

Computer Science as a Black Vocation
Revisiting W.E.B DuBois and Booker T. Washington¹

By
Shawn Filer
Stanford University

Christian K. Davis
Stanford University

In memory of Professor
Kenneth A. Taylor, for whom
The Souls of Black Folk
was the best kind of
philosophy and vocation.

Stanford Computer Science student, B.S. 2019, M.S. 2020

On the one hand, there's all this pressure from non-CS faculty and peers to avoid "vocational" training like CS, because it's considered "selling out to corporations." On the other hand, my CS education, even with all its problems, is the best path I could find to building generational wealth and having a say in how tech affects my community.

¹ With significant help from J.B. at UC Berkeley.

INTRODUCTION

What sort of education will best uplift Black people in America? This longstanding question continues in American universities today, beginning with the famous debate between the first president of the Tuskegee Institute, African American Educator, Booker T. Washington (1856–1915) and Harvard-educated sociologist and philosopher, W.E.B. Du Bois (1868–1963). While Washington’s (1901) *Up From Slavery* drew on abolitionist Frederick Douglass’ 1853 essay “Learn Trades or Starve,” Du Bois argued in his seminal *The Souls of Black Folk* (1903) that a liberal education would best build cultural competence to enable Black people to enter positions of power in a white-dominated society. In fact, both men understood how mastering technology could offer a key to financial well-being and autonomy for Black people, but they famously disagreed on what kind of education would secure equity and empowerment.

This debate continues among Black students in higher education today: Is computer science merely a technical vocational skill? Or does it have the potential to offer a uniquely Black vocation that imparts wealth and enables us to build cultural competency as well? Do we even want cultural competency, as Du Bois defined it, or should we follow others who have developed newer, more meaningful models of knowledge and Black belonging? Our paper examines the persistence of the Booker T. Washington vs. W.E.B. DuBois debate and builds on Duke Professor Alicia Nicki Washington’s redefinition of cultural competency to argue that CS “vocational” training is never separated from cultural education. We also draw on an important new study from von Vacano et al. (2022) that provides methods for more inclusive STEM education for students from historically marginalized groups. Through a critical review of the debate and empirical survey of 135 Black computer science graduates at different American institutions of higher education, we demonstrate how computer science can become a better vocation for Black Americans. Our paper reconsiders the importance of vocational training in higher education and demonstrates that the many cultural roadblocks Washington and Du Bois identified persist, while both the meaning of vocational and higher education have transformed. Where the Washington-Dubois debate made “vocation” sound antithetical to higher education, we believe it plays an important role in university and college education, and that for us “vocation,” especially

with respect to Black empowerment, is no mere acclimation to industry, but rather a calling to serve our community.

CRITICAL REVIEW

The authors of this study are Black American men, who entered university education as low-income students. None of us had a computer science background, and only one of us had enjoyed an introductory survey of philosophy in public high school. The parts of this essay on W.E.B. Du Bois began as an essay that Shawn Filer wrote for the late great Stanford Professor Ken Taylor in 2017, and some of the elaboration here develops in response to Professor Taylor's comments. Reading *The Souls of Black Folk* in his first weeks on campus, it was clear to Shawn as well as to the other authors, that the Washington-Du Bois debate manifested itself in many conversations among Black students, most of whom were already familiar with the vocational training vs. liberal education debate, even if they'd not yet read Washington and Du Bois' texts. Whereas these two early Black thinkers offered competing views of empowerment during the Jim Crow Era, we and our peers confront the same struggle for equity in the context of an increasingly powerful Silicon Valley. The times have changed, but not the issues. Reading Booker T. Washington's argument for accommodation to white power structures bears a chilling resemblance to the assimilation expected of Black college graduates in an American workforce shaped by technology, especially under what Professor Ruha Benjamin calls the "New Jim Code" (2023), where society continues to engineer inequality. In the process of writing this paper, many reviewers asked us to cut the close reading of Du Bois and Washington, but we believe it's important to invite readers to spend more time with these important texts, especially Du Bois's "Story of John," as it painfully demonstrates that more than a century after Du Bois, barriers persist for Black people, even those who have benefitted from a college education. We offer a long read, 8000+ words, without apology.

Because of the continued relevance of Booker T. Washington's and Du Bois's efforts to uplift Black people through work and education, it is important to understand their histories and the forces that shaped them. Washington's (1901) *Up From Slavery* and DuBois' (1903) *The Souls of Black Folks* reflect their different relation to enslavement. Washington, born into slavery on the James Burroughs plantation near Hale's Ford, Virginia, was fathered by a white man he never met who took no interest in him. As Washington worked as a former slave in the coal mines, he came to understand skilled labor as a path to Black self-sufficiency. Washington maintains that his controversial argument for accommodation to white audiences is just a temporary, gradualist approach to full inclusion someday. Yet, his rhetoric remains apologetic for white enslavers.

In his autobiography, *Up from Slavery*, Washington describes both his Black enslaved mother and his white father as "victims" of the evil institution of slavery. Referring to his father, he demurs: "But I do not find especial fault with him. He was simply another unfortunate victim of the institution which the Nation unhappily had engrafted upon it at that time," (pp. 2-3). This grafting metaphor suggests slavery was somehow external to the true spirit of America, when in fact, we have long had evidence that American economic and political dominance globally derived from slavery (Harris, 2004). Studies like the *1619 Project* (Hannah-Jones & Watson, 2021) claim that slavery was central to the establishment of the United States and that founding fathers' grandiose ambitions imagined "they could successfully break off from one of the mightiest empires in the world [Great Britain] and rely only on "the dizzying profits generated by chattel slavery," (Hannah-Jones, 2019, p. 18.).

As Washington hopes to persuade white audiences of the mutual benefit of Black manual labor, he exculpates whites for their enslavement of Black people. In his famous "Atlanta Exposition Speech" of 1895, which Du Bois dubs "the Atlanta Compromise," (Du Bois, 2008, p. 34), Washington goes so far as to suggest that even the "sins" of enslavement fail to disturb Black Americans' gratitude to white Southern employers: "whatever other sins the South may be called to bear, when it comes to business, pure and simple, it is in the South that the Negro is given a man's chance in the commercial world," (Washington, 2013, p. 58). Washington claims that with such an eager and loyal Black work force, white employers need not seek new immigrant labor. To highlight the great availability of Black labor right at home, Washington offers an allegory of a lost ship that calls for help "Water, water; we die of thirst!" The "friendly" ship repeatedly advises "cast down your bucket where you are." Although at first confused, the captain of the distressed

ship finally lowers his bucket and discovers he's at the mouth of the Amazon River and the water is fresh. The allegory of salvation finding local labor addresses Black people as well. Look no further, help is right here in America:

To those of my race who depend on bettering their condition in a foreign land or who underestimate the importance of cultivating friendly relations with the Southern white man, who is their next-door neighbor, I would say: "Cast down your bucket where you are"— cast it down in making friends in every manly way of the people of all races by whom we are surrounded (p. 58).

Washington's rhetoric of manly friendliness sounds like an antiquated use of the word "man" to underscore the shared humanity of Black people and whites. But it also much more ambitiously presents Black men as *masculine* because they are equally capable of acting like "people of all races" and of participating in their culture.

In declaring such a shared friendship and manliness, Washington promises his white audience that Black people will forgo civil and social equality in the name of economic advancement: "The wisest among my race understand that the agitation of questions of social equality is the extremest folly." Using the metaphor of a hand, Washington suggests that Black people will live happily in separate but supposedly equal circumstances, just as segregation laws confirmed a year later in [Plessy v. Ferguson](#), 1896. "In all things that are purely social we can be as separate as the fingers, yet one as the hand in all things essential to mutual progress," (Washington, 2013, p. 58). This offer of labor in exchange for political accommodation made Washington popular among whites (Crowley, 2022). Black scholars of technology, like Professor Keith V. Johnson and Elwood Watson (2004) reject his accommodation but present context for Washington's preference for vocational training over higher education, arguing that the Southerner, Washington "harbored deep suspicion about the Black intellectuals who dwelt in the northern cities," (p. 67). Washington believed deeply in Douglass's 1853 exhortation "Learn Trades or Starve." Sadly, the industrial revolution proved Douglass's claims about trades overly optimistic and Washington wrong as well. Monique Patenaude (2012) studies the fate of Black families who moved to Douglass's adopted home of Rochester after having invested in learning manual trades like shoemaking. Despite Douglass and Washington's belief that trades would secure a road to self-sufficiency and belonging, local northern white-owned businesses hardly

welcomed these new Black tradespeople. In fact, her research shows that Black tradespeople were displaced when larger, white-owned businesses industrialized. Johnson and Watson (2004) assert that strict focus on trades ultimately caused a great setback for Black people. “Educationally, vocational training was a failure,” (p.66), claiming that manual labor and trades kept Black people at the bottom of the social hierarchy. Having a vocation seemed like a logical first step for formerly enslaved peoples who had long been denied an education, but vocation alone, e.g., knowing trades, proved insufficient for overcoming racism and the fact that whites owned most of the capital needed for industrialization.

Du Bois, meanwhile, understood as early as 1903, in *The Souls of Black Folk*, that *any* kind of training, even the finest elite education might give Black people what Du Bois imagined was cultural competency, but it would not banish racism, nor would it impart the “manliness” Black men craved to be on equal footing with white men. In fact, such cultural competency often exacerbated the pain of “double consciousness,” Du Bois’ term for how Black people live with internalized white perceptions of themselves alongside their own self-understanding. As Du Bois dreamt of Black Americans living above the “veil” and the “color-line” that separated them from all the privileges of whites, he refused accommodation. Unlike Washington, he knew that neither compromise nor any vocation nor education alone could end systemic racism. Instead, over his long intellectual life, Du Bois developed a pragmatic mixture of education, vocation, and community engagement to uplift Black people. (Alridge, 2018). In “Of Our Spiritual Strivings” his first chapter in *The Souls of Black Folk*, Du Bois imagines the despair of Black people after the disappointments of Reconstruction: “Lo! we are diseased and dying, cried the dark hosts; we cannot write, our voting is vain; what need of education, since we must always cook and serve?” (Du Bois, 2008, p. 13). To move Black people from accepting their lowly social status, Du Bois imagined a special group of educated Black men who could uplift the community, the “Talented Tenth,” a vanguard of elite Black college graduates. In fact, this elite would disappoint him by promoting their own self-interests rather than uplifting the larger Black community (Johnson & Watson, 2004; Alridge, 2018).

For these reasons, Du Bois never lost focus on community. Seeking multiple paths toward empowerment meant that he often adopted contradictory or conflicting roles. Lauren A. Wendling (2018) describes him as “not only an educational revolutionary, but simultaneously a conformist, integrationist, and separatist when it came to the place of the Black community in American

society,” (p. 288). The conformist and integrationist parts refer to Du Bois’ exaltation of white high culture and its values. Truly convinced of his own classical education, he believed that learning the European canon would not only provide cultural competency, but also open Black minds to the universal Hellenic truths of beauty and justice. Du Bois clung to this notion of canonical liberal education even as late as 1942, sounding consistently Platonic in “The Negro College and Minority Technique: “The school in itself [is] not a place where youths [are] taught to earn a living....The man that spends his life earning a living, has never lived. The education that trains men simply for earning a living is not education,” (Cited in Wendling, 2018, p. 288). Later, as he developed a more jaundiced view of European culture, he set his views on the Black community prioritizing self-care.

Du Bois’s own conflicting positions also characterize the situation of Black people in higher education today, where even the most privileged education fails to ensure equity. The penultimate essay in *Souls of Black Folk*, “The Coming of John” demonstrates the enormous obstacles that Black people face in America regardless of their education. “The Coming of John” follows the life of a fictional young Black man named John Jones who once had a white playmate named John Henderson, who was the son of the town's powerful white judge. Although the two Johns played together as children, everything changed when both were educated. At first, John Jones appears as a squirrely youngster who is completely “unschooled” and as “careless” about learning as he is happy in his community. When he goes north to Johnstown, he nearly fails out of school, is forced to take a leave of absence, and learns hard work in the North. Upon returning, he has transformed into a serious, hardworking student who is deeply devoted to asking great questions about the cosmos, ancient Greek grammar, and classical western civilization. After a much-lauded graduation where he appears to be the hope of his school, John Jones finds himself in New York City, drawn into an opera performance. It happens that John’s childhood playmate, John Henderson, who had graduated from Princeton, stands in line behind him with a woman date, awaiting entry to the opera as well. John hears the woman joking darkly about “lynching” the Black man in front of them who is “in the way.” But John Jones is too enthralled with the culture, wealth, and splendor to notice. He pays all his money for a seat, and ends up next to John Henderson and his date. Listening to Richard Wagner’s *Lohengrin*, John feels wholly transported from the earthly world into a realm of aesthetic beauty. For a brief moment, it seems as though Jones has reached the pinnacle of his western European high culture education, having developed

such perfect sensibilities as to love this antisemitic, nationalist, proto-Nazi German composer, Richard Wagner. In John Jones's ecstasy, he accidentally touches the arm of the white woman next to him. She "drew away" (p.159). Little does Jones know that John Henderson had already asked the usher to remove him from the theater. Jones and Henderson only recognize each other in the moment when Jones is ejected from the opera. In the end, a European high-culture education offered Jones no entrance into the powerful white world.

John Jones decides to return home and help his own community, but his education has so changed him he no longer understands his community and can no longer communicate with them. After insulting everyone in church, he convinces Judge Henderson to let him open a school for Black children, and even accommodates the demand for "separate but equal" education. However, Judge Henderson hears that John Jones has been teaching about the French Revolution and other emancipatory ideas and immediately shuts down the school. Dejected, Jones walks home and encounters Henderson, who is assaulting Jones's sister Jennie. John Jones kills John Henderson with a stick. Soon after, Jones hears a thundering lynch mob coming for him. But, while humming a Wagner tune, he seems to understand his fate as inevitable and know that his death will not quench the fury of the white man.

Du Bois's grim short story shows how Black people will never be redeemed by developing cultural competency as long as culture and society are defined by white people. As the furious Judge Henderson thunders towards John Jones, Du Bois depicts the judge as an irrational coward and his ill-fated Black hero as the truly "manly" man. About to be lynched, Jones demonstrated how well-equipped he remains with his classical liberal education and shrouds himself in aesthetic ideas. He appears Stoically disengaged and thus mentally "free," enjoying his Wagner music, which is supposed to indicate he has transcended to a higher realm of self-possession and human understanding. Meanwhile, the white furious judge proves himself to be merely a creature of animal violence. Jones's calm manliness, called "temperance" and "prudence," by the ancient Greeks, presents Jones as a man in control of himself, deserving of admiration, not death. Du Bois wants us to know that the Black man wins here. Or does he? In true Stoic fashion, Jones may be free in his mind, but the world remains violent and unjust.

The "Coming of John" lands differently for us computer science students who are forever admonished to look beyond "mere" vocational training toward liberal education. For us, John Jones' murder demonstrates the persistence of systemic racism and the failures of liberal

education. What would have saved John Jones? Not a supposedly “free” mind focused on Wagner at the moment of death. Rather, greater numbers of Black people in positions of institutional power. Du Bois wanted that, and a hundred years ago, his vision of liberal education seemed to promise such an entrance. We know it remains inadequate. Our task for Black empowerment is to challenge the fraught “New Jim Code” (Benjamin, 2023) that exacerbates many of the engineered inequalities that have existed since the Jim Crow era of Washington and Du Bois’ times. Tech is no panacea, and certainly not the only route to Black empowerment. But gaining technical and vocational skills enables us to enter these organizations, and promote our communities into positions of power. With tech skills we can intervene in technology designs and decision-making as well. For example, here is an HBCU grad in Computer Science, who pursued the field not necessarily for building generational wealth, but to mitigate tech harms:

In high school I noticed the growing ubiquity of technology in social institutions and saw how they were harming Black people (i.e., predictive policing). I wanted to learn the technical skills to make better technology or know how to stop these harms.

Many proponents of the early Du Boisian position believe we are “selling out” like Booker T. Washington, who asked Black people to accommodate. Indeed, our own professors and peers accuse us of this much: we very clearly recall lectures during our frosh year of college, when white tenured ethics professors would lecture us on the evils of focusing on technical skills and working for consulting firms like McKinsey or Big Tech for summer internships, pointing out their harms to our communities and arguing that these institutions are just using us for diversity statistics. We’d leave the lecture hall knowing they were right about corporations using Black people, but we felt confused wondering how we were supposed to change tech if we avoided it, and how the alternatives were any less exploitative. Black people need to enter all fields of power, but CS is one of the few that doesn't expect one to do free labor to get in the door. Pre-law tracks like working for senators, government, public service, and non-profit internships often require volunteer work to start. Only our wealthy peers from dominant groups can afford to move to Washington DC, pay their own rent and food, and work unpaid. Even as many of our peers shamed us for studying computer science and working in tech to build generational wealth, we wondered what kind of self-sufficiency a humanist or social science liberal education could impart if entry-level employment required unpaid or minimum wage labor and there are far fewer

vocational paths from them. Amongst ourselves we often said, and still say to those who pressure us not to “sell out,” as though paying to work in the nation’s capital and elsewhere was not also an unjust accommodation: “poverty ain’t sexy.” When these other paths to Black empowerment pay, then more of us will choose them. In the meantime, there’s no doubt computer science has many problems, as our survey clearly shows, but we believe it can become one potentially advantageous vocation for Black people, if we address its problems and better support Black engineers.

CRITICAL SURVEY

From our perspective as Black men who work in industry, the demand for accommodation to dominant culture has never ended. So while Booker T. Washington was morally wrong to promise white people that his Black community would adjust their ambitions for white fears and interests, his efforts serve as a warning about what continues to be expected of Black Americans. Every day when working for consulting firms and tech corporations, Black Americans continue to accommodate ourselves to the white and Asian-dominated culture as a strategy for survival. Empowerment remains slow for those working in 21st century institutions that have concentrated power and money in their hands. We often bury our dissenting thoughts in our hearts and share them only among our communities. Surely, our university education has taught us about oppression, social domination, capitalism, and intersectional justice, but awareness of these economic and historical lessons remains inadequate to equip us for survival in the tech world and related institutions. We need to organize and help each other rise through the ranks into positions of power.

Black empowerment can arise from education as long as it leads to sustained community action. In her important essay, “When Twice as Good Isn’t Enough,” Professor Alicia Nicki Washington (2020) defines “cultural competency” not as liberal education in the sense that Du Bois imagined, but rather as a practical social and cultural training that teaches students about how corporate and institutional power works and why systemic racism remains entrenched. In so doing, she builds a framework with which Black students can better navigate their challenges, and students from dominant groups gain awareness of their privileges and learn to criticize the status quo in universities and industry. Her approach requires non-Black people to go beyond lip service

and critically examine their own biases, so that one avoids becoming the all too common “allersary,” a term Washington coins to describe individuals “who consider themselves majority allies, yet still exhibit toxic traits that are adversarial,” (p. 214).

Building on Professor Washington’s work, we also benefited from many other Black women researchers of CS education, including Professors Yolanda A. Rankin, Jakita O. Thomas, Sheena Erete, Monique S. Ross, and Tiffani L. Williams. Black feminist CS education gains critical insights from Professor Patricia Hill Collins’ (2019; 2020) groundbreaking work in Black Feminist Studies and intersectionality as well as Professor Kimberlé W. Crenshaw’s (1989) Critical Race Theory. With these readings in mind, we better grasped the transformations of culture since Washington and Du Bois advocated for “manliness” in the language of their times. In the 21st century, we drop the vocabulary of “manliness” and seek other language for “self-understanding,” “cultural competency,” and “self-possession.” Confronting intersectional issues in computer science education today, we repeatedly encountered issues of gender and race. These readings helped us understand “epistemic violence,” which refers to the denial of racism in CS education where the dominant group defines “acceptable knowledge” that “reflects and protects the dominant group’s status of power and privilege... while rejecting and silencing other forms of knowledge produced by marginalized populations,” (Rankin, et al., 2021, p. 2). Our study confirms Rankin et al.’s findings that such marginalization for women and gender minorities occurs “constantly” in computer science, at “every level, academically, personally, and professionally, and on many different fronts,” (Yankin et al., 2021, p. 24).

Methods

After obtaining an Institutional Review Board (IRB) consent from each survey responder, we used the snowball sampling method. We initially sent an email to 17 Stanford and 22 University of California, Berkeley Computer science graduates who were members of the Black Student Union and/or the [National Society of Black Engineers](#) (NSBE) and who are now early career professionals (5 years or less after graduation) to participate in an anonymous survey about their experiences as Black students of computer science. Upon completion of these surveys, each of these students recommended another Black computer science member of NBSE who was willing to take the survey. We repeated this cycle until we ultimately recruited a total of 121 U.S. Black computer science graduates who are early career professionals and 23 graduate students. Given

that the snowball sampling began at Stanford and Berkeley, over half of responses were from these two institutions (43 and 35, respectively). Eleven of the 134 Black survey responders attained their Bachelor's or Master's degrees in computing disciplines from HBCUs. Thirteen were from San Jose State University. Twenty-seven graduates of public four-year universities and five community college grads did not provide the name of their institutions (Figure 1).

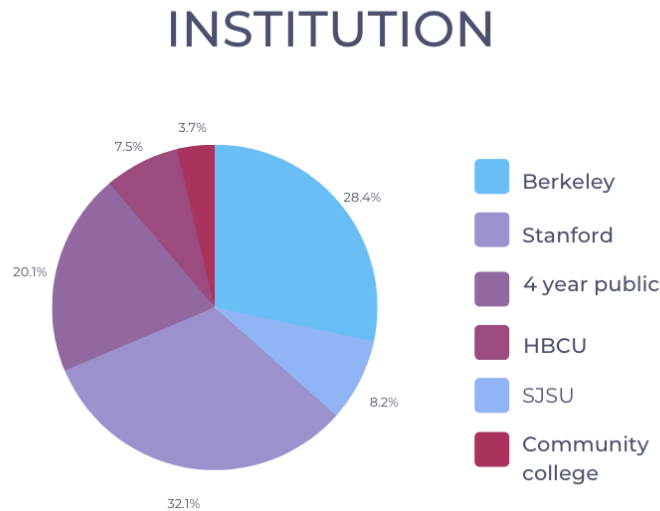


Figure 1. Distribution of Institutions attended

Data Collection and Analysis

Once we had collected the IRB consent for each participant, we released the survey which had the following open-ended paragraph style questions

1. Do you consider yourself to be a Black person in computing? Why or why not?
2. Please tell us about your ancestors in the Diaspora and where your immediate family is from.
3. What is your gender identification? You can exclude this question, if you prefer.
4. What motivated you to pursue a career in computing?

5. What description fits your university: Public 4-year, private 4-year, HBCU, 2-year, other?
Including the name of your institution is optional.
6. My most important courses in college were:
7. I owe my success to:

We also used five-level Likert statements with the possibilities:

Strongly disagree

Disagree

Neither agree nor disagree

Agree

Strongly agree

8. I arrived in college with previous coding experience.
9. My computer science education included accessible pedagogy and fair assessments.
10. My computer science education prepared me very well for industry and leadership.

We conducted a content analysis of the survey forms. Next, using in vivo coding (i.e., using the actual words of participants), we coded all 134 forms to identify their experiences in their own words.

Results

There were 11 students who studied outside of the United States. We removed these to focus on the American educational context for Black computer scientists. We asked the question: “Please tell us about your ancestors in the Diaspora and where your immediate family is from.” because we wanted to understand how the descendents of the Black Americans Washington and Du Bois had addressed viewed their education in the 21st century. We discovered that about 54% of the Black computer scientists we surveyed identified as the descendents of formerly enslaved Americans. The rest had parents from Africa and the African diaspora, some of whom described themselves descendents of enslaved Africans elsewhere and others whose families had arrived in

the US from formerly colonized African nations. Of the respondents, 36% describe themselves as mixed Black (Figure 2).

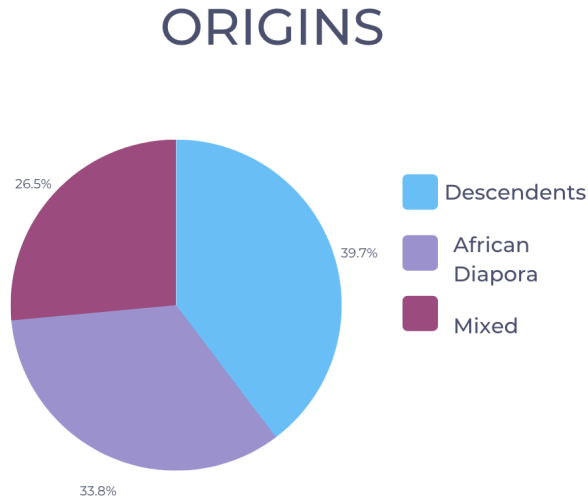


Figure 3. Distribution of Origins: Descendents of Enslaved Black Americans, African or Diaspora immigrants, and mixed. Most of the mixed respondents were also descendents.

We found that 42% identified as women, 44% as men and 10% other and 2% declined to answer (Figure 3).

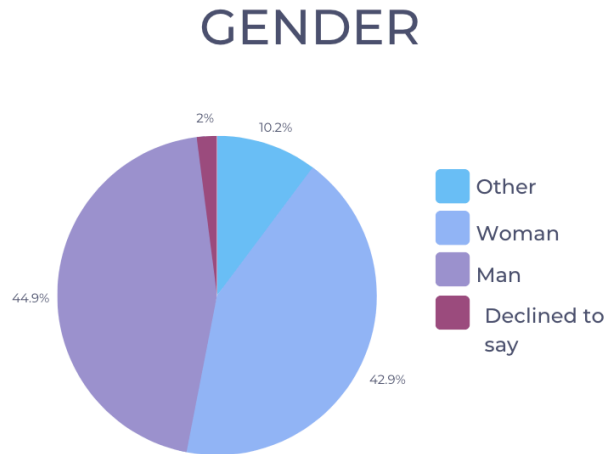


Figure 3. Distribution of Gender

Interestingly, 13 of the 43 graduates at Stanford and 9 of the 35 from Berkeley had started as pre-med majors and then switched to computer science.

Here is a response from a low-income, first-generation Stanford student who had been valedictorian at their high school and originally dreamt of being a doctor. The pre-med chemistry sequence ended that for them:

My most important courses were 1) my first math class Vector Calculus for Engineers (CME100), which I took as an incoming Frosh. But I nearly dropped out of school because of how hard intro to chemistry was and how utterly unprepared I felt for the material—I felt stupid. Then, 2) the other most important course I took in the Winter Quarter, the introductory computer science course CS106A. I came in as a complete beginner and was worried I'd feel pushed out like I did in chem classes, but it was extremely accessible; far from perfect, but a serious step up from the "weeder" classes I had taken.

Here is a response from a Berkeley graduate, also a first-generation student.

While I'd been at the top of my class in high school, active in theater, track, and STEM, I'd only ever planned to be a doctor. Then my first semester I got a C in Intro to Chemistry and a C+ in a required humanities writing course. I had been hoping the humanities course would help my GPA, but the professor seemed to not like me or my work for unknown, subjective reasons that I could not budge no matter how much I went to office hours and followed up on his suggestions. After that demoralizing experience, I didn't feel I had a chance at medical school. So I turned to computer science. My two C grades deterred me for a whole year until I took enough good grades in coding and math courses to get into the major. It is HARD to get into Berkeley CS because there are limited spots. Once in, I knew as long as I kept B average and I could still earn a decent living. I found the professors and TAs in computer science generally much more helpful than premed, but that most of all, my Black community helped teach me and get me through when I doubted myself.

For our premed students, CS proved more welcoming, but many students still struggled. The most common phrases for students who graduated in computer science were “doubted myself,” “I had a hard time finding a partner for assignments,” and “my Black community helped me.” Many students who started elsewhere in STEM moved to computer science because they'd heard “the teachers were better.” But many still found computer science too prohibitive in its pedagogy, assessments, and culture. Several survey respondents mentioned that they never completed their degree but still work as engineers. Here's a response from a student at a big, elite private university in the South:

It bothers me always that I didn't finish, and now that I make enough money I guess I could get the degree at some point. But college was a shock to me. I never imagined working so hard and still failing. I never could adjust to the culture, where I constantly felt out of place and had a hard time finding a partner for assignments.

Every time I took a leave of absence I felt so much better away from campus. I must have only a few courses left to the degree, but don't know if I could survive going back.

At Stanford, students who found computer science unwelcoming switched to related fields like Symbolic Systems, Management Science and Engineering, and Science, Technology, and Society, or some other type of engineering (24 Stanford graduates). Many Black students remark that after leaving CS for other types of majors, their higher education remained uneven, with some opportunities to gain skills and succeed, some not. Data science opened more doors. At Berkeley, many declared data science (15) because they found better pedagogy, assessments, and culture outside of computer science.

A Berkeley grad said the following:

First of all, so many people want to study CS at Berkeley, it's difficult to get in. And then I found more Black people in Data Science and a nicer, more collaborative culture. More women and other kinds of people too. The exams were way less stressful and more balanced percentage-wise with the projects and other types of assignments. It hasn't hurt me not having a CS degree. I currently have a high-paying engineering job in a regional office of a major tech firm. Often in industry, I share war stories with other Black engineers, who gave up on the computer science major like I did.

With elite competition to claim their institution produces the best engineers, there is a lot of focus on the academic, theoretical, and systems side of computer science, which has less immediate application in industry. Such an effort allows elite universities to claim they aren't merely vocational but also maintain what they call "academic standards," which means coverage of content in courses is condensed for breadth rather than depth, testing includes problems that students have never seen before, and teaching focuses on the top 1/3 of students who come in with the most preparation—these are rarely Black students. Several Stanford graduates commented on what they thought were "unfair" assessment practices in computer science. Here is one example:

There's one teacher non-Black students seem to think is "great" and he even thinks of himself as "inclusive" and "supportive." I failed his course after doing every assignment and all the other work because the exams were 60% of my grade. I switched to MS&E [Management Science and Engineering]. Most of my Black friends in his course failed too, switched majors, and never took another CS course. One Black girl had a nervous breakdown and left Stanford, we've never heard from her again.

Although computer science departments have made many efforts at inclusiveness in the last ten years, stories like the above comprised about 50% of the commentary we received. For every success story and good outcome, there's a terrible story as well. With the students who do stay in the CS major and survive, they are very clear about how they succeeded. These students say they "owe their success" to their teachers, TAs, and Black communities:

I owe my success to a couple of professors who actually valued teaching, a handful of TAs who took the time to bridge gaps (cultural, academic, etc.), and a bunch of friends supporting me. My friend, Sarah, was the only reason I didn't drop out of school Freshman Fall; she was struggling too but was brilliant and managed to convince me that my struggle wasn't due to a lack of intelligence or ability. There was exactly one (1) TA who took the time to go around the swarm of students clamoring for guidance on the bonus problem to ask me if I needed help while I held back tears of frustration staring at problem one. Simply put, I owe my success to the people who, at pivotal moments, managed to bring me in and lift me up.

The Black students who succeeded most often at Stanford and Berkeley came from large Black communities such as Atlanta, Chicago, Houston, and Oakland, California. Many had enjoyed great community support and mentorship before they arrived at college. Of these students, those who identified as men mentioned the special programs that got them interested in computer science early and helped them choose this major before they arrived: "I believe my dual enrollment at Georgia Tech helped me significantly." Women, however, were divided on their

early start experiences. Some women declared these elementary and high school programs as “life-changing” with “great women of color role models.” Others were less impressed: “boring and repetitive, and I couldn’t see how this would help me in college.” Women also remarked “I had calculus and advanced math in high school, but it really depended who the teacher was. When I got to college I had to retake courses before I was ready for vector calculus and linear algebra.”

Black graduates who succeeded at Stanford, Berkeley, and Duke frequently acknowledge cultural struggles that they experienced, and remark that similar obstacles now confront them at work, but they’re better prepared, after having built strong networks. Meanwhile, outside of predominantly white and Asian elite institutions, students felt much more positively about their computer science education and learning communities. 11 students from HBCUs, 13 from San Jose State University, and 27 from other public four-year universities said they thought that their computer science education was “excellent,” with “dedicated teachers” and that the assessments were “reasonable and fair,” and they graduated with computer science degrees. 90% of these graduates strongly agreed their “education prepared them very well for industry and for leadership” as opposed to the 80% from Berkeley and Stanford who agreed strongly to this statement.

Describing the obstacles that they encounter in industry, many say it’s like the college experience but with much higher stakes and less obligation to be collegial, since work relationships are often fleeting:

One woman from a four-year public university reported:

I’m told everyone hates the whiteboard coding part of the interview, but no one tells you about the mean guys from elite universities who ask you obscure edge cases just to laugh at you and watch you fail. I hear tech is doing all sorts of “outreach” to change this, especially for Black job candidates. Well, as of last month, it’s not changed much.

Another woman who attended an HBCU and sees herself as a success and as a leader climbing the ranks through management positions, nevertheless had this to say.

Being Black in tech takes so much from you. Being a minority, a huge chunk of your time is spent demystifying your colleagues' misconceptions. Being Black will pressure you to over-compensate. Being Black will make it harder for colleagues to speak directly to you, because they don't know how. So they'll report directly to your manager for any issue. Being Black will make you a great hire for diversity tokens, but you'll also be the first one out the door, because you're the only one at the company. Being Black in tech, is where you're one of a handful at a top conference, because so many like you are unable to attend due to fees. Being Black in tech is where your work might not see the light of day, because there are just way too many hoops to jump through. Being Black in tech takes from you. It isolates you. But we endure to keep the fight alive and hold the door open for others.

Such a testimony to all that continues to be unjust in tech demonstrates how, even after a student has successfully graduated from a CS program, Black engineers continue to encounter an uphill battle in their chosen profession.

Discussion

Inspired by the survey responses we received, we consider how clearly the work of Black women in computer science like Nicki Washington (2020) and Yankin et al. (2021) uncovers the systemic barriers that Black computer scientists face. We also build on von Vacano et al. (2022) which calls for a comprehensive approach to address disparities in STEM education, considering both individual student-level factors and broader institutional and systemic issues. This important Berkeley study emphasizes the importance of critical faculty and peer instructor development as key elements in promoting inclusive STEM education and disrupting historical forces that contribute to inequalities. Drawing on von Vacano et al. and our critical research, it becomes clear that structural changes need to be implemented more substantially than they have been so far.

There is still much work to be done to make computer science a more equitable and inclusive field. Comparing our survey results to this critical reading as well as the Washington-Du Bois debate, we see how, regardless of the content that universities deliver, by far the greatest support comes from the Black community themselves. Du Bois was wrong to believe that the Talented Tenth would uplift the rest of the Black community, and he sorely regretted having had such a hope. Likewise, reading about John Jones Stoically accepting his death, while humming Wagner, makes us cringe.

Perhaps Du Bois wanted us to recoil from such a Stoic death and to take action into our own hands. We believe that our survey demonstrates that liberal education and the humanities may have different problems but still as many that exclude Black students as computer science. Du Bois's "The Talented Tenth" depended on assimilation to European high culture. Many of us see that Tenth as folks who successfully integrated into and excelled in a white-dominated education system. Such assimilation persists today for Black students at universities that advertise on one hand, "bring your whole self to class" and "everyone's story matters," but where, in the end, many find much more immediate success if they "tone-down" their Blackness and smooth over the complexities of their identities. Our experiences as low-income Black men at elite universities have shown us, just as our literature review and data have, that anyone can learn anything, and maybe even everything, just not all at once. A student who is curious and engaged is a student who will learn, but to even feel the freedom to be curious, they have to have hope their hard work will get them to the next step. To do so, they need to feel safe and so they can be authentic. Christian Davis who works as a tutor for Black students asserts the importance of such belonging when he began section leading for Stanford's beginning CS course CS106A and tutoring for Stanford's then newly founded [Black LaIR](#), a Black student-run academic mentorship program that "works to foster a community of mentorship, collaboration, and inclusivity within the CS Community:"

So many students come into Black LaIR the first time and are frustrated, they feel inadequate and like they simply can't grasp the concepts. I don't think we did anything special to teach them compared to what happened in the classroom or office hours; what was different is that we provided a space where they could engage with the material authentically. The students could speak to us the way their communities had communicated their whole lives; they were surrounded by other students that looked like them who were all at varying levels within CS, and they could let go of that breath they didn't even know they were holding. Suddenly, they didn't have to search for the perfect way to phrase their question or settle for saying "I don't know" because their explanation of a concept might not make sense to their non-Black professor or TA. When a student can engage with the concepts and explain themselves and be understood in their native tongue, you'd be surprised how quickly a student can pick something up.

Conclusion

Reading Booker T. Washington and W.E.B. Du Bois again for this study, we were struck by how much of the debate remains the same in the Black community, even if the terms are now very different. Some Black students continue to express guilt for choosing a field that notoriously weeds out their community, and builds algorithms that disproportionately harm Black people. Others understand the challenges within the field and industry, yet believe that they can better serve their communities if they become empowered with technical skills and economic mobility. The best kind of non-technical education Black students can gain at the university most closely resembles the kind of “cultural competency” that Professor Nicki Washington recommends, which helps Black people to better communicate their concerns and navigate the systems of power. Rising up in the tech hierarchy often requires that we share some of the critical tools we learned at the university only among our community and allies. For us to gain access to computer science organizations, we must bring in more Black people, support them, and bring change from the inside.

Should more students study computer science or less obviously “vocational” fields? We hope this paper makes clear that “vocational training” is not incompatible with higher education, but rather especially helpful when combined with a broader social, cultural, and political education like Du Bois imagined later in life. In that sense, computer science can be a unique vocation for Black people if we bring ourselves and our culture to it. How can teachers help? Instructors in all fields and especially computer science must create a space where that curiosity can be nurtured and where that excitement can turn into passion. That space is one where students can show up authentically; and can avoid the evil of comparison, especially with their more privileged peers. When Black students are given the space and encouragement to reach understanding through making connections to what exists in their world, they can improve computer science for everyone.

References

- Alridge, D. P. (2018). *The educational thought of WEB Du Bois: An intellectual history*. Teachers College Press.
- Benjamin, R. (2023). Race after technology. In *Social Theory Re-Wired* (pp. 405-415). Routledge.
- Collins, P. H. (2022). *Black feminist thought: Knowledge, consciousness, and the politics of empowerment*. Routledge.
- Collins, P. H. (2019). *Intersectionality as critical social theory*. Duke University Press
- Crenshaw, K. (1990). Mapping the margins: Intersectionality, identity politics, and violence against women of color. *Stan. L. Rev.*, 43, 1241
- Crowley, J. W. (2022). Booker T. Washington Revisited. *American Literary Realism*, 54(2), 170-181.
- Douglass, F. (1853). “Learn Trades or Starve!” *Frederick Douglass Papers*, 1850-1860.
- Du Bois, W. E. B. (2008). *The Souls of Black Folk*. Oxford University Press.

- Hannah-Jones, N., & Watson, R. (2021). *The 1619 Project: Born on the water*. Penguin.
- Hannah-Jones, N. (2019, August 19) *The 1619 Project*. *New York Times Magazine*. Retrieved, June 1, 2023 from <https://www.nytimes.com/interactive/2019/08/14/magazine/1619-america-slavery.html>
- Harris, L. M. (2004). *In the Shadow of Slavery: African Americans in New York City, 1626-1863*. University of Chicago Press.
- Johnson, K. V., & Watson, E. (2004). The W.E.B. DuBois and Booker T. Washington Debate. *The Journal of Technology Studies*, 30(4), 65-70.
- Patenaude, M. (2012). *Bound by pride and prejudice: black life in Frederick Douglass's New York*. [Dissertation. University of Rochester].
- Rankin, Y. A., Thomas, J. O., & Erete, S. (2021). Black women speak: Examining power, privilege, and identity in CS education. *ACM Transactions on Computing Education (TOCE)*, 21(4), 1-31.
- Rankin, Y. A., Thomas, J. O., & Erete, S. (2021, March). Real talk: Saturated sites of violence in CS education. In *Proceedings of the 52nd ACM Technical Symposium on Computer Science Education* (pp. 802-808).
- Ross, M. S., Huff, J. L., & Godwin, A. (2021). Resilient engineering identity development critical to prolonged engagement of Black women in engineering. *Journal of Engineering Education*, 110(1), 92-113.
- Smith, C. A., Williams, E. L., Wadud, I. A., Pirtle, W. N., & Cite Black Women Collective. (2021). Cite black women: A critical praxis (a statement). *Feminist Anthropology*, 2(1), 10-17.
- von Vacano, C., Ruiz, M., Starowicz, R., Olojo, S., Moreno Luna, A. Y., Muzzall, E., ... & Harding, D. J. (2022). Critical faculty and peer instructor development: Core components for building inclusive STEM programs in higher education. *Frontiers in Psychology*, 13, 754233.
- Washington, A. N. (2020, February). When twice as good isn't enough: The case for cultural competence in computing. In *Proceedings of the 51st ACM technical symposium on computer science education* (pp. 213-219).
- Washington, B. T. (2013). The Atlanta Exposition Address. In *Capitalism vs. Collectivism: The Colonial Era to 1945* (pp. 58-68). Routledge.

Wending, L. A. (2018). Higher education as a means of communal uplift: The educational philosophy of WEB Du Bois. *The Journal of Negro Education*, 87(3), 285-293.

Williams, T. L. (2022). The lives of hidden figures matter in computer science education. *Communications of the ACM*, 65(2), 20-22