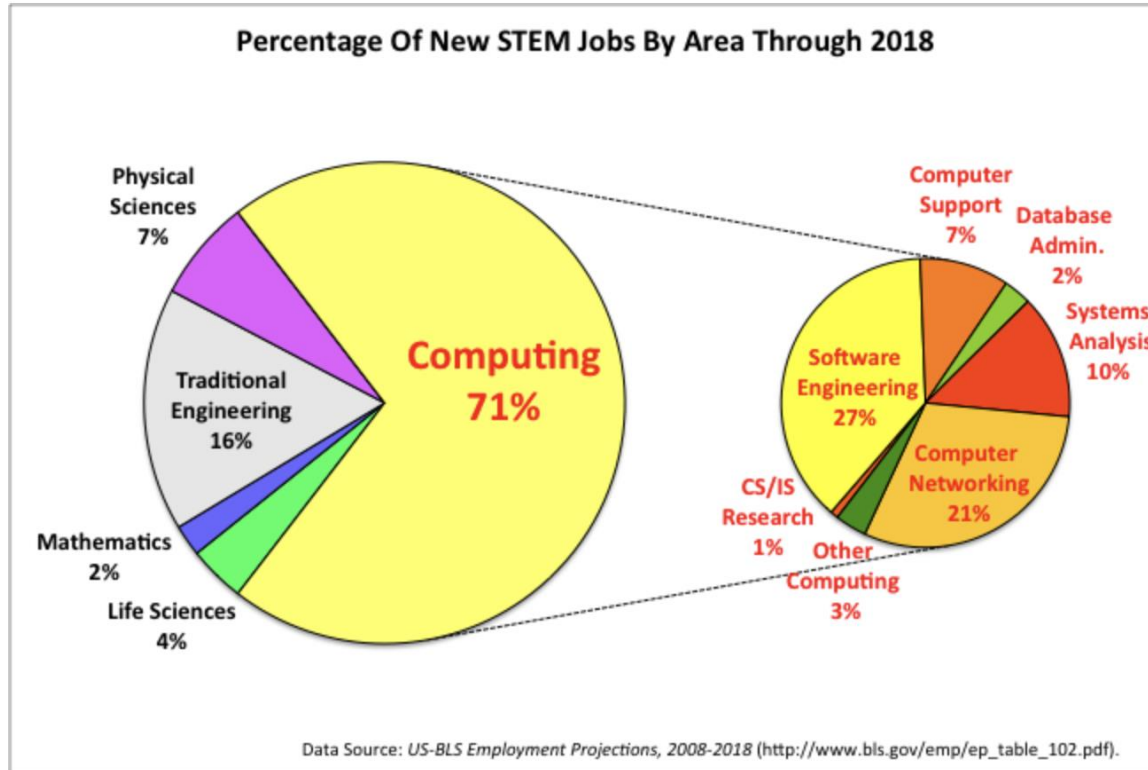


# Why would we *not* do this?

We have a win-win scenario.

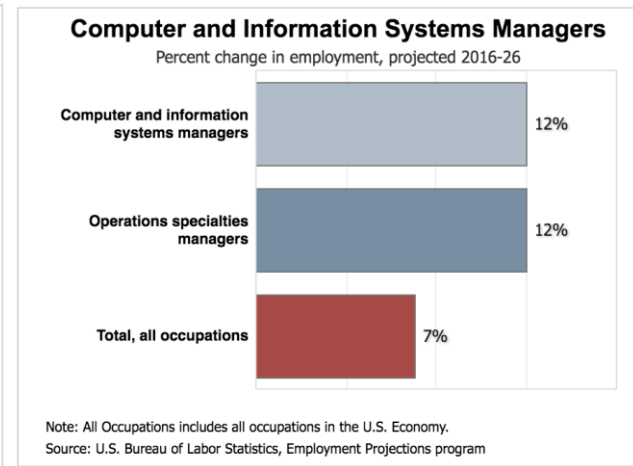
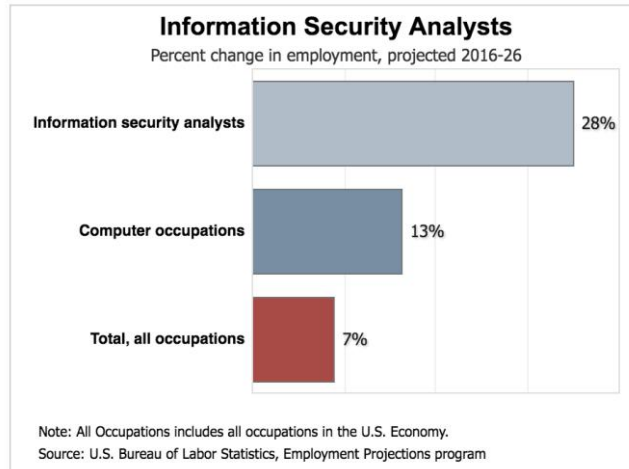
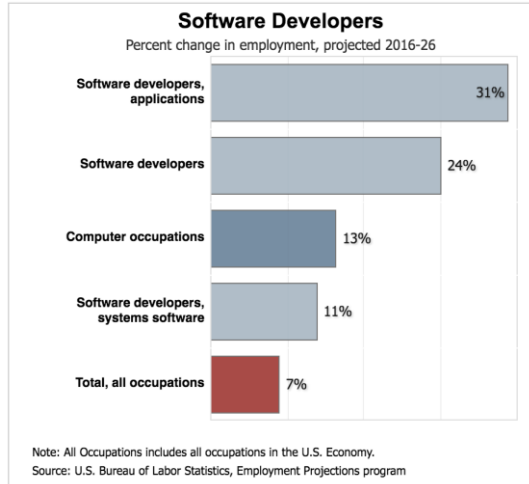
1. **The People** got their money back: 32 - 48X original investment.
2. Marist got more accepts, diversity, name recognition, etc.
3. Students got a college degree in area enjoying explosive growth for foreseeable future, according the BLS.

# What was awaiting those who graduated?





# Forecast: BS degree, <5y experience



Median pay: \$ 106K

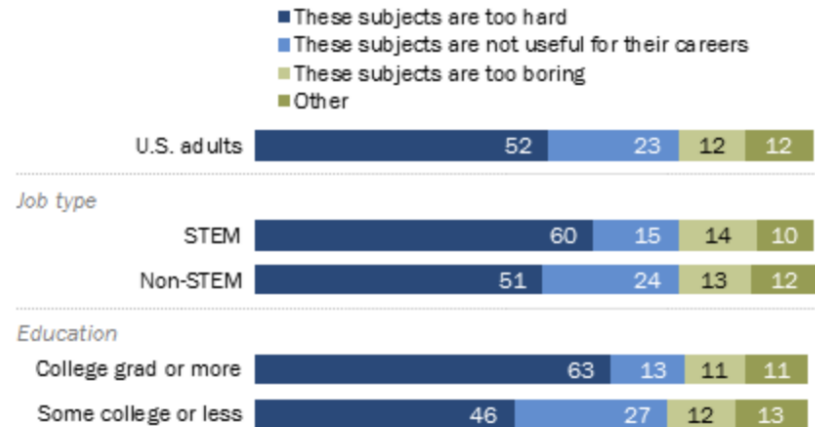
Median pay: \$ 98K

Median pay: \$ 142K

# Why then don't more people pursue STEM?

## Half of Americans say more people don't pursue STEM degrees because of the difficulty of the subjects

*% of U.S. adults who say the main reason many young people don't pursue college degrees in science, technology, engineering and mathematics is that they think ...*



Note: Respondents who did not answer are not shown. Some college includes those with an associate degree and those who attended college but did not obtain a degree.

Source: Survey of U.S. adults conducted July 11-Aug. 10, 2017.

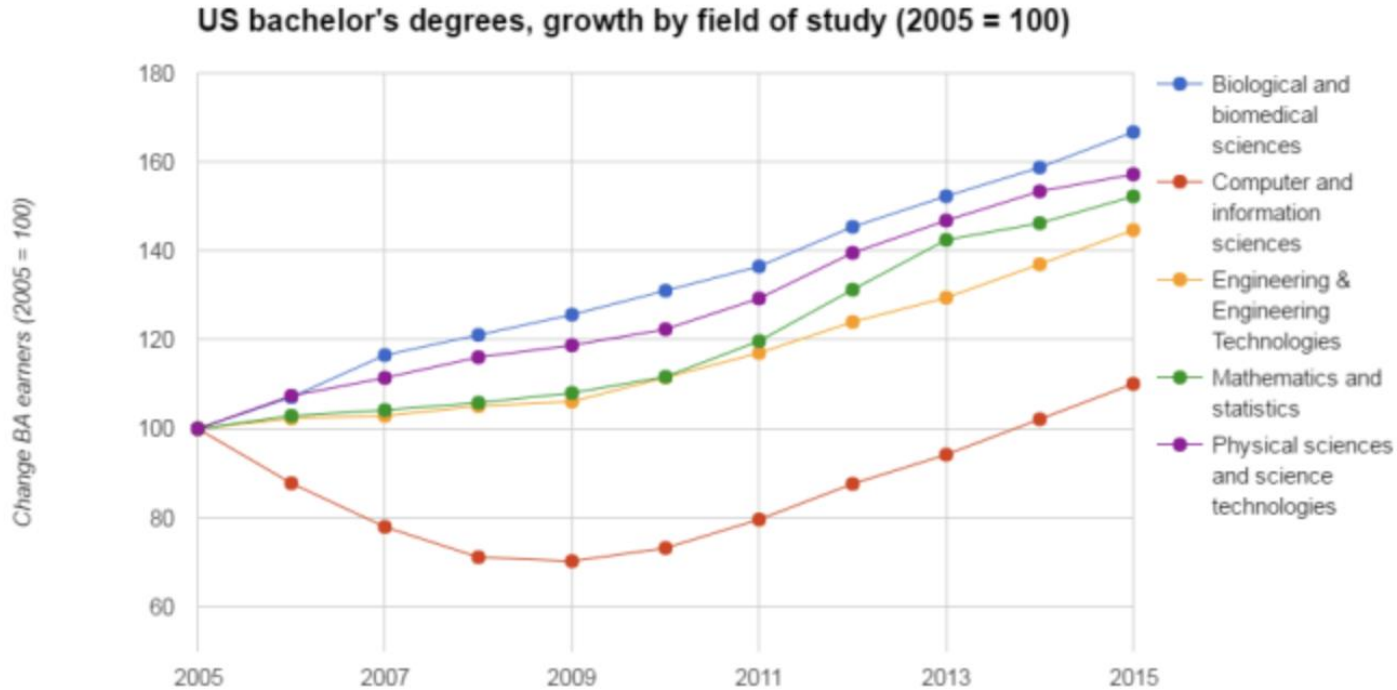
# Not *whole* story

Pew study that doesn't explain increases in apps, accepts, and enrollments.

Propose instead...

1. Scholarships overcame financial hurdles for some who faced them.
2. Program helped put word out about STEM for communities harder to reach.
3. Outreach for 12 educated wider audiences about STEM.
4. Effort caught a wave in the business cycle.

# STEM degrees



Data via National Center for Education Statistics, danwang.co

# Conclusion

ROI for S-STEM scholars likely paying off big time.

Wider audiences could probably benefit from learning more about STEM, particularly technology.