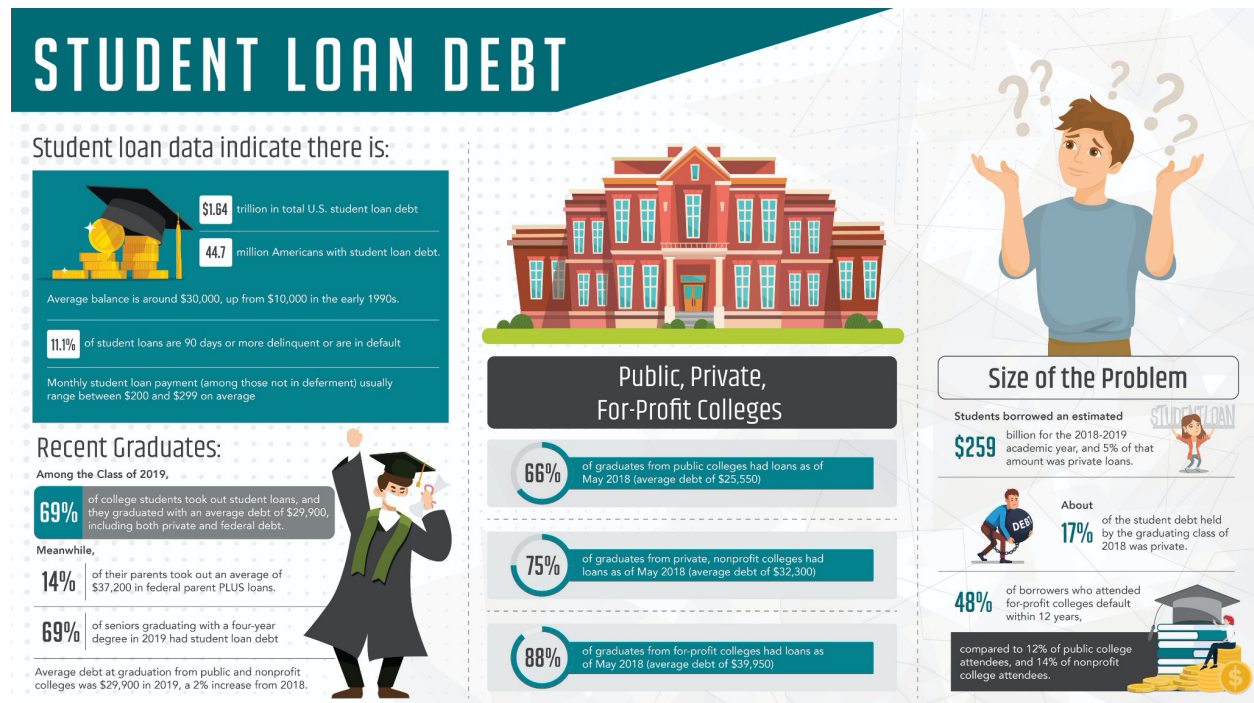# Data Science Reveals US Higher Education and Student Loan Systems are Failing Students Who Need Them Most

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Word Cloud of the most common terms related to student debt,

sourced from 26 topical academic articles.

Introduction

Student debt in the US is an enormous problem. Almost 45 million Americans hold student debt, which totals an astronomical $1.64 trillion. With the 2020 Presidential election of Joe Biden, the important issue of student debt - and the potential for some type of student debt forgiveness - has once again risen to the foreground of social and political conversations.

In partnership with ShapingEdu, data scientists from social impact start-up Omdena examined the root causes and key parameters of the student debt problem in the US, and then built an innovative tool to empower potential borrowers with customized information on the financial and personal impacts of their student loans.

Working on a prompt by ShapingEdu, researchers from the social impact startup Omdena used social science and data science to examine the issue, producing key insights around the parameters, demographics, and causes of student debt. Then they prototyped a solution.

Omdena's data scientists found:

- The majority (76%) of student loan debt is under $40,000, with a large portion (35%) under $10,000. Defaults are driven not by large debt burdens, but by smaller loans, held by vulnerable populations who are not adequately equipped to pay off their loans.

- The system hurts those who need help the most - minorities and women. Minorities begin at a disadvantage, make (or are forced into) college choices that exacerbate that disadvantage, and then are faced with loan and repayment systems that are riddled with problems and difficult to escape.

- Private for-profit institutions are a particularly poor investment, with a poor cost-to-debt ratio, and low completion rates. They are a disproportionately large source of loan defaulters, many of whom are minority and low-income students.

- There is a strong correlation between student debt and mental health. Minority students are particularly vulnerable to for profit colleges, undue debt burdens, and stress from student debt. Women, Black and Hispanic graduates, and graduates from for profit universities, report the highest levels of stress from education debt.

Omdena's data scientists built on the insights gleaned from this project to develop an innovative solution - an application intended to empower students - especially the most vulnerable - with customized information on the financial and personal impacts of their student loans. Designed to go beyond traditional loan calculators, the app leverages historical data to create a personalized dashboard that guides students in decision making. Using a Loan Simulator and a Borrower Profile, the dashboard shows users the various repayment rates for "students like them" at different institutions. The app's tailored approach provides students with a potent interactive tool that demonstrates how decisions about loan types and colleges could affect them personally, helping borrowers avoid potentially damaging choices with long term ramifications.

What is the real student loan crisis?
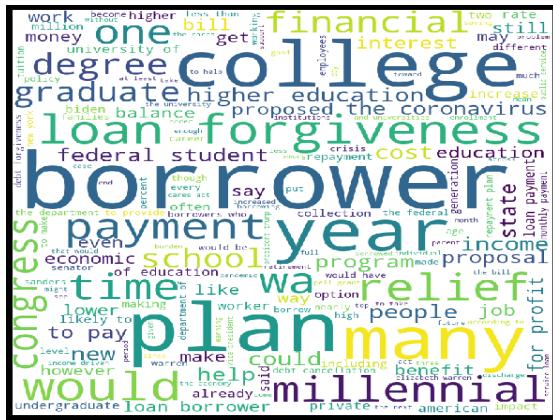
WORD CLOUD based on searches for terms: "student debt crisis, student debt, student loan, and/or loan forgiveness" in Forbes.com 2013-2020 articles, Medium.com blog posts & Change.org petitions.

Student debt in the US is a multifold problem. The total debt itself is extremely high ($1.64 trillion) and is held by a significant number of people - almost 45 million Americans have student loan debt.[2] Omdena researchers used social science and data science to explore the parameters, causes and repercussions of the student debt crisis. Their findings are nuanced and unsurprising, supporting the significant body of research that points to the predatory practices of for-profit private colleges, and the systematic disadvantage faced by low-income students, female students, and students of color.

The total student loan debt in the US, and the number of debt holders, are rising rapidly due to multiple factors, including the increased importance and costs of a college degree, the increasing number of people attending college, and the accumulating costs of interest on the growing balance of loans. Omdena researchers focused on the ability of students to repay their loans as a central aspect of this problem. The cost of college and the amount of student loan debt across the nation would not be as much of an issue if graduates were earning enough to readily repay their loans. In other words - the investment value and potential payoff of the

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[2] Friedman, Zack. "Student Loan Debt Statistics In 2020: A Record $1.6 Trillion." *Forbes. Forbes Magazine, February* 5 (2020). https://www.forbes.com/sites/zackfriedman/2020/02/03/student-loan-debt-statistics/?sh=44503e6281fe

college degree is as, if not more, important than the overall amount of debt and the number of

borrowers.

Key Finding - The majority of the student debt burden consists of mid-sized and smaller

loans. 76% of borrowers owe under $40,000, and a large portion (35%) owe under

$10,000.

Omdena's research revealed that while the total student debt in the US is enormous, it

is not primarily composed of huge loans, as one might assume.[3] Based on numbers from the

US Department of Education, a surprising majority (almost 76%) of those holding student loans

owe under $40K, and almost 35% owe less than $10K. So, in theory, repayment of a large

portion of America's vast student loan debt should be relatively manageable. *See Figure 1.*

Figure 1 - Student Loan Balances by Number and Percentage of Borrowers
Source: Omdena Research and US Dept of Education

Student Loan Balance	Borrowers (millions)	Percentage of Borrowers
Less than $5000	8.3	18.3%
$5,000 - $10,000	7.5	16.5%
$10,000 - $20,000	9.2	20%
$20,000 - $40,000	9.5	21%
$40,000 - $60,000	4.1	9%

[3] Note - Recent articles that have shared this observation:
Friedman, Zack. "Student Loan Debt Statistics In 2020: A Record $1.6 Trillion." *Forbes. Forbes Magazine, February* 5 (2020). https://www.forbes.com/sites/zackfriedman/2020/02/03/student-loan-debt-statistics/?sh=44503e6281fe.   Harris, Diane "The Truth About Student Debt: 7 Facts No One is Talking About" *Newsweek. August 8* (2019)*.* https://www.newsweek.com/2019/08/23/student-debt-loans-truth-facts-cover-story-1453057.html.

$60,000 - $80,000	2.5	5.5%
$80,000 - $100,000	1.3	3%
$100,000 - $200,000	2.2	5%
Over $200,000	0.8	1.7%
TOTAL	45.4 million borrowers	100%

Key Finding - Most borrowers are able to repay their loans. However, for 30% of Federal Direct Loan holders, student debt has proven unmanageable, indicating that their college education was not worth the investment.

The overall manageability of student loan debt is supported by the fact that most of the Federal Direct Loan debt - which represents a majority of the total student loan debt ($1.2 trillion of the $1.6 trillion, held by 39 million of the total 45 million borrowers) is in good standing. Based on numbers from the Department of Education, 70% of the Direct Loan debt, held by 70% of borrowers, is either in Repayment, or held by borrowers who are still in school or in a grace period after graduation.

The "problem" group is the remaining 30% - $370 billion in Direct Loans, held by almost 12 million people - which are either in Default, Deferment or Forbearance. For this group student loan debt has proved to be an unmanageable burden - their education was not worth the investment and did not empower them with the resources to repay their debts.

Roughly half of this group is comprised of the 6.4 million Americans (16% of all borrowers) who have needed to put their loans in Deferment or Forbearance, representing $250 billion dollars, or 20% of the total borrowed amount. The other half of this group consists of the

5.5 million Americans (14% of all borrowers) who have defaulted on almost $120 billion dollars

in loans - 10% of the total borrowed amount. *See Figure 2.*

Figure 2 - Direct Loans - Status by Borrowers and Loan Amount
Source: Omdena Research and US Dept of Education

STATUS	NUMBER of Borrowers (in millions)	PERCENT of Total Borrowers	LOAN AMOUNT (in Billions)	PERCENT of Total Loan
In Repayment	18.5	47%	$ 685.5	55.5%
Still in School	7	18%	$ 131.5	11%
Deferment or Forbearance	6.4	16%	$ 251.3	20%
Default	5.5	14%	$ 119.8	10%
Grace Period	1.8	5%	$ 45.2	3.5%
ALL Direct Loans	39.2 million	100%	1,233.3 Billion USD	100%

As a June 2019 report by The Institute for College Access & Success (TICAS) explains,

"default is the most devastating possible student loan outcome. Upon entering default, the entire

unpaid balance (including accumulated interest) becomes due."[4] Default destroys a borrower's

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[4] Ahlam, Lindsay and Gonzalez, Veronica "Casualties of College Debt: What Data Show and Experts Say About Who Defaults and Why" The Institute for College Access & Success (TICAS). June 2019. https://ticas.org/wp-content/uploads/2019/09/casualities-of-college-debt.pdf

credit score, makes repayment extremely difficult, and can create compounding financial

hardship. To collect unpaid debt, the federal government can garnish a defaulted borrower's

wages, as well as withhold tax refunds and other federal benefit payments. Defaults negatively

impact more than the lives of defaulters themselves; they also affect the interest rates for all

borrowers. Working to address the causes of defaults and prevent them should be a key

element of any manageable and equitable educational system.

**Key Finding - Defaults are driven by smaller loans (under $10,000) - and vulnerable
populations.**

Who are those students who are most likely to default on their loans, and why?

Omdena's research echoes work by groups such Utah State University's Center for Growth and

Opportunity, The Institute for College Access & Success (TICAS), New America, and the Center

for American Progress, which has found that "the nation's current system of higher education

puts the most vulnerable students at the greatest risk of default."[5]

Research by Utah State University's Center for Growth and Opportunity, for instance,

found that default is most common among borrowers with smaller balances.[6] As the figure

below shows, nearly two-thirds of defaulters have less than $10,000 in student debt. In fact, the

default rate for borrowers with less than $5,000 in debt is more than three times that of

borrowers with over $40,000 in debt. *See Figure 3.*

Figure 3 - Default Rate by Loan Balance
Source: Omdena Research and Center for Growth and Opportunity

[5] Miller, Ben. "Who Are Student Loan Defaulters?" Center for American Progress. December 14, 2017.
https://www.americanprogress.org/issues/education-postsecondary/reports/2017/12/14/444011/student-loan-defaulters/
6 Hedlund, Aaron. "What Can Be Done to Address Rising Student Debt?." The Center for Growth and
Opportunity, Utah State University. (2019).
https://faculty.missouri.edu/~hedlunda/policy/CGO_studentdebt.pdf
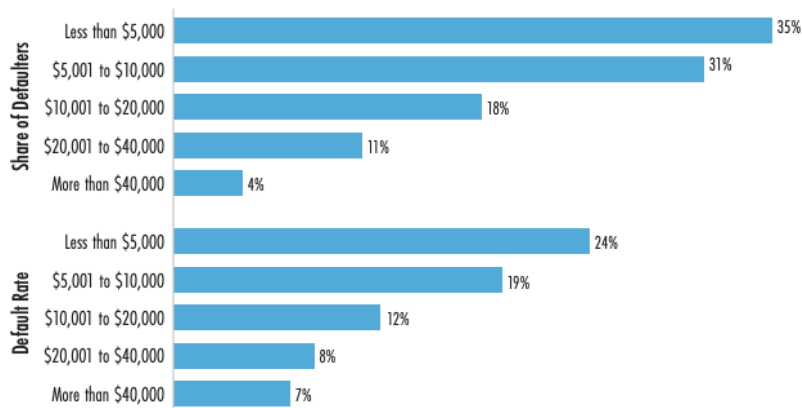
New America's 2019 exploration of debt among Millennials revealed that four groups of

borrowers are experiencing particularly acute financial hardship: students of color, low-income

students, those who do not graduate, and those attending for-profit institutions. These groups of

borrowers often overlap, leading to high rates of default. Low-income students and students of

color have higher rates of borrowing, but lower rates of graduation - leading to the double

whammy of debt without the associated wage gains of a college degree. These students are

over-represented in for-profit private colleges, whose poor student outcomes make student debt

even more difficult to manage.[7] A Center for American Progress review of data related to loan

defaulters from the National Center for Education Statistics (NCES) similarly found that

borrowers who default on their loans are more likely to be first generation, non-completers,

financially independent (without parent support), low income, and enrolled in private for-profit

colleges.[8] *See Figure 4.*

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[7] Whistle, W. "Millennials and student loans: Rising debts and disparities." in "The Emerging Millennial Wealth Gap Report" New America. October 29, 2019
https://www.newamerica.org/millennials/reports/emerging-millennial-wealth-gap/millennials-and-student-loans-rising-debts-and-disparities/

[8] Miller, Ben. "Who Are Student Loan Defaulters?" Center for American Progress. December 14, 2017.
https://www.americanprogress.org/issues/education-postsecondary/reports/2017/12/14/444011/student-loan-defaulters/

Figure 4 - Borrowers and Defaulters, Demographics
Source: Center for American Progress

TABLE 1

Share of borrowers, by demographics and default status
Students entering college in 2003-04 who took out a federal loan within 12 years of entry

	Percent of defaulters	Percent of all borrowers	Percentage-point difference
Age			
18 or under	35	47	-12
20 to 29	33	21	12
Attainment			
Bachelor's degree	10	34	-25
Dropout	49	30	19
Dependency			
Dependent			
Independent with dependents			
Parent education level			
No college degree	70	54	15
Finances			
$0 expected family contribution	43	25	18
Bottom 25%	40	27	14
Top 25%	10	20	-10
Borrowed for graduate school	5	18	-13
Pell			
Ever received Pell Grant	87	68	19
Race			
White	44	60	-16
Black or African American	30	17	13
Hispanic or Latino	18	14	4
Parent education level			
Public four-year	19	29	-11
Private nonprofit four-year	11	17	-6
Public two-year	31	33	-2
Private for-profit	38	19	18

Source: Author's analysis of data from National Center for Education Statistics, "2003-04 Beginning Postsecondary Students Longitudinal Study,
Second Follow-up (BPS:04/09)," Tables cdmbhp15, cdmbhm7a, cdmbhnf95, benbhb2a, cdmbhnkde8, cdmbhn6c, cdmbhpbff, cdmbhnf34,
cdmbhm72, and cdmbhmb52, available at https://nces.ed.gov/datalab/powerstats/default.aspx (last accessed November 2017).

CAP

Who is most affected?

Key Finding - The education and loan pipeline - from choosing schools to taking out and

repaying loans - has a disproportionately negative effect on minorities and low-income

borrowers.

Omdena's review of data from the National Center for Education Statistics (NCES), the

United States Department of Education's College Scorecard, the Bureau of Labor Statistics, and

the Institute for Women's Policy Research ultimately found that the entire education and loan

pipeline - from choosing schools to taking out and repaying loans - has a disproportionately

negative effect on minorities and low-income borrowers.

Key Finding - Minority students are at a disadvantage from the onset. First of all, minority

students are more likely to be low income. *See Figure 5.*

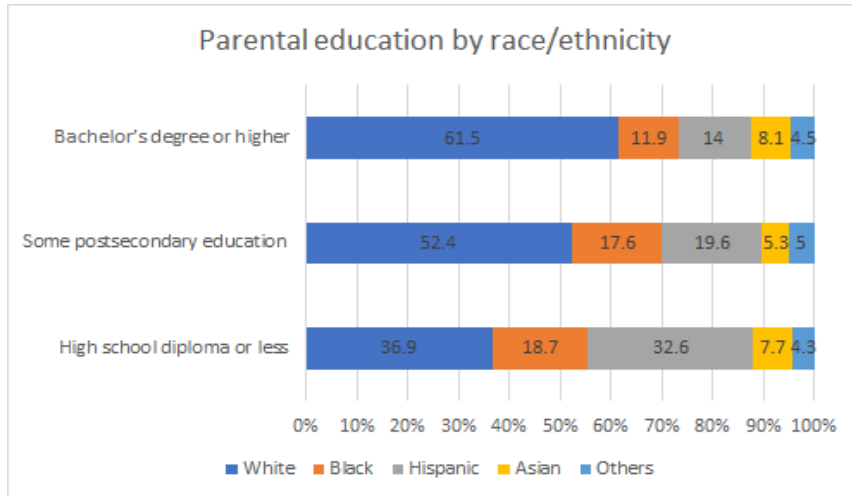**Figure 5 - Income group by race/ethnicity**
Source: Omdena research and National Center for Education Statistics
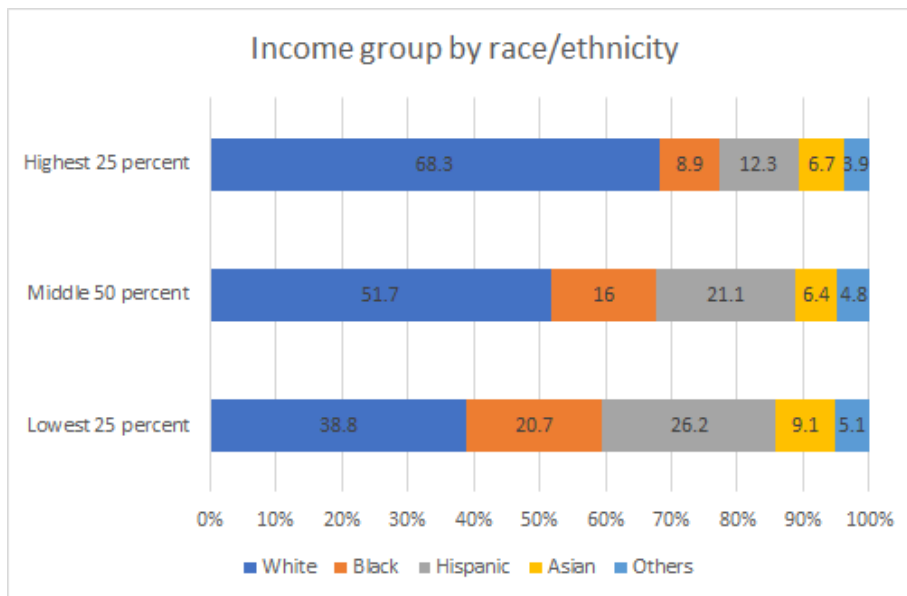
In addition, first generation students (those whose parents didn't go to college) are most likely to

be Hispanic and Black. *See Figure 6.*

**Figure 6 - Parental Education by Race/Ethnicity**
Source: Omdena research and National Center for Education Statistics

And finally, Black students are also 50% more likely to be independent - that is, without parent

financial support. *See Figure 7.*

Figure 7 - Student Status (Independent/Dependent) by Race/Ethnicity
**Source: Omdena research and National Center for Education Statistics**
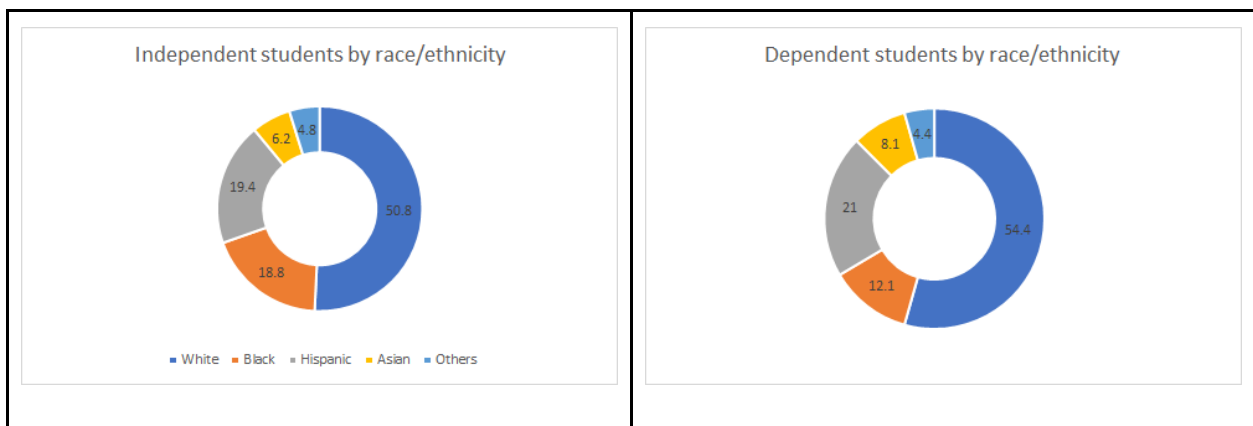
Many students - including over a third of all White, Black, and Hispanic students - are

working at least 10 hours/week while in school. Asian students in particular are most able to

focus on schoolwork without having to balance it with outside jobs. Black and Hispanic students

are most likely to be working at least 20 hours/week, and often over 35 hours/week - leaving

little time for schoolwork. *See Figure 8.*

Figure 8 - Undergraduate Students - Hours Worked
Source: Omdena research and National Center for Education Statistics
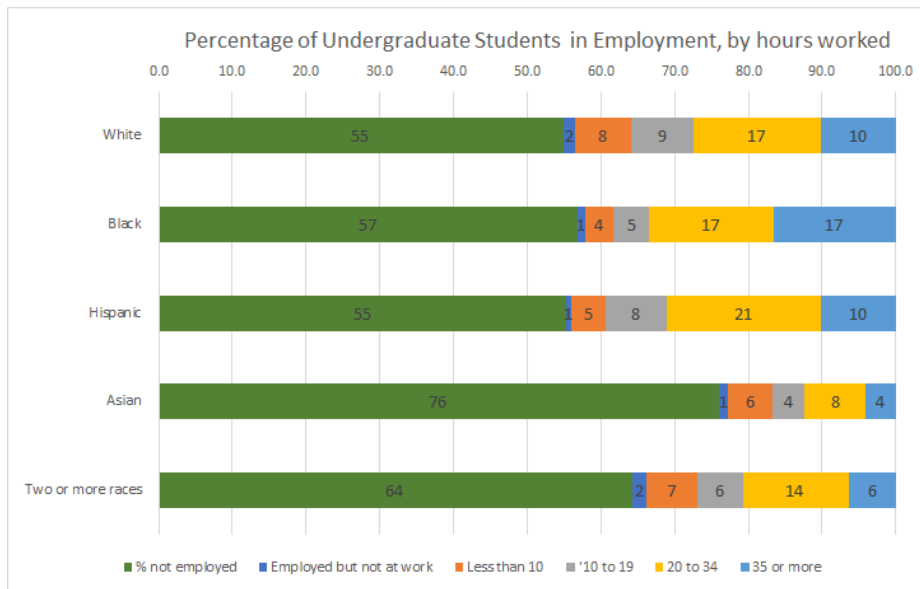

The trouble with for-profit colleges

Key Finding - Private for-profit colleges are a particularly bad investment. Their high

**rates of debt, low completion rates, and lack of payoff lead to frequent defaults.**

Using College Scorecard data from 2009-2018, Omdena researchers compared the

costs, debt burden and completion rates of public institutions, private nonprofit colleges, and

private for-profit colleges. Private for-profit colleges proved to be the worst investment - with

lowest completion rates, and a poor cost-to-debt ratio.

Completion rates in particular are an important factor - as students who do not complete

college are saddled with debt, without the benefits of added income from their degree. So, for

instance, while completion rates at public universities and at private nonprofit universities hover

around 60%, completion rates at private for-profit universities are consistently under 30%.

Private non-profit schools are by far the most expensive, costing over twice as much as

public schools - with a price tag that has increased by almost $15,000 in the past ten years,

while the costs of the other schools have remained relatively steady. However, private nonprofit

schools offer more support for students, and are attended by students who are better equipped

to pay, so that the average debt at private non-profit schools, while higher, makes up a much

smaller portion of the overall fees. For instance, in 2017, the average cost of a private nonprofit

school was $48,000 per year, with an average debt of around $17,000 per year - roughly 35% of

the cost. In comparison, at private for-profit colleges the average debt of $12,000 per year is

roughly 50% of the $25,000 annual tuition. *See Figure 9.*

Figure 9 - Average cost, debt and completion rates - by type of Institution
Source: Omdena research and US Department of Education
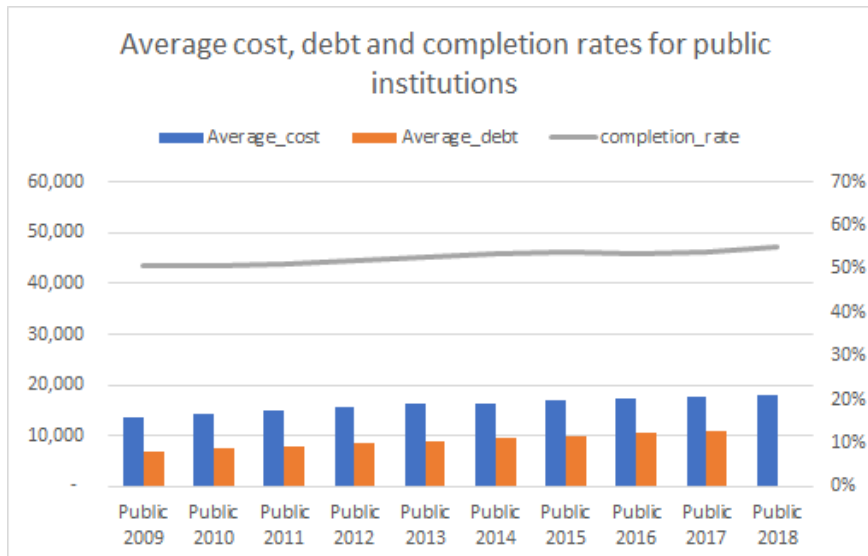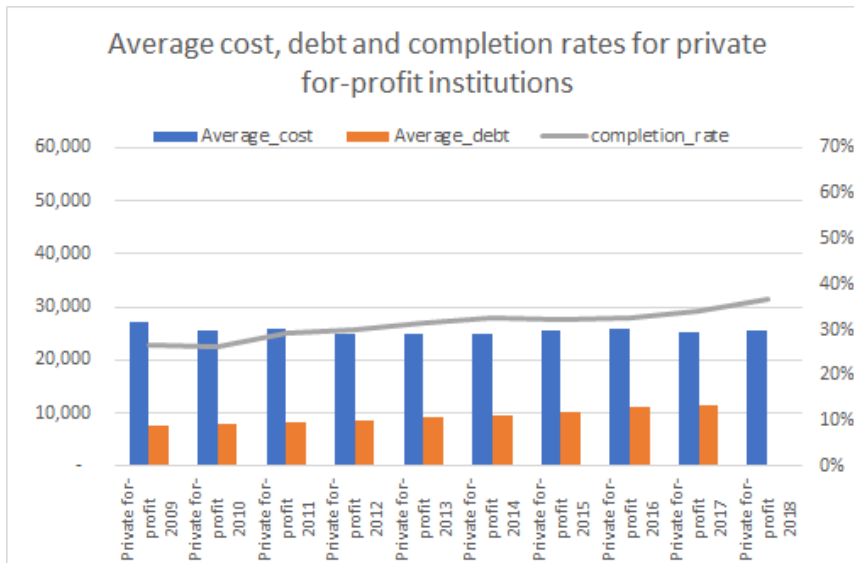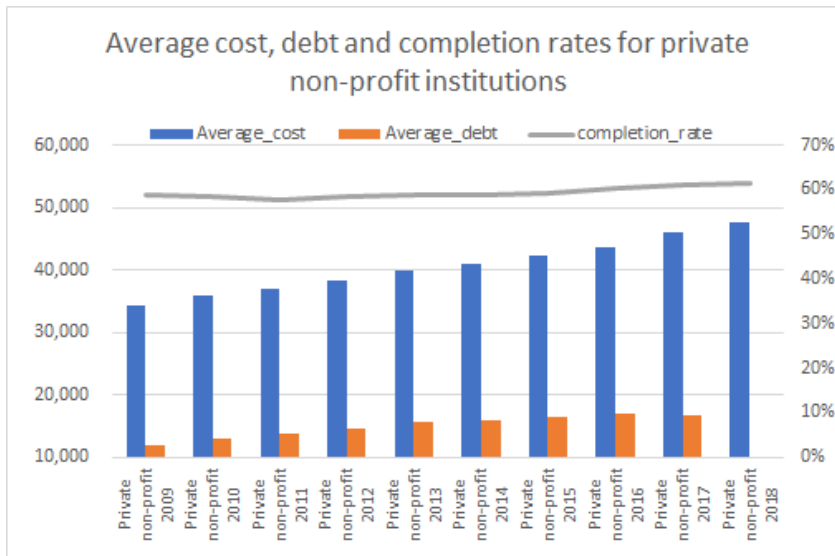
Omdena's analysis of student debt held while students are still in school found that

students attending for profit schools are most likely to have student debt - almost 80% of all

students in 2 year for profits and 70% of students in 4 year for profit colleges have taken loans.

At the other end of the spectrum are students attending 2-year public colleges, where only

about 20% of students have student loans. See Figure 10.

Figure 10 - Student Borrowing by Institution
Sources: Omdena research and US Department of Education College Scorecard, US

Department of Education Federal student loans dataset and Federal Reserve Bank of New York student loan and demographics dataset.
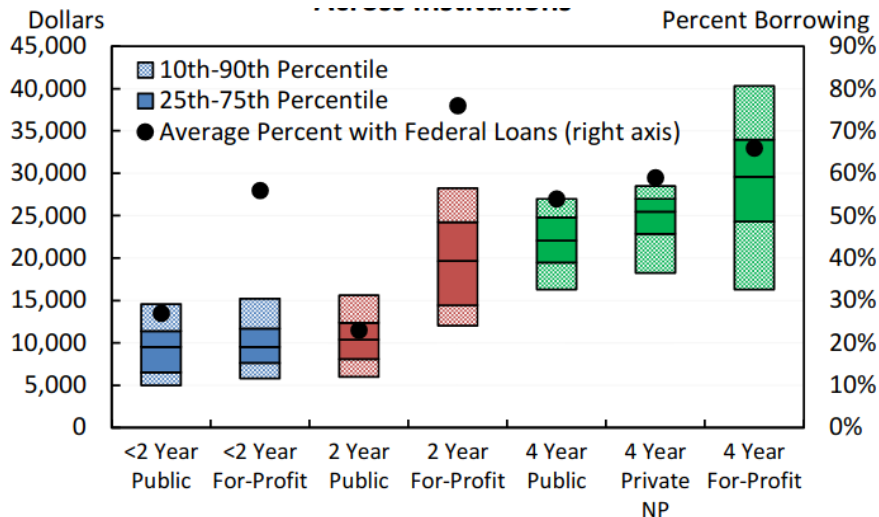
Upon graduation, the student debt burden is even heavier. According to 2018 data, private for-profit colleges have the highest percentage of graduates with student loans (88%), with the highest average debt - almost $40,000. Private nonprofit colleges are next in line (75% of graduates have loans, with an average debt of $32,300). In comparison, "only" 66% of graduates from public colleges had loans, and at $25,550, their average debt is much lower.

The high rates of debt, the low completion rates, and the lack of payoff, lead to high rates of default for student borrowers from for profit colleges. A 2019 analysis by the Chicago Booth Review found that while for-profit colleges only enroll 10 percent of US students, they account for up to 25% of all borrowing, and approximately half of student-loan defaults.[9] Similarly, a 2018 report by TICAS found that 48% of borrowers who attended for-profit colleges default within 12 years, compared to 14% of nonprofit private college attendees and 12% of public college attendees.[10]

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[9] Gold, Howard. "Who's at fault for student-loan defaults?" Chicago Booth Review, May 13, 2019. https://review.chicagobooth.edu/public-policy/2019/article/who-s-fault-student-loan-defaults
[10] The Institute for College Access & Success (TICAS). "Students at Greatest Risk of Loan Default" April, 2018

Graduates from these programs agree with this negative assessment. Omdena's analysis of a

2012 NCES Survey of 2007-8 Bachelor's degree recipients found that just 54% of respondent

from private for-profit colleges reported that their degree was worth the financial costs -

compared to 72% of overall respondents. See Figure 11.

Figure 11 - Student Borrowing by Institution
Source: Omdena research and 2012 NCES Survey "B&B"

| Borrowing, employment, enrollment, and demographic characteristics	Percentage of respondents who reported that their degree was worth the financial cost
All Respondents	72.2
Did not borrow	81.5
Borrowed	68.5
Attended Public University	75.1
Attended Private Nonprofit University	69.1
Attended Private For-profit University	54.2
Sex - Male	71.6
Sex - Female	72.7
Race -White	72.8
Race -Black	68
Race - Hispanic	71.6
Major - Computer and information sciences	75.1
Major - Engineering and engineering technology	85.2
Major - Biological and physical sciences, science technology, mathematics, and agricultural sciences	75.1

https://ticas.org/wp-content/uploads/legacy-files/pub_files/students_at_the_greatest_risk_of_default.pdf

Major - General studies and other	76.4
Major - Social sciences	70.3
Major - Humanities	64.2
Major - Healthcare fields	76.1
Major - Business	73.5
Major - Education	77
Major - Other applied	65.8

Key Finding - Minority students are particularly vulnerable to for profit colleges, and face undue debt burdens

Omdena researchers also analyzed the data surrounding student school choices and graduation rates. They found that minority students are making - or being forced into - poor school choices, with negative impacts on future career prospects, earning potential, and the ability to repay loans.

NCES data from 2015-16 shows that Black and Hispanic students are overrepresented in private, for profit colleges - especially in those offering 2 year and under degrees. White and Asian students primarily attend nonprofit or public 4-year schools, which offer a better investment. Interestingly, both White and Black students are overrepresented in public less than 2-year schools. *See Figure 12.*

Figure 12 - Undergraduate Students by Race and Type of Institution
Source: Omdena research and NCES

Percentage distribution of undergraduates, by race/ethnicity, control and level of institution
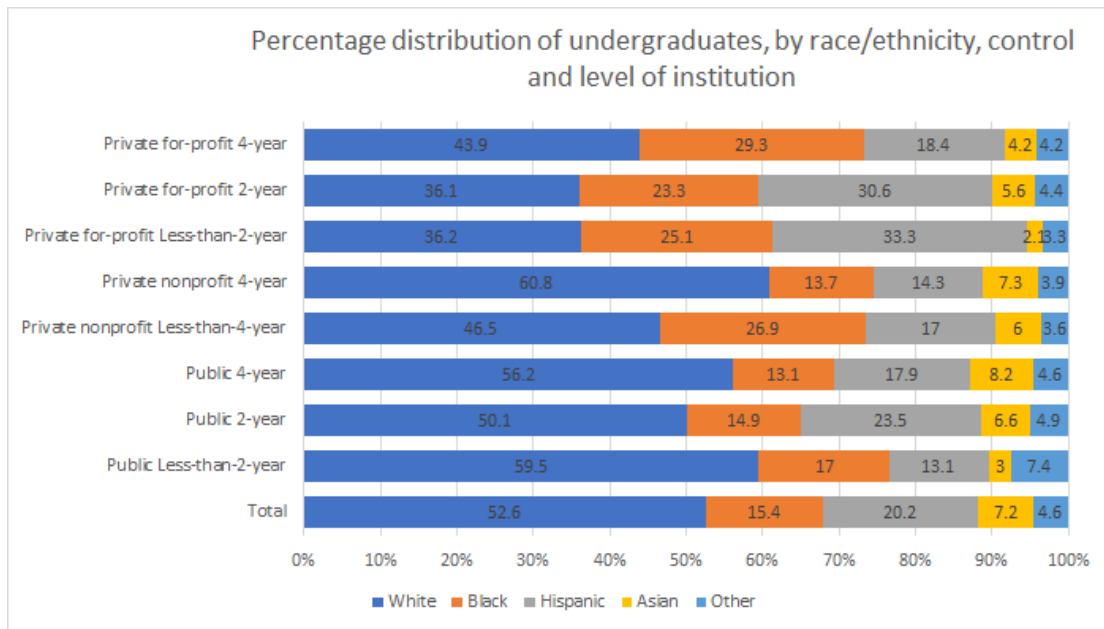
These findings are supported by College Scorecard data from 2013-14, which shows that private, for-profit schools have the highest share of female, minority, and first-generation students - while private non-profit schools have the lowest share. *See Figure 13.*

Figure 13 - Undergraduate Students by Race and Type of Institution
Source: Omdena research and College Scorecard 2013-2014

Type of Institution	% Black	% Hispanic	% Female	% 1st Gen
Public	14%	13%	58%	46%
Private non-profit	13%	12%	59%	36%
Private for-profit	24%	19%	70%	52%

In addition, according to NCES Data from 2018, dropout rates at 4-year colleges are highest for American Indian, Black, and Pacific Islander students. *See Figure 14.*

Figure 14 - Degree Completion by Race
Source: Omdena research and NCES Digest Table 326.15

Percentage distribution of 2012 entry cohort by outcome
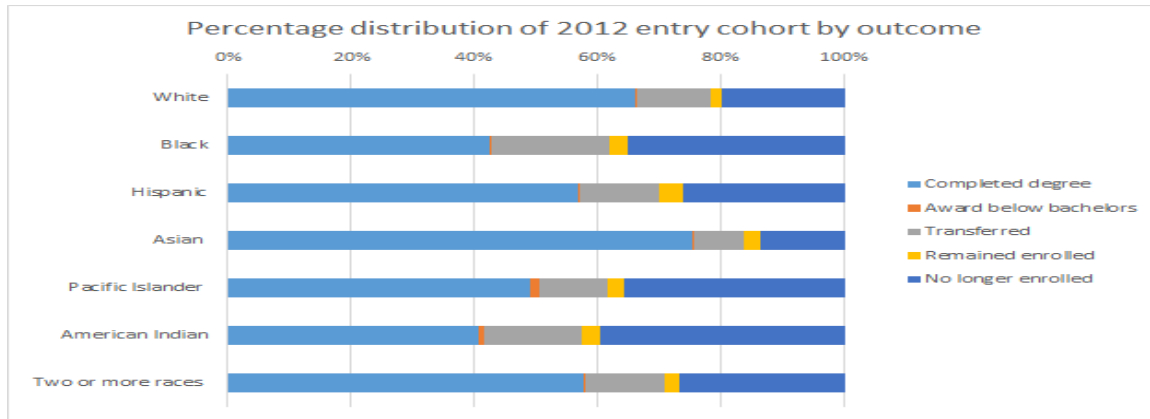
As a consequence of the factors above, Omdena research found, minority college

students are more likely to be in debt, with higher levels of debt. Omdena's review of NCES's

National Postsecondary Student Aid Study (NPSAS) data from 2007 and 2011 on the

distribution of student loan debt across Bachelor's degree recipients demonstrates that Black

and Hispanic students are more likely to be in debt and have higher levels of debt. This chart

also shows how, between 2007 and 2011, debt increased across the board for all groups -

White, Black and Hispanic - except for Asian students. The size of the debt burden also went up

for all groups, including Asian students. In other words, for all groups, the percentage of

borrowers with loans over $35,000 increased between 2007 and 2011. That increase was

greatest (17%) for Black students, and lowest (3%) for Asian students. See Figure 15.

Figure 15 - Student Loan Debt by Race
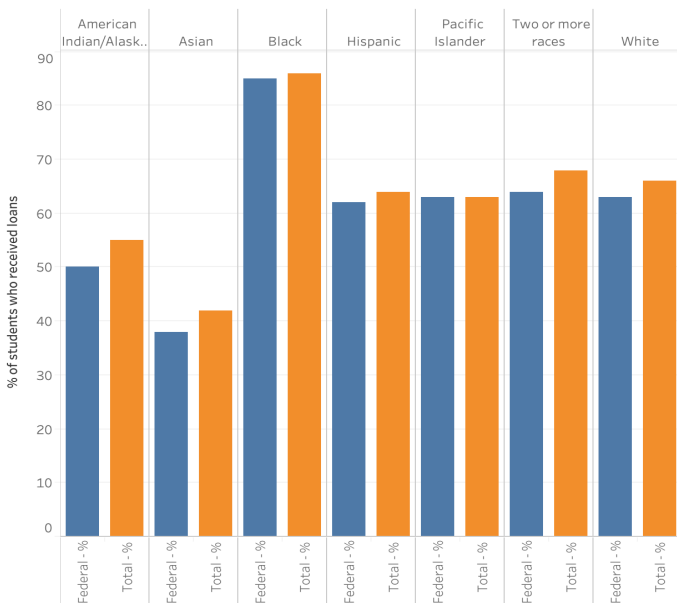**Source: Omdena research and NCES National PostSecondary Student Aid Study**
(NPSAS)
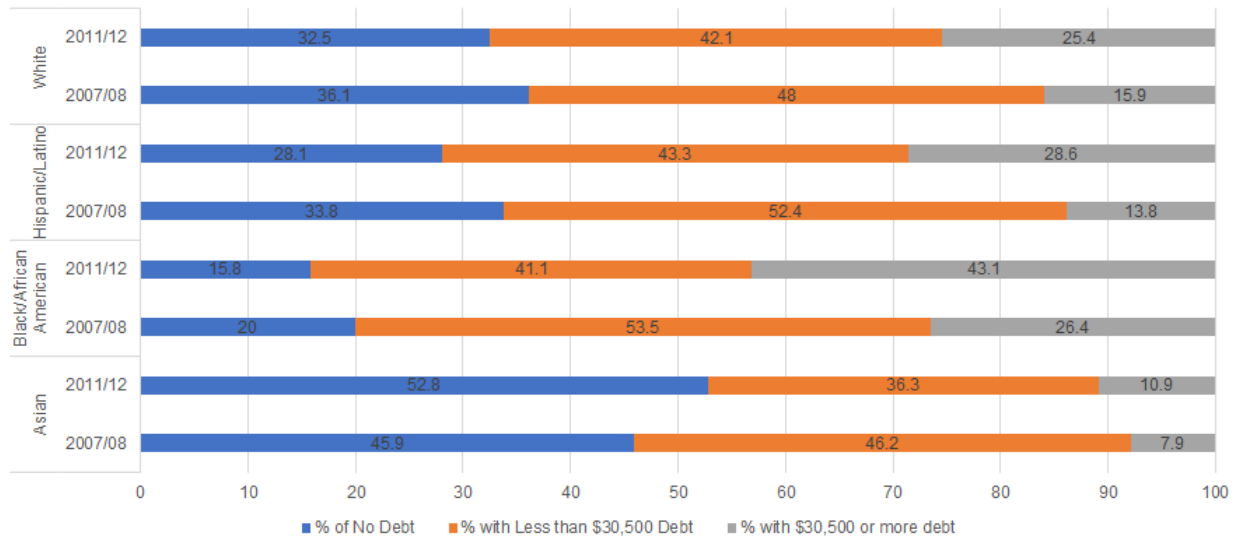
In addition, Omdena's analysis of 2015-2016 NCES data on student borrowers ages 18 to 24 in

their 4th (senior) year or above shows that Black students also have by far the highest

percentage of loans. *See Figure 16.*

Figure 16 - Student Borrowers by Race
Source: Omdena research and NCES

Key Finding - Gender differences are most apparent in choices of major and career. The

Gender wage gap increases with education.

Omdena researchers also found that gender differences were most apparent in field of

study and career choices. Women far outnumber men in the fields of healthcare, humanities,

and, to a lesser degree, education. Men most outnumber women in STEM fields. Business and

applied sciences are favored by both genders, with more men than women in both cases. *See*

Figure 17.

Figure 17 - Undergraduate Students by Gender and Field of Study
Source: Omdena research and NCES
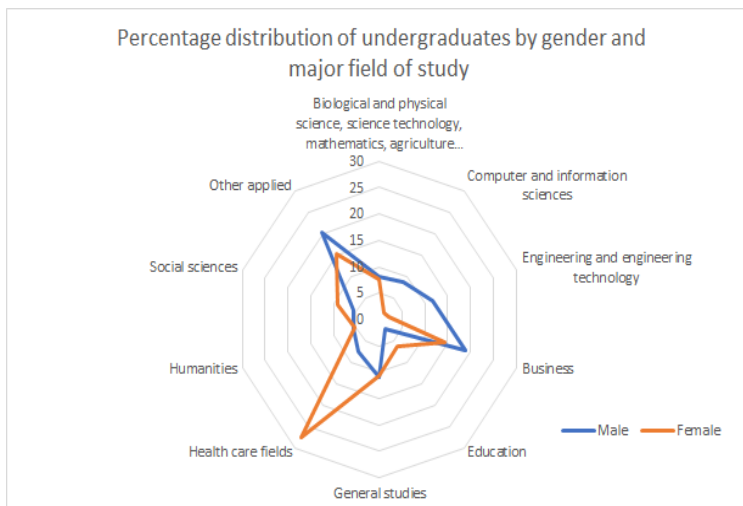
In terms of career choices, both genders show a preference for business and applied sciences.

However, there are far more men in both fields, and women's top choice, by far, is healthcare.

See Figure 18.

Figure 18 - Education Fields by Gender
Source: Omdena research and NCES
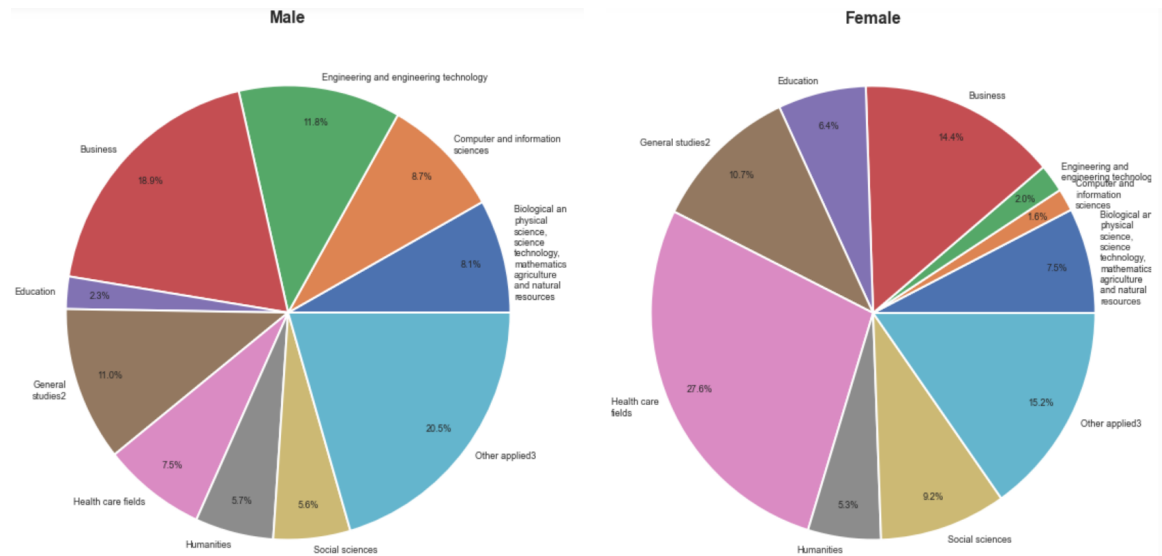
Astonishingly, the gender wage gap increases with education. Data curated by the

Institute for Women's Policy Research indicates that while the wage gap between men and

women with up to an Associate's degree was roughly $10,000 annually in 2013, that gap

increased to $20,000 for college graduates, and $30,000 for those with advanced degrees. In

fact, women with advanced degrees made less than men with Bachelor's degrees. See *Figure

19*.

Figure 19 - Earnings by Gender and Level of Education
**Source: Omdena research and Institute for Women's Policy Research "Status of Women
in the States" Project, 2013**

Median Annual Earnings for Full-Time, Year-Round Workers by Educational Attainment, Aged 25 and Older, 2013
Source: IWPR analysis of American Community Survey data (Integrated Public Use Microdata Series, Version 5.0)

The true costs of student debt

Key Finding - There is strong correlation between student debt and mental health

Omdena's textual analysis of academic papers related to student debt and mental health found a strong correlation between these key terms. The Word Cloud below, created from the 20 most frequently used terms found in a review of 26 topical academic articles, visualizes the four largest terms- debt, student, health and mental. *See Figure 20.*

Figure 20 - Word Cloud - 20 Most Frequent Terms related to Student Debt & Mental Health

Omdena researchers used topic modeling, which clusters key words together, to create

the top five topic clusters illustrated below. These reveal a relationship between debt & mental

health (Topics 3 and 4) and student debt and family (Topics 2 & 5). *See Figure 21*

Figure 21 - Top Five Topics related to Student Debt & Mental Health

Key Finding - Women, Black and Hispanic graduates, and graduates from for-profit

universities, report the highest levels of stress from education debt

Omdena's analysis of self-reported data on education debt related stress, from NCES's

Baccalaureate and Beyond Longitudinal Study (specifically, the 2012 Survey of 2007–08

Bachelor's degree recipients), found that graduates from private for-profit universities reported

the highest levels of stress. 56% of graduates from these universities reported either high or

very high levels of stress - as opposed to 40.6% of graduates overall. Women, Black and

Hispanic graduates, in particular, reported significantly above average amounts of "very high"

levels of stress. *See Figure 22.*

Figure 22 - Undergraduate Students by Race and Type of Institution
**Source: Omdena research and NCES Baccalaureate and Beyond Longitudinal Study**

Borrowing, employment, enrollment, and demographic characteristics	Level of stress reported from education-related debt				
	Very low	Low	Moderate	High	Very high
All Respondents	9.4	18	32	21.6	19
Attended Public University	11.3	19.2	32.5	19.3	17.7
Attended Private Nonprofit University	7.1	17.4	31.3	23.3	20.9
Attended Private For-profit University	3.1	10	30.8	34.7	21.3
Sex - Male	13.1	22	30.9	20.5	13.6
Sex -Female	6.8	15.3	32.8	22.3	22.8
Race -White	10.3	19.1	31.9	21.3	17.4
Race - Black	5.7	15.3	29.6	21.3	28.1
Race - Hispanic	7.8	12.9	32.7	23.5	23.1

Omdena Solution - Web Application

One key driver of poor outcomes is the fact that financial literacy is low for all students.

According to NCES data on the percentage of undergraduates responding correctly to financial

literacy questions, no students - regardless of age or race - were able to score over 40%.

Asians, Pacific Islanders and White students scored best (just over 30%), while Black students

scored worst (under 20%). *See Figure 23*.

Figure 23 - Undergraduate Student Financial Literacy by Race
Source: Omdena research and NCES Profile of Undergraduate Students 2015-2016
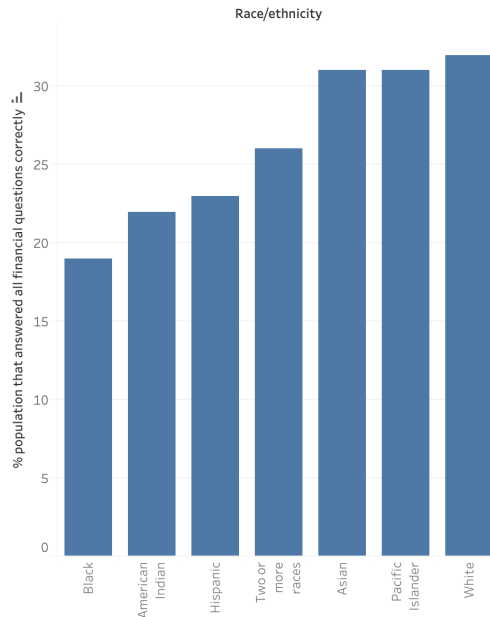
In addition, the loan repayment system itself is riddled with problems. These include

inconsistent, confusing and predatory lending practices, a lack of incentive for loan servicers to

be helpful, the reduction in state support for public institutions, and a lack of understanding by

borrowers. A range of solutions to the student debt crisis have been offered - by politicians, as

well as policy organizations. Sample solutions include simplifying the system, instituting an

income-based program for all, strengthening oversight of the loan program and its servicers,

improving borrower education, and many more.[11]

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[11] Sample reports, policy papers and articles outlining solutions include:
Johnson, Daniel. "What Will It Take to Solve the Student Loan Crisis?" Harvard Business Review. 2019.
https://hbr.org/2019/09/what-will-it-take-to-solve-the-student-loan-crisis
Campbell, Colleen. "How Congress Can Fix Student Loan Repayment." Center for American Progress.
2019.
https://vtechworks.lib.vt.edu/bitstream/handle/10919/89155/HowCongressCanFixServicing.pdf?sequence
=1&isAllowed=y

A team of collaborators on Omdena's Student Debt challenge took a slightly different approach. Their intent was to arm students with targeted financial and personal insights into the impacts of their student loans. Towards that end, challenge participants developed a Web app prototype, available here, intended to guide students in decision making by offering two different types of visualizations - a Loan Simulator, and a Borrower Profile. Based on background and loan info, the app's dashboard graphs the repayment burden over time for different loan types. The dashboard also leverages student demographic information to illustrate repayment rates for "students like them" at different institutions. This second visualization is particularly powerful, guiding their choices by enabling users to see how students of similar backgrounds have fared at different institutions.

For the Loan Simulator portion, users of the app input loan details - the size of the loan, the interest rate, and the length of the repayment term. They also indicate the year that their education begins, and the estimated duration of study. Finally, they estimate their savings ability, with options for up to three different life stages (such as before, during and after college).

The example below shows a loan amount of $30,000, at an interest of 5%, to be paid off over the course of 10 years. It assumes a school start date of June 2021, for a duration of 4 years - for graduation in June of 2025. In the example below, the borrower posits that they would be able to save $50/month for 2 years before the start of school, as well as $50/month during the four years they are in school. They also estimate a savings ability of $400/month after graduation. *See Figure 24.*

Figure 24 - ShapingEdu Dashboard
Source: Omdena
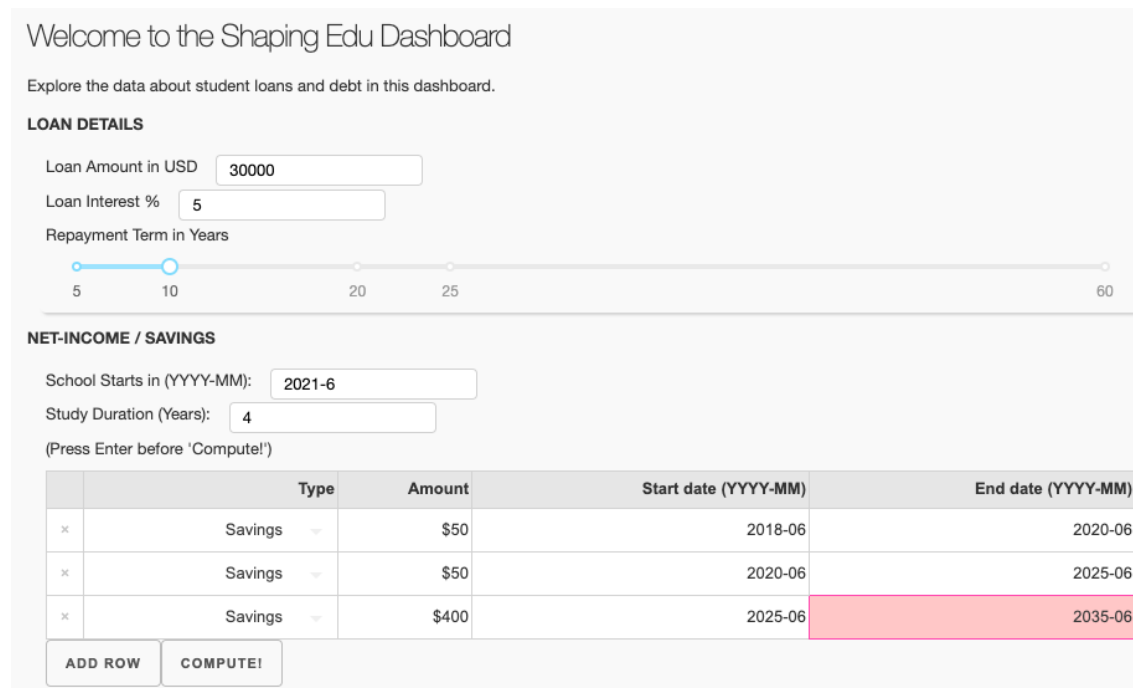
Based on this information, the Omdena ShapingEdu Dashboard shows the estimated monthly

payment, the payoff date, the amount of interest that will be paid, and the total amount paid at

payoff. For our example, the monthly payment is estimated at around $318, with a payoff date of

July 1, 2035. Total interest over these ten years will be almost $8,184, so that the total amount

paid will be $38,184.

A line chart on the dashboard provides a visual demonstration of these numbers. A red

line indicates the original borrowed amount. The blue line shows repayment beginning upon

graduation in 2025, and ending in 2035, when the loan has been paid off, with interest. A yellow

line shows the payoff point and total amounts if the loan were taken for a shorter amount of time

(5 years) or a longer amount of time (20 years.) And finally, a green line tracks the amounts

saved - indicating when the borrower has saved enough to pay off the loan in full - in our case,

by June 2032. *See Figure 25.*

Figure 25 - ShapingEdu Dashboard
Source: Omdena
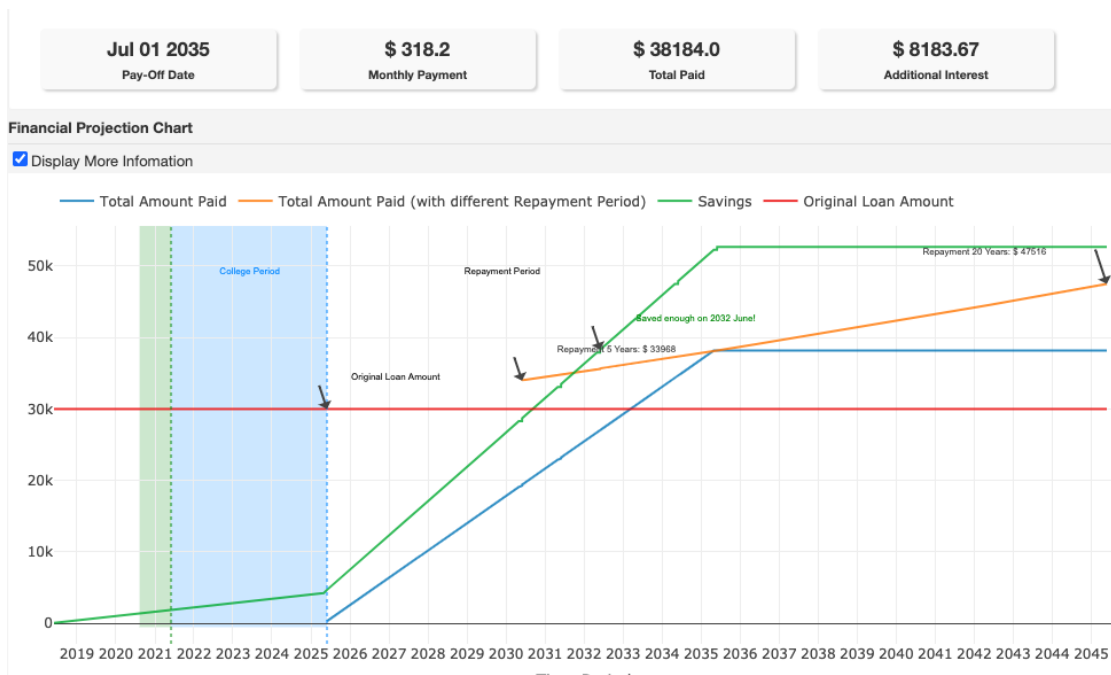
Adjusting the inputs - loan amount, interest rate, terms, study duration and savings amounts - produces different results and visualizations. While other student loan calculators provide similar information, the prototype developed by Omdena creates an interactive graphic that helps borrowers immediately visualize and better understand the implications of their loan terms. In particular, it brings home the impact of interest rates, and repayment times.

The Borrower Profile section leverages historical data from College Scorecard to enable users to see how borrowers like them fare in repayment at their institution of choice. Borrowers input profile information such as the name of the school, their gender, family income, and whether they are an independent student (paying their own way) or dependent. They also indicate whether they are a first-generation student, and if they have graduated.

The app provides borrowers with a series of repayment statistics for borrowers with similar personal profiles after 3, 5 or 7 years. Borrowers could see, for instance, the difference graduating or not graduating makes on repayment statistics. They can see how well first-generation borrowers, or female borrowers, or borrowers with a similar income level, fare in

student loan repayment at their school of choice. User profiles are a powerful tool for future

planning and enable borrowers to leverage real world data on "students like them" to make

important decisions regarding school choice and student debt in an informed manner.

Conclusion

In partnership with ShapingEdu, Omdena's data scientists examined the root causes

and key parameters of the student debt problem in the US, and then built an innovative tool to

empower potential borrowers with customized information on the financial and personal impacts

of their student loans.

Omdena's researchers found that student debt is often a result of poorly informed

choices by borrowers who don't adequately understand the implications of their school costs

and are not equipped to evaluate the value of their educational investments. These students

often make (or are forced into) college choices that exacerbate existing economic

disadvantages, trapping borrowers in cycles of debt that are difficult to escape.

The prototype designed by Omdena researchers combines user provided demographic

information and existing student loan data to generate personalized financial predictions for

users. The Loan Simulator enables borrowers to see into the future - visualizing monthly

payments, interest rates and payoff amounts for different size loans. The Borrower Profile

provides even more powerful insights, enabling borrowers to see what repayment rates look like

for borrowers "like them" at different schools. These two interfaces help guide student choices,

empowering students with essential information to help make informed decisions regarding

schools and student loans. As the US addresses the important issue of crippling student debt,

helping borrowers make informed decisions about educational investment will be essential to

preventing future burdens and promoting a thriving economy.

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