California Competes
Higher Education for a Strong Economy

A College Considerator

Factors to weigh in contemplating college affordabilty

PREPARED BY:

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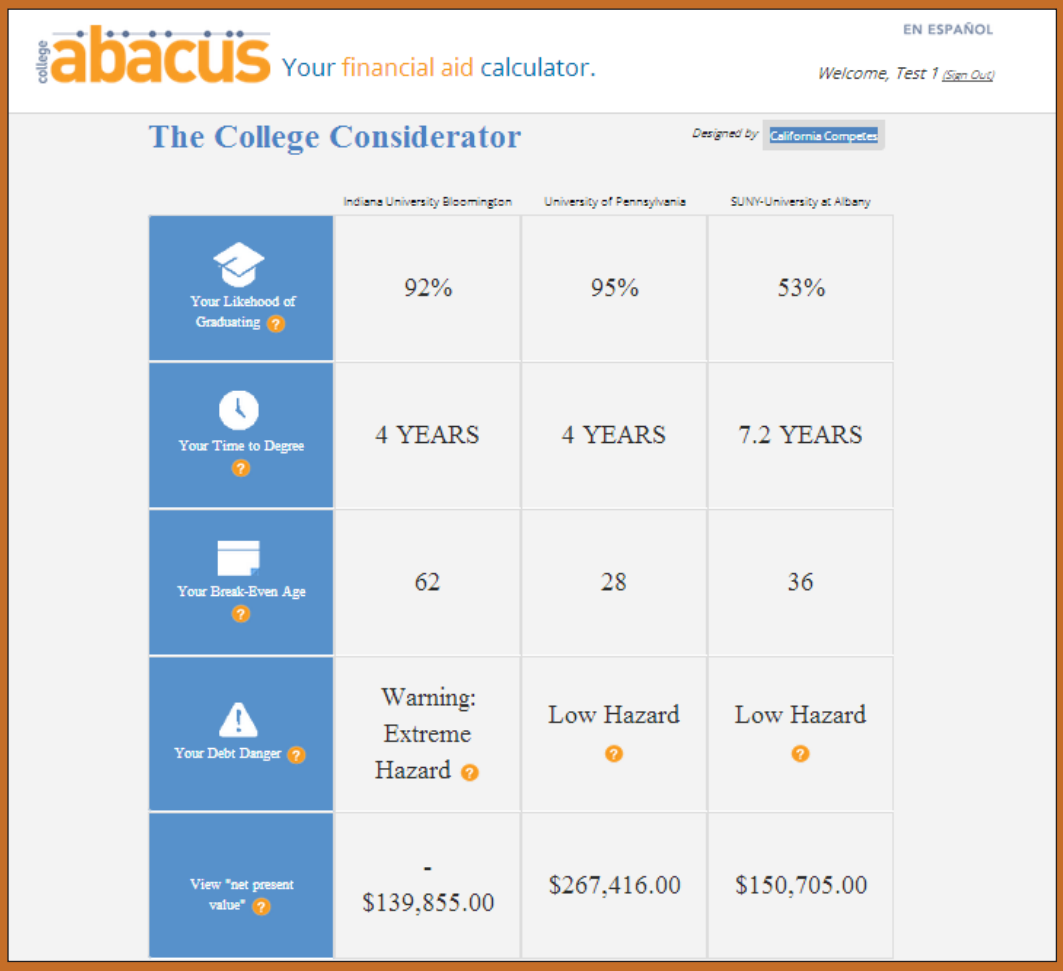

Opportunity, creativity, enterprise, efficiency and growth are the hallmarks of economic development and the lens through which California Competes develops non-partisan and financially pragmatic recommendations to improve postsecondary education.

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Disclaimer

This paper is one in a series of reports funded by Lumina Foundation. The series is designed to generate innovative ideas for improving the ways in which postsecondary education is paid for in this country — by students, states, institutions and the federal government — in order to make higher education more affordable and more equitable. The views expressed in this paper — and all papers in this series — are those of its author(s) and do not necessarily reflect the views of Lumina Foundation.

A College Considerator

We tried to create a calculator to help potential students consider college options. Here are the issues that came up for us and how we handled them.

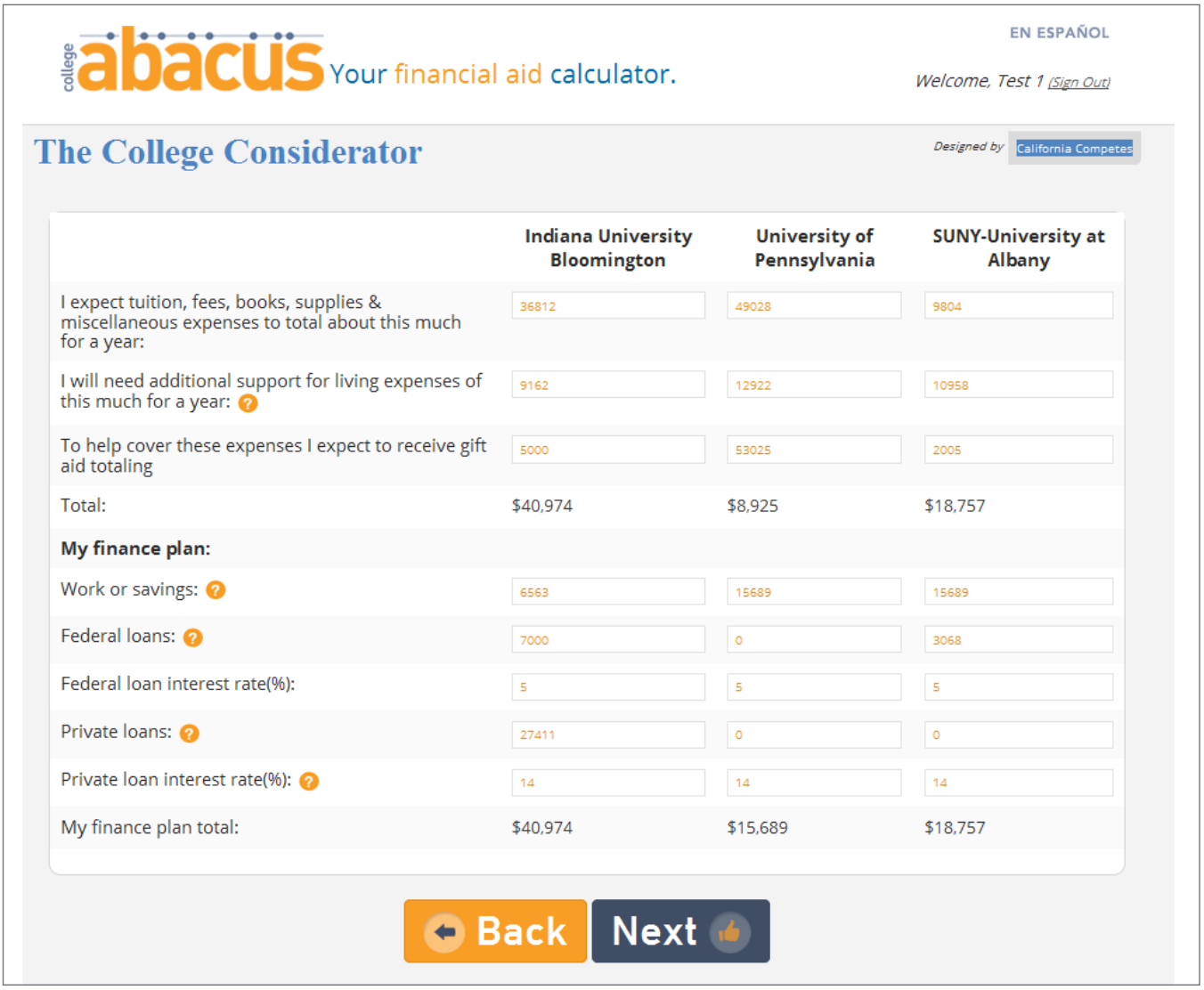
Few question the critical role that college affordability plays in promoting or inhibiting college access and success. Whether a student's college choice is affordable can make the difference between whether the student attends or not, and whether she completes. Nonetheless, there is no common agreement of what "affordable" means. The test of affordability is certainly not just whether the student has the money to spare in his wallet or his checking account. If a student takes on loans, how much debt is too much? To what extent should a prospective student's own opportunity costs be considered? If a student enjoys college, are the sacrifices less costly from an affordability standpoint?

Whether something feels affordable can depend as much on personal preferences and emotional factors as on concrete prices and interest rates. It also depends on expectations of the future, desired benefits that may or may not come. Will I be inspired? Will I get a degree? Will I get a well-paying job? Will I be happy in that job? Affordability is much easier to evaluate ex post than ex ante, but even then it is difficult: What would have happened if I had taken a different path?

To force ourselves to concretize the concept of affordability, we set out to build a calculator that would provide students with useful (even if not simple) information about the affordability of their college choices, incorporating as many factors as we could.

When we presented the first version of our tool we still called it a "calculator." To be sure, it was not the usual simplistic formula like the ones consumers use to figure out whether to rent or purchase a home, or whether the added price of a hybrid is worth the future savings in gasoline. Our initial alpha version included consideration of the user's opportunity costs, the level of personal commitment that the person might be making as a student, and the college's track record in graduating the students that it enrolls.

We changed our nomenclature because in developing the tool we have realized that its usefulness may be more in prompting thinking — things to consider — than in providing any type of calculated answer, hence the *considerator.* The "right" choices can't be calculated with any precision. Ultimately, there is no way of avoiding



We worked with College Abacus to design an alpha version of the considerator that builds on the College Abacus engine, which facilitates comparison of colleges' cost and financial aid estimates.

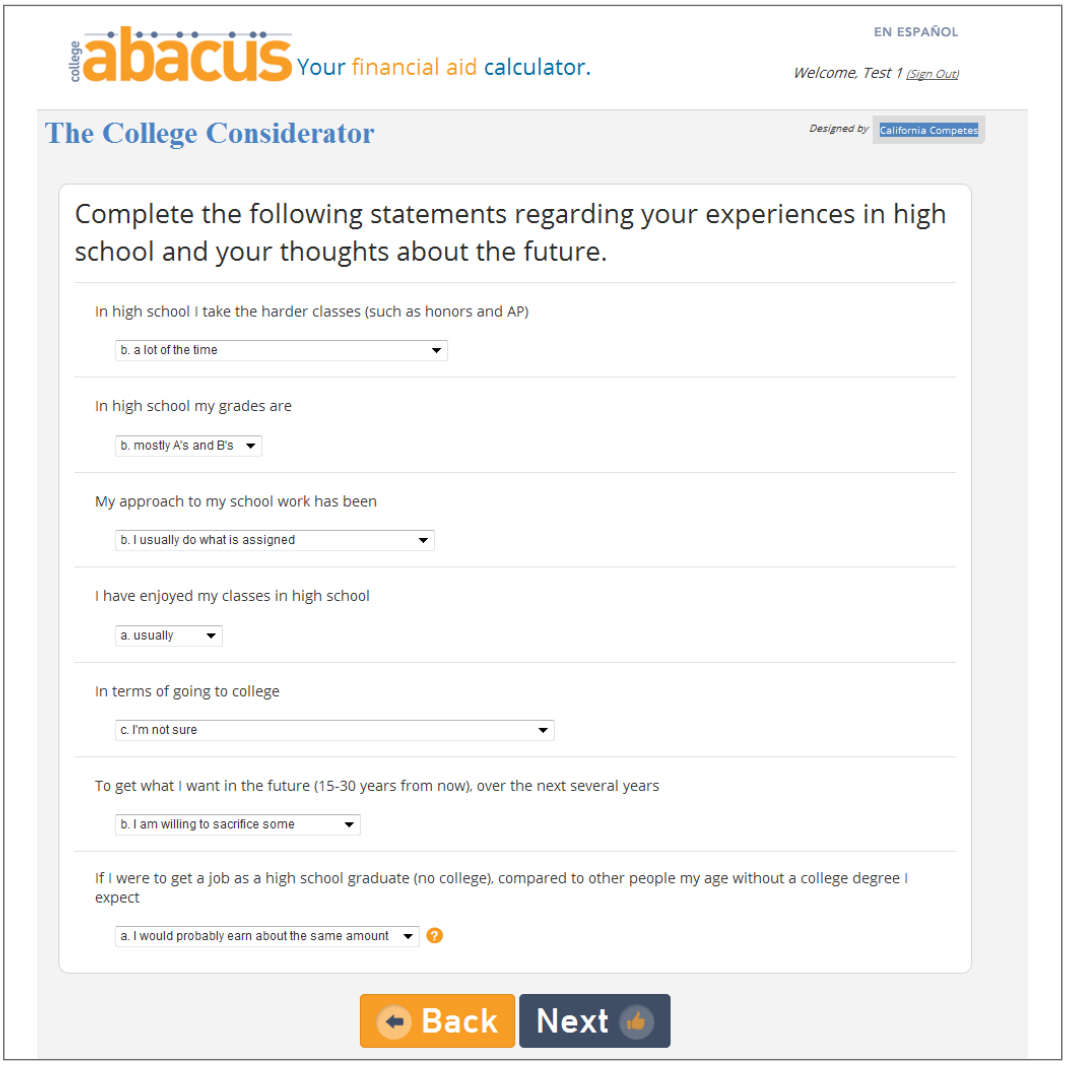
To examine a working version of the considerator follow the instructions at this URL: californiacompetes.org/considerator

Is it a good idea to show a potential college student that her poor showing in high school is an indicator that she will struggle in college, too?

the fact that whether, how and where to go to college involves leaps of faith about what might happen at a college, about what the world will be like in the future, and about one's own interests, abilities, and preferences. With any tool, the best we can hope to do is help the potential student think it through.

Our purpose in developing the tool is exploratory, a "what if" exercise. If a calculator existed for estimating the relative value or affordability of college choices, what would it need to include? Our contribution is to attempt to create that tool. We have not tested whether using it would change anyone's decision, or whether that change would be for the better.

With the warnings duly issued, here is our description and explanation of what we created, and our thinking as we did it. We start by describing the tool's outputs



The considerator asks questions to develop an estimate of the user's own academic drive.

and the data and formulas that go into creating them. Next we turn to the intangible, grappling with the complications involved in trying to value the invaluable. In part 3 we are back on firm ground, responding to some of the questions and suggestions we have heard regarding the approach we have taken. We end with some thoughts about the hazards in attempting to simplify complex decisions.

1. The considerator's outputs

A college degree is co-produced by the student and the college. Whether a student graduates depends on the courses, instruction, and supports that a college provides, but is also related to the student's own ability, level of commitment and choices that she makes. The real *potential* usefulness of the tool is in signaling to prospective college students the choices that can make a difference in their personal likelihood of completing, and of completing on time.[1] The college selected makes a difference, but so does **how** a student decides to go. For example, the considerator's output shows the effects of working too much, living with friends who aren't in college, or enrolling part time. The purpose of the tool should not be to declare or predict a fate, but instead to encourage the choices that improve the chances of degree completion without excessive risk to the student.

In recognition of both the college and student roles, our tool applies personal factors to a college's data to produce the user's predicted *likelihood of graduating* and *time to degree*. For example, for a student with a strong academic history and a plan to live on campus, the personal likelihood of graduation is higher than the college's average rate reported to the federal government, and the expected time to degree is shorter. On the other hand, for a student with little evidence of academic commitment and with a plan to work off campus, the likelihood of completing would be lower. Assuming that the user is a senior in high school, some

Figure 1: Student's Academic Appetite

Factor	Value
Rigor of high school curriculum taken	
High	2
Medium	1
Low	0
Unknown	0
Grades	
mostly A's	2
mostly A's and B's	1
mostly B's	0
mostly B's and C's	-1
mostly C's	-2
most C's and D's	-3
Approach to schoolwork	
Very committed	1
Good student	0
Flakey	-1
Enjoys school	
usually	1
sometimes	0
rarely	-1
Excitement about college	
high	1
low	-2
unsure	0

of the factors are ones that the student cannot do much to change, such as the grades earned in high school courses and the rigor of the courses taken. These are used not as an indication of intelligence or fate but rather as an indication of the student's own academic drive.

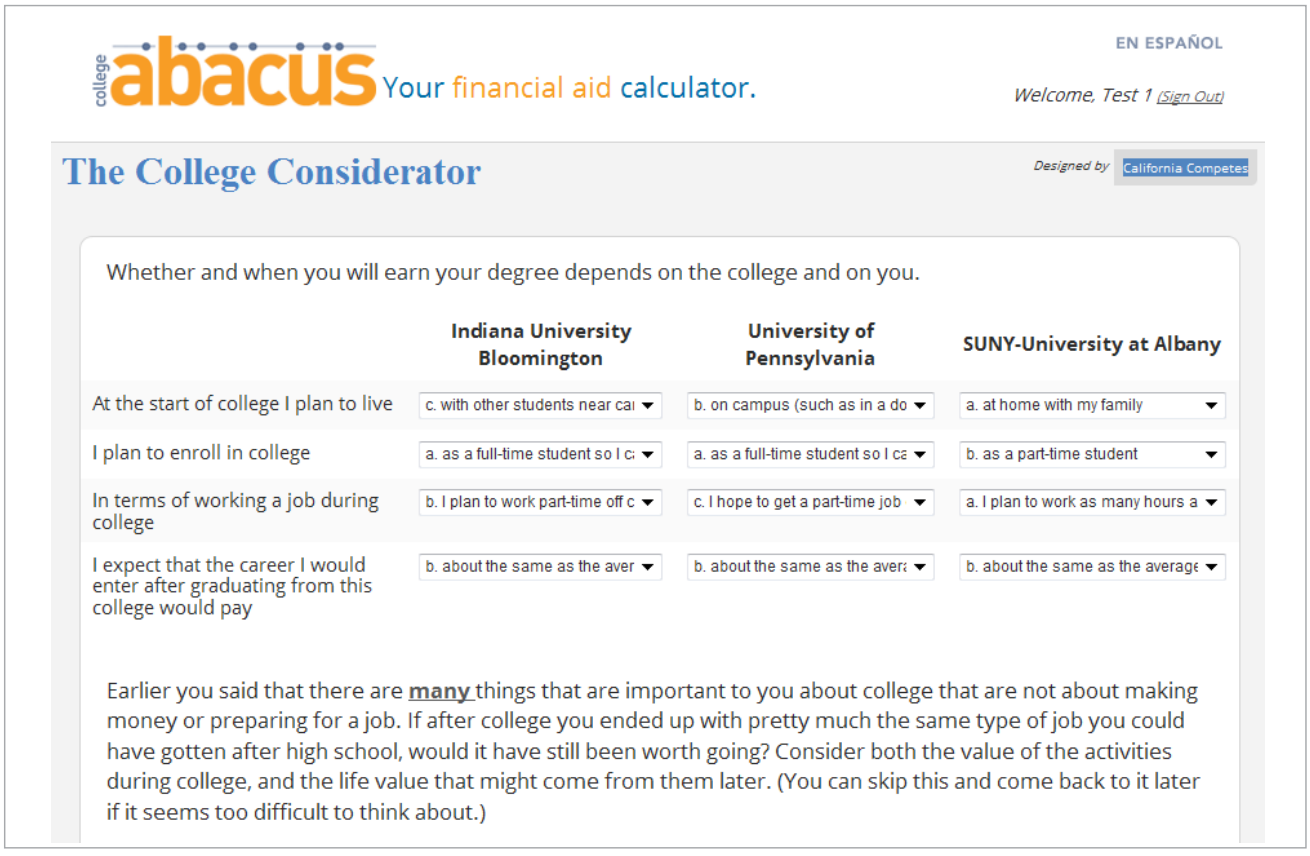
Is it a good idea to show a potential college student that her poor showing in high school is an indicator that she will struggle in college, too? We do worry about discouraging people with data that may or may not apply to them. On the other hand, it does not seem appropriate to keep the data from them if it can inform

their decisions. For example, providing a mediocre student with this information might encourage her to select a smaller college where she might get more support rather than a larger more impersonal setting.

The likelihood-of-graduating and the time-to-degree are two of the five outputs the considerator produces. The considerator also produces a break-even age and a debt danger and, optionally, a net present value, all described further below. These outputs are also personalized, taking into consideration the colleges chosen and the characteristics and plans of the user.

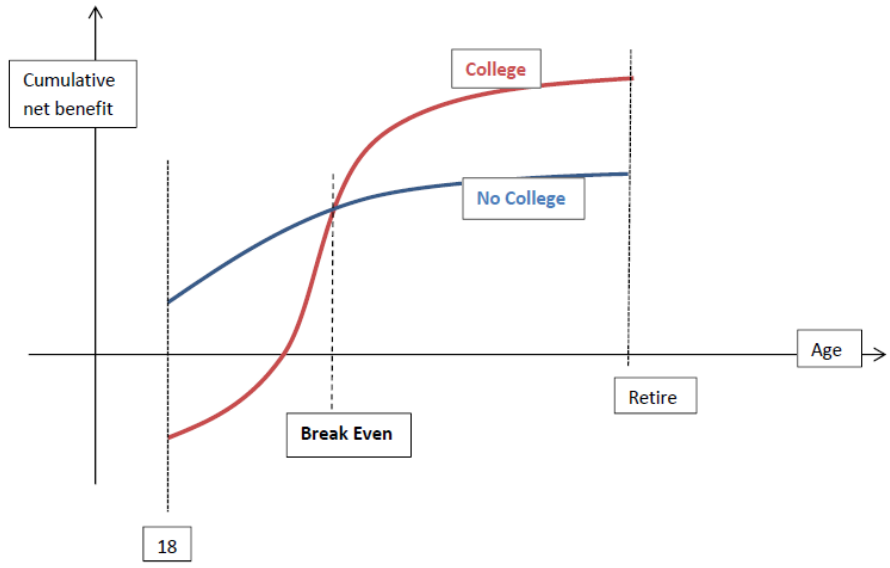
Figure 2: Characteristics of Attendance

Factor	Value for graduation likelihood	Value for time to degree
Living plans		
At home	-1	1
On campus	3	0.7
Off campus with students	1	0.9
Off campus not with students	-2	1.3
Enrollment intensity		
Full time	3	0.7
Part time	-3	1.7
Unsure	0	1.2
Work plans		
As much as possible	-3	1.7
Part time off campus	-1	1
Part time on campus	1	0.7
No job	0	0.9



The considerator asks questions to develop an estimate of the user's own academic drive.

Figure 3: Break-even Age



In constructing the considerator we obviously needed to make decisions about data to include, questions to ask, and values to attach to the resulting information. Below we describe how the current algorithms work. Every number and formula could be refined with further research. We have attempted to construct an overall approach that is less simplistic, more iterative, more personalized, and more thought-inspiring than the current advice ("college is worth it!"); we do not pretend that these are all the right or best numbers and algorithms.

Likelihood of graduation

We start with the college's eight-year graduation rate data from the federal Integrated Postsecondary Education Data System (IPEDS) as a base, while we assume that for any individual the likelihood of graduation can vary anywhere from a minimum of five percent to a maximum of 95 percent. The rate is based on the college's eight-year rate and the user's answers to the questions about their high school experiences and their interest in college. For each value point earned, the rate is adjusted one-fifth of the distance between the college's base and the maximum, up to a maximum of 30 percentage points. High school grades[2] and curriculum[3] are both well-documented indicators of success in college. A user's self-described interest in school and college can partially make up for the a deficit in grades and curriculum, an inclusion which, like the effect levels of each factor, are based on our general understanding of the observations of educators.

For example, for someone who took a rigorous curriculum but got only C's (plus 2 and minus 2) while earning zeroes in the other categories, the college's base rate would be unchanged (Figure 1). Someone with poor grades and little indication of interest in college would have a much reduced likelihood of completion. If the college's base rate is 30 percent, a user who shows enormous academic commitment could show a rate of up to 60 percent.

Next, the user answers questions about his own plans for how he will attend college (Figure 2).[4] For each value point, the user's rate moves one-fifth of the distance between their academic-adjusted rate and the maximum or minimum, again with a maximum adjustment of 30 percentage points. Combining the factors in Figures 1 and 2 (shown on the previous pages), a student who is

Figure 4: Earnings Assumption

Expectation relative to peers	With only a high school diploma		With degree from identified college	
	Amount	Inflator	Amount	Inflator
Higher	$30,903	~1.75% annually (compounded)	$45,96	~2.14% annually (compounded)
Average	$22,816		$32,844	
Lower	$15,920		$25,150	

very strong on academics and plans to live on campus, attend full time, and work little if at all would show a likelihood-of-graduation 60 percentage points higher than the college's IPEDS eight-year rate (but no higher than 95 percent).

We have made only crude attempts to avoid double-counting factors that should be considered only once. Ideally, we would like to use school graduation rates conditional on academic preparation, especially since there is evidence that the match between school and student is as important as the school or student independent of the other.[5]

Years to a degree

Of those who graduate, how long does it take them to finish? If we had student-level longitudinal data for each college we could observe exactly how many years and months it takes students to graduate and produce an average as well as appropriate deviations from the average based on student factors. But we don't yet have

Going to college isn't a single act like buying a lottery ticket. It is really a series of decisions over a period of years about where to go, what courses to take, whether to go to class, how hard to study, etc.

those data, so we must determine an average time-to-degree (for first-time, full-time freshmen) using federal IPEDS data. From these we can see how many additional students in a cohort graduated between the four-year and the six-year snapshot, but we cannot tell how many of them graduated in, say, 4.5 years versus 5.9 years. To produce a single number (a base time-to-degree from which we can deviate based on individual factors), we take the four-year graduation rate (A), six-year graduation rate (B), and eight-year graduation rate (C) and create an overall years-to-degree estimate using the following formula:[6]

"Base time to degree" = (4 x A/C) +
(5 x ((B-A)/C)) + (7 x ((C-B)/C))

For James Madison University, for example, with four-year, six-year and eight-year rates of 66, 81, and 82 percent respectively, the resulting "average," or "base time to degree" is 4.2 years. At Kansas State University, with four-year, six-year and eight-year rates of 28, 63, and 66 percent respectively, the result is roughly six months longer, at 4.7 years.

As with the second adjustment to the graduation prediction, we adjust the time to degree based on how the user plans to attend: where she plans to live, whether she will go full time, and how much she plans to work. We multiply the highest and lowest of the three values (far right column in Figure 2) by each other, and multiply that product by the base time to degree, with a minimum of four years. For example, for a student going to Kansas State who plans to live at home (value of 1), go full time (value of 0.7), but work as much as possible (value of 1.7), the Kansas State base of 4.7 would be multiplied by 1.19 (the product of the aforementioned 0.7 and 1.7), resulting in an adjusted time to degree of 5.6 years.

Net present value

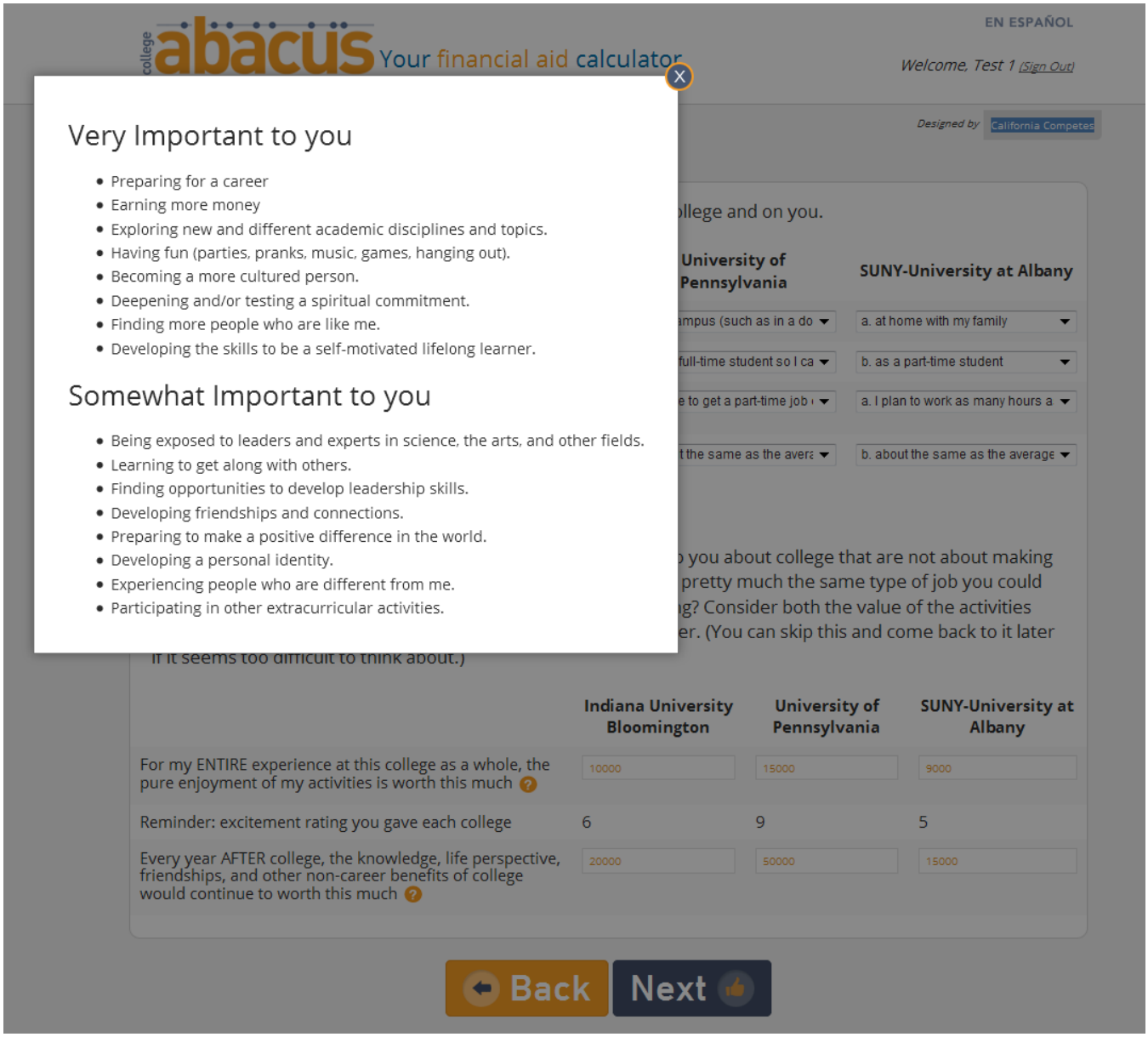
Experts and advisors talk about college as an "investment" because while the costs occur in the near term, many of the benefits come in the future. The simplest way most people think about it is in terms of a future job — you will earn more money later if you go to college now — but of course there are other benefits and costs as well. These amounts can be laid out as year-by-year monetary equivalents, applying a factor (discount rate) to account for the fact that some benefits and costs are immediate while others occur over time. Because economists love the NPV concept while most humans' eyes glaze over, we give the users the option of viewing the NPVs for each college rather than forcing the concept on them.[7]

The elements of the cash flow used for the NPV analysis are described in the next section. For the NPV analysis we use a discount rate of one percent, three percent, or five percent per year depending on the users' answer to the question regarding their own willingness to sacrifice for the future.

It would be simple math to multiply the likelihood-of-graduation by the NPV to establish a single number. But going to college isn't a single act like buying a lottery ticket. It is really a series of decisions over a period of years about where to go, what courses to take, whether to go to class, how hard to study, etc.

Break-even age

Our preferred alternative to an NPV analysis is an estimate of the age at which the cumulative gains from going to college overtake the losses (Figure 3). The considerator's break-even age considers all of the calculated benefits (including the user's valuation of the psychic benefits) and all of the costs, including opportunity costs, assuming the user successfully earns the degree.



The considerator prompts users to consider some of the purposes of college beyond just career and money, to prepare them for the somewhat paradoxical task of estimating the monetary value of the non-economic aspects of college.

Determining the break-even age requires calculating and accumulating the gains and losses associated with going to college and those associated with not going to college, listed below. Gains and losses are expressed in terms of projected cash flows, including the cash flows associated with student loans that may be used in financing college. Users may even include values for the enjoyment and life enrichment benefits of college.

Gains:

Earnings during college. This is based on the user's self-identified earnings potential with only a high school diploma (similar to peers, lower, or higher), multiplied by an amount based on work plans while attending the particular college (60% if the user plans to work as much as possible; 30% if working part-time off campus, 20% if working part-time on campus).

College options do not exist in the same vacuum of opportunities that we legislate for children. Diving in as a full-time college student needs to be compared against not going, or going less intensely while working more.

Earnings after a college degree. These are based on the user's expectation of earnings (similar, lower, or higher than other college graduates) after the expected degree from the particular college indicated (Figure 4).[8] Users may choose different earnings expectations for different colleges.

Enjoyment value. This amount is the user's allocation of a lump sum dollar amount to the value of the activities while in college — the enjoyment of lectures, discussions, sports, etc.

Life enrichment value. Users may attribute an annual post-college value to the life perspective, friendships, bragging rights, or other benefits of college outside of career earnings.

Student loan proceeds. Student loans are treated as income when received (as noted below, payments are considered losses as the loans are paid off over time).

Losses:

Counterfactual earnings. The amount the user would earn if she didn't go to college, based on her expectation of earnings compared to others right out of high school (similar, lower, or higher) after the expected degree from the particular college indicated (Figure 4).

College expenses. The out-of-pocket dollar amounts actually spent in each year of enrollment for tuition and fees, books and supplies, and other expenses that would not be incurred if the student did not choose to go to college. (Living expenses are not included here, but are included as an item that may need to be *financed* in order to facilitate college-going). Note that this doesn't necessarily correspond to how much college is costing the student, as this is a cash-flow analysis; it's what the student contributes to college out-of-pocket, after grants, supports, and loans.

Student loan payments. Amounts paid on student loans, including interest. The amount is allocated annually, assuming a ten-year post-college repayment period on federal loans and 20 years for private loans. (All interest accrues rather than being paid during college.)

The earnings amounts used in the considerator, shown in figure 4, are our estimates of the 25th percentile, median, and 75th percentile for adults age 18-24, working full-time for the full year.[9] For users who indicate that they would expect to earn more than their peers, the "higher" figure is used, if lower, then the lower figure. The inflator is based on the cross-sectional earnings differences by age among those with only a high school diploma or only a bachelor's degree.

Debt danger

Whatever the expected gains and losses associated with going to college, many students borrow money in order to finance direct college expenses and/or living expenses during enrollment, and this can create liquidity problems irrespective of whether the benefits of college exceed the costs. To the extent that a user is able to use federal loans to cover his needs, the considerator rates the hazard to be low because of the availability of income-driven repayment options. However, to the extent that a user relies on private loans, especially those with high interest rates, the level of hazard increases based on the percentage of initial earnings needed to make the annual payments based on a standard 20-year repayment plan, assuming the user is in the lower quartile of college graduate earnings.

Private loan payment/Earnings	Hazard level
Less than 5%	Low
At least 5% but less than 10%	Moderate
At least 10% but less than 15%	High
15% or more	Severe

By using the 25th percentile of college graduate earnings, this is an indicator of hazard, not fate. At the same time, eight percent of earnings has commonly been used as a cautionary point for student loan repayment, and since we are completely ignoring the federal loan debt, the hazard levels seem appropriate.

2. Opportunity costs and the meaning of life

Consider how opportunity costs are addressed in K-12 education. Employers are prohibited from hiring children except for limited hours so that those children and families are not tempted by the money they could earn by taking a job. We require people to be in school until age 16 or so rather than giving them the option of satisfying immediate desires for money. In other words, for their own good we restrict their options by declaring the opportunity costs — the money they could have earned — to be nonexistent. We do not consider it a "cost" of schooling that children are denied that income. At the college level, however, there are no such restrictions. After high school people are trying to figure out where they want to land on a spectrum from all work and no college to all college and no work. College options do not exist in the same vacuum of opportunities that we legislate for children. Diving in as a full-time college student needs to be compared against not going, or going less intensely while working more.

It is perhaps not particularly controversial for us to include an estimate of what a student might have earned with only a high school diploma. But to consider only non-college earnings compared to college earnings fails to acknowledge that a college might contribute to a more fulfilling life in ways that are not reflected in the wages of a job. As the free-enterprise advocate Arthur Brooks said recently, happiness can be strongly related to the work we do, but the rewards may be psychic — "kids taught to read, habitats protected, or souls saved" — rather than dollar currency.[10] Furthermore, we do paid work in part so that we can afford leisure, hobbies, travel, giving, the joy of raising children. Once basic needs are met, money and happiness may have little correlation.[11]

We decided there are two aspects of college that somehow need to be included in the considerator: the added value of the college experience itself, and the life enrichment value that may come afterwards from having attended college as opposed to some other activity after high school. It may seem odd to try to attach dollar values to these activities and outcomes, but the reality is that some people are, in effect, also enrolling in college for these reasons11or are paying more to attend a college that they feel is more likely to deliver on these outcomes. If users aren't allowed to include personal fulfillment outcomes, the considerator narrows and cheapens the value of college in ways that are not honest or helpful.

But how to estimate in dollars the value of things that feel like the very definition of non-economic?[12] We don't pretend to have the right answer, but feeling that we needed to account for it somehow, we settled on this approach. Rather than blurting out a question that may seem to some like asking how much love is worth, we prepare the user by asking them questions about the various reasons for going to college (everything from career preparation, to having fun, to "developing a philosophy of life"). Armed with this perspective, we ask them to declare a value they would attach to each of their college choices. We ask for two numbers — a lump sum amount for the value of the activities during college,[13] and the amount per year, for the rest of their working lives, for the non-monetary benefits accrued after college.

Putting a value on the college experience has the effect of lowering the break-even age and increasing the net present value. (For example, if you attached a value of $100,000 to the college experience, and it happened that tuition and foregone earnings also total $100,000, then college will have been "worth it" even before you get a post-college job). Of course, thinking about the non-pecuniary value of a college education does not reduce the tuition that a student might need to pay or the debt they may need to take on. But considering these factors may help a prospective student develop a better sense of what he wants from a college education, and how much it might be worth paying to get it. The user may want to peg this personal-enrichment value at the same number (or zero) for all colleges. But if one college feels like it would be a better life experience, the considerator offers a way to acknowledge and consider that value.

One additional point about the life enrichment value of college: Many of the activities that might seem geared toward that outcome — hanging out with friends, going to football games, going to interesting presentations or exhibits — are activities that contribute to people being happy in college, and therefore continuing through to graduation. Furthermore, they contribute to some of the critical-thinking and human attributes that are often most valued in good employees and leaders. Separating them out as distinct from preparation for a career or making money may create a false impression that they are unrelated to being a successful graduate when, in fact, they may be integral.

3. Decisions and difficult issues

We have had to make a lot of decisions about what to include in the considerator. Below we list some of them with discussion of how we made our decisions.

User's age

The considerator is designed for the traditional-age prospective student near or at the end of high school. What and how a student did in high school is taken as a given, an indicator that to some degree predicts a likely future. If the considerator is to be used for younger students, they could be shown how the courses they take and how hard they study in high school might affect

their likelihood of success in college. But usability for a younger audience requires different questions and another line of thinking.

Likewise, older adults who are considering college have life experiences that likely make their experiences in high school less useful in predicting their academic drive in college. A version of the considerator for older adults should ask about work and other experiences that might be more relevant indicators of college readiness or ambition. The current version of the considerator does not account for these factors and is not intended for older or younger users.

Sub-baccalaureate credentials

The considerator assumes that the college choice is solely and discretely between a bachelor's degree and no college at all, even though some students are specifically interested in sub-baccalaureate training, others forge paths that initially forgo college but often end up with some postsecondary training (including the associate's degree), and many college graduates go on to graduate school. A future iteration of the considerator could identify people who indicate their sole or primary interest is preparing for a job or trying to improve their earning potential, and include college options below the baccalaureate level.

Earnings by college and by major

There is a much attention these days to newly available data on earnings by college major, sometimes even at the institutional level. The primary reason we did not attempt to use these data is that we wanted to start simple. But we are not convinced that these data would be appropriate, either. Most starting college students end up changing their majors during college, so suggesting that a high school senior choose a college based on the earnings from a specific major seems inadvisable. As a compromise approach, we do allow the user to indicate earnings that are higher or lower than average for a college graduate, but we keep the range within the more likely rather than encouraging decisions based

Most starting college students end up changing their majors during college, so suggesting that a high school senior choose a college based on earnings from a specific major seems inadvisable.

on outliers. That said, if more data becomes available regarding earnings distributions by college, it might be appropriate to use those figures. In addition, if a student were to use a considerator tailored to students a year or two into college, these data could perhaps be more helpful and appropriate.

Graduate and professional school

Some students start college with a plan to become a lawyer, a doctor, an archaeologist, a physicist, or other vocations that involve higher education beyond a bachelor's degree. It is difficult to figure out how to consider that possibility in the considerator. As currently designed, the college graduate's earnings are for those with only a bachelor's degree, which means that some very high potential earnings are not included in the calculations. But including the higher earnings would seem to require that the calculator also consider the tuition and fees and opportunity costs involved in graduate and professional school. This is a topic that deserves further thought and discussion.

Race, ethnicity and gender

Data on graduation rates and earnings are available by race, ethnicity, and gender. We also know that success in college is highly correlated with whether or not your parents attended, if both were present in the household, and other factors. We could ask users for additional demographic information and tailor the information accordingly. However, there are relationships between demographic factors and academic factors, so that incorporating them into the considerator could result in accounting for a single factor several times over.

Furthermore, would asking the users about immutable characteristics create a sense that their fates are sealed as a result? Is it dishonest not to include it? One research task worth considering is to examine the differential between high school and college earnings and how that varies by race, to get a sense of whether using more tailored data in the considerator would be likely to produce different outcomes. This is another topic that deserves additional thought and discussion.

Earnings and labor force participation

The considerator assumes that the expected earnings of attending or not attending college correspond to the earnings distribution of young adults who did and did not attend college. This assumption suffers from selection bias, since the population of college earners is undoubtedly different from that of their non-college counterparts. In this way, the considerator has probably overstated the college earnings premium, although that premium is not stable and varies from year to year.

Furthermore, we use earnings for people working full time for a full year. This fails to take into consideration the risk of not getting a job. However, census data do not distinguish between people who are not working full time because they don't want to (e.g. they are in school, doing a volunteer stint, taking care of a child or parent) and those who want to be working full time. Further refinement of the considerator might consider how to address this issue.

Society's goals for higher education

The considerator is a tool for the individual. It is not a method of determining the appropriate public subsidy of higher education or a method of determining what is important for society.

Ultimately, there is no way of avoiding the fact that whether, how, and where we go to college involves leaps of faith about what might happen at college, about what the world will be like in the future, and about one's own interests, abilities, and preferences.

The considerator has been instructive, however, in identifying or reminding us of some of the intervention points and the complications in getting the outcomes we want. For example, as a society we may want college to be a transformative experience for developing creativity and leadership and good citizenship. If that is not what an 18 year old realizes is important, he may well choose a college — or a way of attending college — that is less likely to deliver it. This is an argument for a public subsidy to attend college and/or the development of standards for what a college education is or is not.

Thoughts and next steps

In a recent article about the use of data to guide consumers' health care decisions, Jason Karlawish makes the point that calculator tools can lead people to believe the numbers are more grounded and more meaningful than they really are.

> But like Dorothy confronting the Wizard of Oz, we need to look behind the curtain. It seems that anyone with a Big Data set and a statistics software package can develop an algorithm, give it a user-friendly interface, and behold: Your future is foretold. It's fast. It's simple. But it's opaque, and it may be wrong.[14]

There is ample evidence from the research literature that information is not particularly useful unless it is boiled down to a simple form. On the other hand, as Karlawish notes, attempts to simplify can lead people in bad directions. In sharing the alpha version of the considerator we should be asking not only whether a next version could be effective in guiding consumers and/or their advisors, but also whether it would guide them well.

ENDNOTES

1 While tuition costs might be higher for a student who takes longer to complete, at least as substantial are the forgone wages from not working (or not earning at the level of a degree holder).

2 There is a plethora of evidence that suggests that grades in high school are a strong predictor of graduation, and that this effect is stronger than the effects of standardized test scores (e.g. Adelman (2006), Bowen et al (2009) Geiser and Santelices (2007)). Bowen estimates that a difference of one standard deviation in high school GPA results in a 7-10% difference in the chances of graduation.

3 Adelman (2006) finds significant stratification in 8-year college graduation rates by both the rigor of the high school curriculum (by quintile) and (more specifically) the highest level of math reached in high school.

4 Ideally the user would see how the considerator's output changes as the user makes (and reconsiders) decisions. The current online version does not allow for this, but it will be considered if we produce a beta version.

5 See Light and Strayer, 2000. This could be a justification for either using school specific rates by preparation level or adjustment for preparation, but not both.

6 This approximation assumes that time to graduation is distributed uniformly between 4 and 6 years and 6 and 8 years. For example, that if 100 more people graduated between the four and six year reported rates, 50 of them finished between four and five years and 50 between five and six years.

7 In addition to the turnoff factor (Can any of us really say what our personal discount rate is?) we are concerned that the NPV analysis can produce large dollar amounts that are not as meaningful as they might seem,

8 Note that the amounts in Figure 4 are based on workers with bachelor's degrees. Later we discuss the complications associated with attempting to include earnings for those with post-baccalaureate credentials.

9 Starting with the age 18-24 mean, from the 2012 Census data, for those with only a high school diploma or no higher than a bachelor's degree, we estimated the 25th, 50th, and 75th percentiles by assuming that they had the same relationship to the mean as do the available percentiles for the age 25-34 Census data.

10 "A Formula for Happiness," *New York Times*, December 15, 2013, page Sunday Review p. 1.

11 Just in case a college with poor earnings outcomes wants to cite this statement as a defense, let us emphasize that getting a job and earning "enough" is very important. But beyond that it is not as important. This argues for accountability measures that focus on eliminating the horrible outcomes rather than celebrating high versus moderate incomes.

12 Peter Thiel provided one answer to this question when he offered $100,000 fellowships to talented students who agreed to forgo college for two years to develop business ideas instead.

13 People may find intrinsic value not just from the other stuff that happens in college, but also from lectures and discussions themselves. The Atlantic magazine cosponsored a "One Day University" at $250 for four live 75-minute lectures. For a full semester of exciting lectures that would be about $7,000 just for being part of the live audience, with no discussion sections or feedback.

14 "Statins by numbers," *New York Times*, November 29, 2013.

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