Surfing Tsunamis and Deserts: Educational Access in an Era of Extreme Conditions

Kim A. Wilcox
Chancellor, University of California, Riverside
https://orcid.org/0000-0002-5803-6503

When it comes to research universities, you could say I'm a superfan. For me, fall 2022 marks 50 years of work in research universities. After starting as an undergraduate and graduate student, I taught and conducted research before serving in a variety of administrative positions in Kansas and Michigan. Nine years ago, I joined UC Riverside (UCR) and moved to California.

The word "California" often conjures thoughts of beaches and surf, locations popularized by The Beach Boys, *Baywatch*, and *Beverly Hills 90210*. Sometimes, the state name brings to mind Hollywood with its celebrities on red carpets. Silicon Valley and young tech billionaires signify yet another popular image of California.

But I don't live in those versions of California. I live in Riverside, a community 55 miles east of Los Angeles, 48 miles northeast of Newport Beach, and 400 miles southeast of Silicon Valley. Those distances don't begin to explain the difference between the symbols of California that often come to mind and the other California, where incomes, philanthropy dollars, infrastructure investment, and physicians are in short supply even as the population keeps growing and growing and growing.

For years, the region known as the Inland Empire has been one of the fastest growing areas of the country and currently holds the nation's fifth fastest growing metro designation.[1] More than 50% of the region's population identifies as Hispanic or Latino.[2],[3] Inland Empire politics are red *and* blue. The geography is snow-capped mountains *and* desert with a mélange of urban, suburban, and rural communities. It's a place where extremes intersect. And in that way, the region serves as a microcosm for our country by representing the problems we face, the promise of public research universities, and needed support systems.

In a world where widening gaps in wealth, political extremity, and climate change threaten access to even the most basic needs, public research universities provide a source of opportunity and solutions. Therefore, as we ride waves of change, focus on access is our charge. Historically, Higher Education has been a great equalizer (albeit, not equally for all populations) while providing needed answers for many of the world's greatest challenges. Investments for infrastructure were critical in the past and remain important now. But we must also evolve with support services for today's students who are facing greater financial, mental health, and preparation challenges. Fortunately, by working together, we can continue moving forward through these extreme conditions.

Public Research Universities: A Success Story

In the history of discovery, American public research universities are a standout success. Before considering the ways in which we might improve access, we should consider the history of public research universities in the United States and the investments that paved a path of progress—the land-grant acts and the creation of the National Science Foundation.

The Morrill Act of 1862 was the first in a series of land grant acts to provide land or financial resources through the sale of land to expand higher education. The purpose of this act as written in United States code reads as follows:

> *[T]o teach such branches of learning as are related to agriculture and the mechanic arts, in such manner as the legislatures of the States may respectively prescribe, in order to promote the liberal and practical education* ***of the industrial classes*** *in the several pursuits and professions in life.*[4]

Even as the original land-grant act sought to expand education access, it was fraught with problems. First, it called for the distribution of 30,000 acres for each congressional district, allowing for either the land or the proceeds of sale of that land, to fund universities. This structure ensured that more densely populated eastern states received a greater share of resources, effectively giving more resources to those that already had the most. However, the legislation could not garner enough support in Congress without that provision. Second, the majority of land to be distributed was taken from 245 Indigenous tribes through violent means. Third, the act, which was adopted during the American Civil War, specifically excluded those states "in a condition of rebellion or insurrection," creating geographic disadvantage for some states.[5]

Subsequent rounds of funding offered partial adjustment for inequities. The Morrill Act of 1890, for example, provided cash to the formerly Confederate states but required that they either establish a college for persons of color or show that race was not a factor in admissions. One hundred thirty-two years after the establishment of the original land grant, the Elementary and Secondary Education Reauthorization Act authorized tribal colleges as land-grant colleges.[6]

The land-grant act had a profound impact on engineering and technical education. In 1866, only 300 men in the United States had graduated with engineering degrees. But by 1870, that number had grown to 866. And by 1911, there were 38,000 engineers. The country was graduating 3,000 engineers a year. As means of comparison, Germany was only graduating 1,800 engineers a year at that time.

Stated another way, within 50 years of the passage of the first Morrill Act, the United States had become the world leader in engineering and technical education.[7] In addition to transforming education in the United States, land grants transformed technological discovery, industrial progress, and land development. After investment in "mechanic arts" proved fruitful, similar acts provided foundation in other disciplines. The Hatch Act of 1887 established agricultural research stations.[8] In 1966, the National Sea Grant College Program Act funded development of university-based programs for coastal research and education.[9],[10] Later, in 1988, the National Space Grant College and Fellowship Program supported 52 consortia conducting research related to outer space.[11] The Sun Grant Research Initiative Act of 2003 created six regional centers for the study of sustainable, environmentally friendly energy sources.[12]

Vannevar Bush and National Science Foundation Infrastructure

For the annual research policy retreat hosted by the Merrill Center in 2016, I highlighted the work of Dr. Vannevar Bush and the three core principles in his publication, *Science: The Endless Frontier*. Dr. Bush's recommended framework for a national research infrastructure led to federal investments in research embedded within universities and establishment of the National Science Foundation (NSF). Both the infrastructure and funding have been instrumental in training scientists and delivering discoveries with broad public impact. GPS, the internet, and Google are but a few examples of innovations born in research universities touching American lives each day.

One of Dr. Bush's principles that has not yet been fully realized, however, relates to access. Dr. Bush wrote:

"There are talented individuals in every segment of the population, but with few exceptions those without the means of buying higher education go without it. If ability, and not the circumstance of family fortune, determines who shall receive higher education in science, then we shall be assured of constantly improving quality at every level of scientific activity."
--Summary Report, Science: The Endless Frontier, p. 25

The land and subsequent sea, space, and sun grants in combination with a federal funding infrastructure transformed not only the United States but the world. And yet, we have room to grow.

Extreme Conditions: Widening Gaps and the Implications for Research Universities

Wealth Inequality Surpassing Gilded Age Levels

Following the Civil War, industrialization quickly drove increases in both wealth and inequality. During the Gilded Age, in the years from 1860 to 1900, 30% of the country's wealth was owned by the top 2% while the bottom 40% had no wealth at all.[13]

The turmoil during the Gilded Age[14] shares similarity with the unrest we are facing now:

- The country was equally divided between two parties.
- Prohibition, education, tariffs, ethnic and racial tension were leading issues.
- Powerful trusts dominated some industries.
- Political organizations like Tammany Hall exerted influence over politicians who awarded jobs and contracts to loyal supporters.

In the early 20th century, new tax laws decreased the gap between those who had the most and lower income earners. However, the capital gains tax laws provided a loophole. In 1997, the capital gains tax was decreased from 28% to 20%. In 2003, the tax was decreased from 20% to 15%.[15] In a period of six years, the capital gains tax had shifted from 28% to 15%, a decline of 46%. Along with these changes, the shift in inequality shot upward. (Figure 1)[16]

For that same period, according to Berkeley's Realtime Equality tool, U.S. incomes for the bottom 50% decreased by

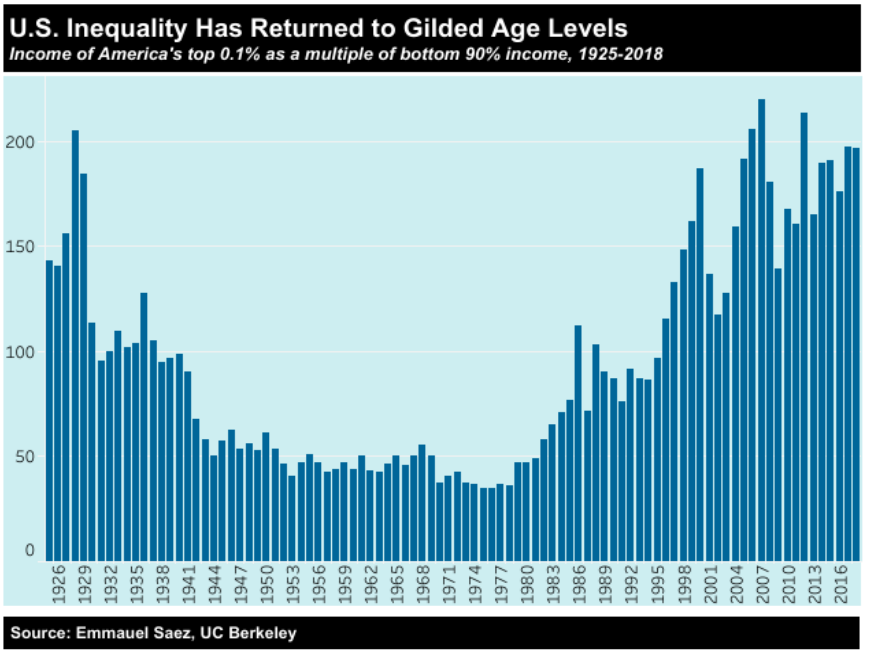

Figure 1.

3.3% when adjusted for inflation while the top 0.01% saw growth of 34.7%. (Figures 2 and 3)[17]

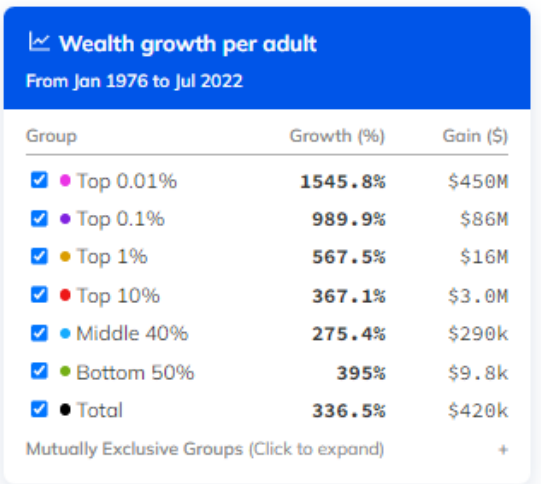

Figure 2.

During the Gilded Age, four families (Baker, Carnegie, Frick, and Rockefeller) held 0.85% of the country's wealth, but according to research from French economist Gabriel Zucman, the same equivalent, the top 0.00001%, held 1.35% of the wealth as of July 1, 2021.[18] Furthermore, the inequality gap, which was already known to be a problem, worsened during the pandemic. According to the Federal Reserve, there was $13.5 trillion in wealth added to American households during the pandemic but one third of that, $4.5 trillion, went to the top 1% of households, and 70% of that, $9.45 trillion, went to the top 20% of households.[19]

The problem of wealth inequality is not uniquely American. A study from economist Thomas Piketty's World Inequality Lab showed that the world's 2,750 billionaires now control 3% of all wealth, which has tripled since 1995. This relatively small group of individuals now holds as much wealth as half of the planet's population.[20]

Other Gaps—Persistence and Mental Health

Mark Kantrowitz calls attention to the disturbing statistic that more than two-thirds of all dropouts are low income in a *Forbes* article on college completion. He also highlights some of the expected factors affecting persistence, such as full-time employment and academic performance.[21]

Like the wealth gap, the pandemic exacerbated persistence problems. Data from the National Student Clearinghouse indicates that one million fewer students are enrolled in college now than before the pandemic began.[22] For the first time in 20 years, the number of Hispanic-Serving Institutions (HSIs) has declined as the Latino student population numbers dropped just over 4%, below 2019 enrollment.[23] When Gallup asked students why they were considering withdrawing from college, the top reasons were emotional health, cost, and difficulty of coursework.[24,25]

As noted above, emotional health is

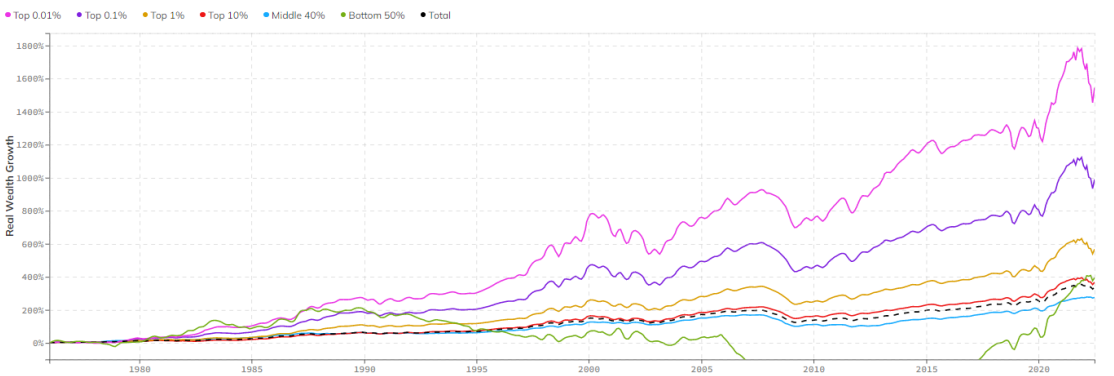

Figure 3.

increasingly cited as a reason that students are leaving college. Researchers at Boston University working with data from the Healthy Minds Study showed that between 2013 and 2021, students reported a 135% increase in depression and 110% in anxiety. The number of students reporting mental health problems doubled over those eight years.[26]

"Lost Einsteins"

In the *Quarterly Journal of Economics* article, "Who Becomes an Inventor in America? The Importance of Exposure to Innovation," authors Alex Bell, Raj Chetty, Xavier Jaravel, Neviana Petkova, and John Van Reenen linked patent records with de-identified IRS data and school district records for more than one million inventors and found that children born into the richest 1% were 10 times more likely to become inventors than those born into the bottom 50%. The result is what they term "lost Einsteins," children whose ability goes unrealized because of social circumstance. The authors posit that economies can improve their results in innovation, and thereby increase economic output, if they offer pathways to success for underrepresented populations, which includes those impacted by income level, gender, and race. The same study found that White children were three times as likely to be inventors as Black children. In the United States, innovation could quadruple if women, underrepresented minorities, and low-income people became inventors at the same rates as men from high-income families.[27]

Addressing the Challenges

To compensate for widening gaps in wealth inequality, persistence, and mental health while continuing to address inequities among underrepresented populations, UCR utilizes a full suite of wraparound services. Some, like UCR's Chicano Student Programs and African Student Programs, have offered support systems for 50 years.

But focus on graduation gaps led to new services by mapping programs to current student needs. The results have been significant. As one example, in 2020, UCR's Pell grant recipients graduated at a 77% rate, one point higher than our overall six-year graduation cohort.[28]

Today, in addition to traditional advising, writing, and career services, UCR offers food distribution to address food insecurity, a range of mental health services, immigration law support, stop-out pathways, and transfer pathways. Our current fundraising initiative spotlights student needs, including experiential learning opportunities through study abroad and internship programs. The campus health services center is getting an upgrade through new construction, new technology, new offerings, and expanded capacity.

Scaling Enrollment While Riding Waves of Change

As we look to expand access while riding waves of change, collaboration has become increasingly important. Partnerships at both the local and national levels expand our knowledge through shared learning and improve our advocacy through strength in numbers. Two examples of organizations to which UCR belongs are the University Innovation Alliance (UIA) and Alliance of Hispanic Serving Research Universities (HSRU).

The UIA began as a coalition of 11 institutions with a goal of graduating 68,000 more low-income and first-generation students above an established baseline among member schools. Currently, the group has increased annual graduates by 30% and increased low-income graduates by 36% (2012-13 compared to 2020-21) with a total increase of more than 118,000 graduates (est.) for 2021-22. The UIA has also expanded membership and now includes 14 member institutions.

The HSRU was established after a consortium of R1 HSIs joined forces on a project to prepare Latino scholars for faculty positions in humanities studies. Recognizing

the need to do more to prepare Latino students for careers in academia, HSRU launched as a 20-member organization in June 2022 with two goals: double the number of Latino doctoral students at HSRU schools and increase by 20% the Latino professoriate in HSRU universities.

Partnerships like these offer three primary benefits to member institutions. First, they establish relationships and connect leaders across the country, deepening networks for additional collaboration. Second, through their aspirations, organization goals often lead to progress in unplanned ways. And third, the achievement of outcomes provides a playbook for others to follow.

In extreme conditions, increasing access can seem impossible. However, we do not have to go it alone.

Conclusion

In 1831, the man who would become President James Garfield was born in a log cabin. Born into poverty and fatherless at the age of 2, he became a janitor to pay his way at Western Reserve Eclectic Institute (later named Hiram College). He transferred to Williams College where he was both Phi Beta Kappa and salutatorian. After returning to Western Reserve Eclectic Institute to teach classics, he was appointed as the school's principal.

Though President Garfield was able to work his way through college, he also serves as an example of the talent we may lose without expanding access. His story gives weight to advocacy for education and low-income students. Investments in education remain important in driving economic progress, innovation, and improved equality. Yet, President Garfield emphasized that the stakes are higher than higher education. He said:

> *"Next in importance to freedom and justice is popular education, without which neither freedom nor justice can be permanently maintained."*

Some of our nation's fundamental values, the ones for which we have fought through civil action and legislation domestically or wars abroad, rely on our continued investment in education. Working together to expand access, therefore, serves as both pragmatic and moral imperative.

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