



Systematic Review

Racial Disparities in the Construction Domain: A Systematic Literature Review of the U.S. Educational and Workforce Domain

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Abstract: Trends in the construction domain, educational enrollment, student graduation, student industry employment, and workforce retention demonstrate that minorities—Hispanics, African Americans, Asian Americans, and Native Americans—are often excluded, segregated, or ignored in this domain. A systematic literature review (N = 68) was conducted to investigate the causes and effects of racial disparities produced by systemic racism in the educational and workforce domains of construction. Particularly, this paper focuses on exploring how racial disparities in construction impact minorities, the current state of the racial divide, the practices that perpetuate racial inequities, and the strategies currently used to prevent, in a sustainable manner, such practices. The results of this systematic literature search revealed that exclusionary practices and ideologies cause an underrepresentation of minorities in construction that directly affects employment and industry representation in the United States. Previous studies show that systemic racism in construction has been supported by meritocracy and colorblindness ideologies, creating an unwelcoming environment where racial minorities have difficulties identifying with the construction domain. Furthermore, systemic racism affects students after graduation from construction programs, as industry trends showcase issues with minorities joining or staying in the field. Although racial disparities caused by systemic racism are an existing issue in the education and workforce domains of construction, there are a rising number of publications that strive to understand how to sustainably increase diversity, equity, and the inclusion of racial minorities. An increasing number of available tools, such as anti-bias and awareness training programs, are being used as a sustainable practice in construction education and in the construction industry to mitigate the effects of systemic racism. Ultimately, this paper's contribution centers on describing the “who”, “how”, and “what” regarding the effect of racial disparities in the construction domain, which reduce the number of minority professionals coming into and staying in the industry.

Keywords: construction; STEM education; racial disparities; minorities; diversity; inclusion



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1. Introduction

The construction industry is a major contributor to the United States (U.S.) economy, with a market size valued at around USD 1.36 trillion and over 7 million employed professionals [1]. The construction industry is projected to employ at least 250,000 people from 2021 to 2031 and experience an annual replacement of the existing workforce of about 700,000, according to the U.S. Bureau of Labor Statistics [2]. However, there are continued reports of widespread workforce labor shortages [3]. These workforce shortages are mainly caused by older professionals leaving the industry once they reach retirement age and a low influx of new professionals [4]. Therefore, the construction industry is in dire need of encouraging a new and diverse generation of professionals to enter the workforce. Research

shows that diversity, equity, and inclusion are prerequisites for construction employers who want to remain competitive in the coming decades, as diverse teams yield novel ideas, increase workplace safety, and influence the retention and optimization of skilled labor [5–8]. These major benefits of a diverse construction workforce can influence the influx of new professionals from educational institutions into construction careers [9], supporting students as they traverse the workforce and fostering the sustainable growth of the industry into the future.

Even though the importance of diversity, equity, and inclusion has been recognized as key to overcoming labor shortages, increasing competitiveness, and improving safety, one area that remains unexplored is how systemic racism impacts the U.S. construction domain. Systemic racism has become an issue that intersects every industry in the U.S. [10]. The theory of systemic racism is defined as the inequities caused by the foundational structure of a society, resulting in the oppression of non-hegemonic racial categories (people of color) across generations [11]. This societal oppression caused by racial injustices and inequities can be traced to the racialized, hierarchical organization of the U.S. society, as people are placed in racial categories that define their economic and social status [12]. The U.S. racialized system benefits groups, institutions, organizations, and structures that have historically held power and resources (traditionally White Americans), asymmetrically displacing underrepresented minorities—people of color, including African Americans, Asian Americans, Hispanics, Pacific Islander Americans, and Native Americans—into inequitable socio-economic positions [13]. Within this theory of systemic racism, racism is the resulting manifestation of oppression at an individual level, expressed through stereotypes (racist beliefs), prejudice (racist emotions), or discrimination (racist behaviors and practices) [14]. Oppression is also intrinsically connected to the phenomenon of privilege, as the racial groups that hold power can accrue societal advantages (e.g., greater access to resources, membership, and normality, ability to ignore race) compared with disadvantaged minorities [11,15]. Systemic racism has recently been exacerbated by the COVID-19 pandemic, increasing racial divides, polarizing political discourse, and propelling social movements (e.g., Black Lives Matter) to the forefront of society, while directly affecting the health, work, and education of people of color across the U.S. [16,17].

This reality of the racial disparities in the U.S. as a consequence of systemic racism becomes magnified for historically White-dominated industries, with individuals who are not White Americans relegated to the least desirable jobs and occupations (e.g., low skill, status, wages) [18]. The U.S. construction domain suffers from exclusionary policies, practices, and ideologies that perpetuate discrimination, e.g., [19,20]. Today, construction mimics employment trends across many industries where minorities are excluded from management and professional occupations [9,21–24]. Consequently, minority students are found to be less likely to choose and stay in construction careers regardless of their training level or educational attainment [9,10]. Researchers have observed how students and professionals of color in construction experience explicit discrimination, such as overt racism (e.g., racial slurs, hate symbols) and harassment (e.g., being yelled at, sexual harassment), and subtle microaggressions such as isolation from other professionals, a lack of access to training and mentorship on the job, and a lack of access to on-the-job hours (e.g., being unfairly given fewer hours or being unfairly let go) [25,26]. These exclusionary practices and ideologies have led to low numbers of minority students and professionals participating in the construction industry.

Due to the importance of understanding the underlying mechanism that currently affects students and professionals in the construction domain, this paper aims to explore how racial disparities in the U.S. construction industry caused by systemic racism impact minorities, the current state of the racial divide, the practices that perpetuate racial disparities, and the strategies in place to prevent in a sustainable manner such practices via a systematic review of the existing literature. Systemic racism as a theory to explain racial disparities [11–13] has not been explicitly studied in construction, as it has been studied in many other domains, including engineering, education, or psychology, e.g., [10,21,27].

Consequently, the contribution of this paper is to discuss “who” is affected and “how” and “what” racial disparities produced by systemic racism displace minorities outside of U.S. construction education and the construction workforce. Finally, a description of the ideologies that support racial disparities in construction and the strategies being used to sustainably address this are presented. To describe these findings, this manuscript is organized as follows: The introductory section explains the need to explore racial disparities through the lens of systemic racism. Next, the research goal and research questions explored in this paper are presented with the aim of investigating the impact of the racial disparities caused by systemic racism in the construction domain. The PRISMA methodology used to conduct this review is then illustrated, outlining the systematic inclusion and exclusion criteria for the literature analyzed in this paper. The point of departure and the contributions of this paper are presented to highlight the critical issues faced by minorities in construction, as described in the existing literature. The Results and Discussion section respond to the research questions by outlining the “who”, “how”, and “what” of racial disparities produced by systemic racism by responding to each of the research questions presented in the manuscript. The VOS mapping technique is utilized to explore the interconnectivity between selected articles on systemic racism, education, and workforce. This technique has been successfully employed by previous researchers and represents a useful tool for elaborating the findings of literature review papers through bibliometric mapping [28,29]. Finally, the limitations of the research are illustrated before presenting the conclusion and the need for future study in this area.

2. Research Goal and Questions

The main goal of this study is to investigate the existing racial disparities in the U.S. construction educational and workforce domains produced by systemic racism. Particularly, the focus of this study centers on identifying the causes and effects of systemic racism for persons who will become employed (e.g., students, apprentices) in the U.S. construction domain and how it will affect them as they transition into the construction workforce (e.g., laborers, project managers). Additionally, this paper also discusses practices to alleviate the effects of racial disparities in education institutions (e.g., universities, colleges, training centers) and companies. Based on this focus, this literature review aims to explore the following four research questions centered around racial disparities caused by systemic racism in the U.S. construction educational and workforce domains:

- Research Question #1: Who is affected by systemic racism in the U.S. educational and workforce construction domains?
- Research Question #2: How are people impacted by systemic racism in the U.S. educational and workforce construction domains?
- Research Question #3: What are the ideologies that support systemic racism in the U.S. educational and workforce construction domains?
- Research Question #4: What strategies are being used to address systemic racism in the U.S. educational and workforce construction domains?

3. Methodology

This study used a systematic literature review method that followed the guidelines provided in the updated Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) 2020 [30]. The PRISMA methodology utilizes a three-phase process for conducting literature reviews that include: (1) Identification, (2) Screening, and (3) Inclusion. Figure 1 illustrates the systematic approach used in accordance with the PRISMA review protocol and demonstrates the literature review process for this study. The PRISMA method offers an organized protocol to identify, screen, and select relevant studies to include in systematic reviews, answering research questions that can only be investigated via understanding the state-of-the-art advances in a topic across multiple studies [30]. This review method has been successfully applied by previous researchers

in the construction domain, allowing for a thorough discussion of topics in the existing literature, while providing original contributions to the literature [31,32].

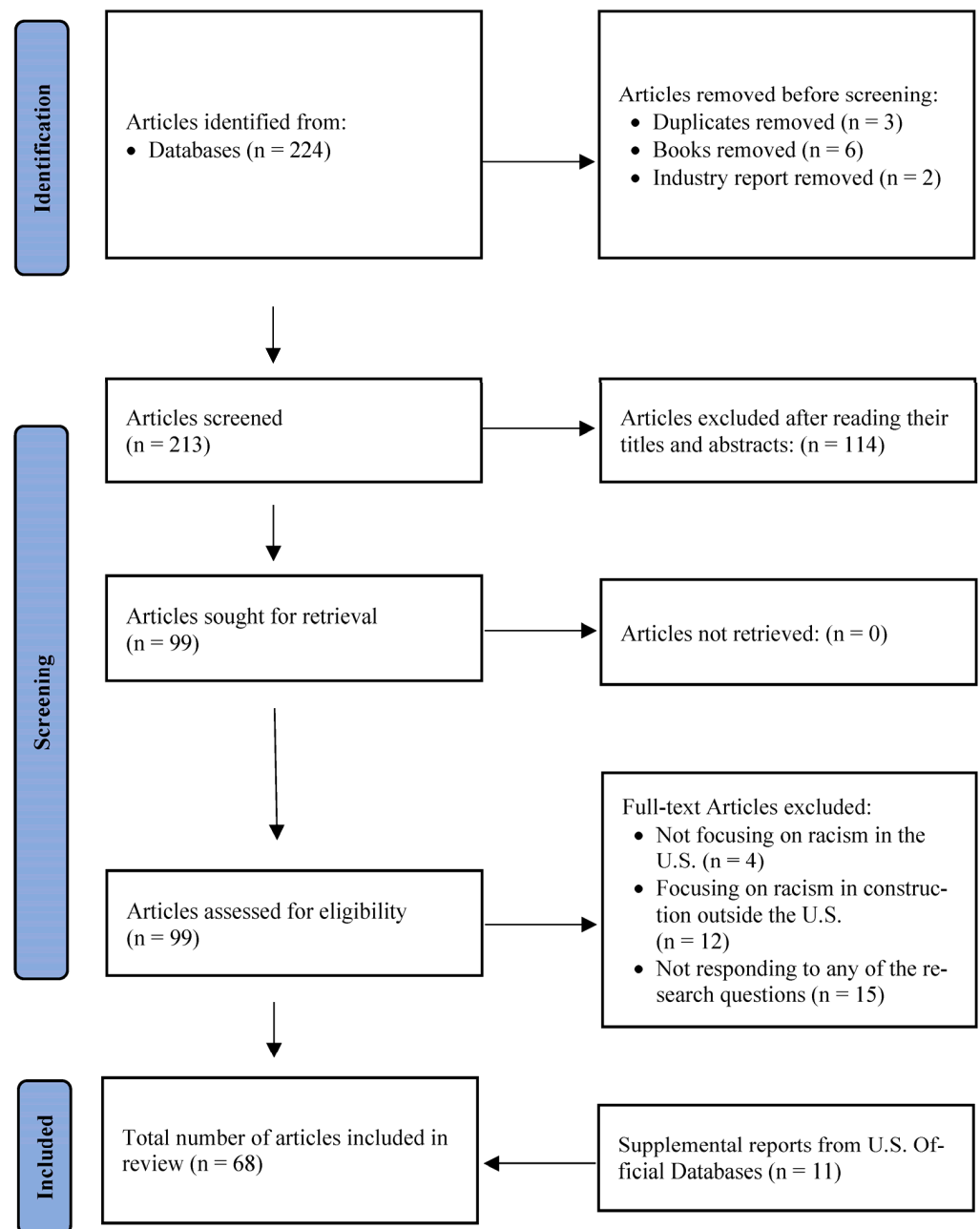


Figure 1. Adapted PRISMA flow diagram—systematic review search process.

To complete the systematic literature review using the PRISMA methodology (Figure 1), three phases were completed as follows:

Phase 1: Identification: This study aims to explore who, how, and what the racial disparities produced by systemic racism affect in the construction education and workforce domains. Additionally, it investigates what initiatives are being performed to alleviate the causes and effects of systemic racism in construction learning institutions and industry. Based on this focus, an electronic database search was performed to identify relevant articles that addressed aspects of this goal. Articles were collected from Google Scholar and Web of Science databases. The collected articles were found in the following publishers: JSTOR, Elsevier, SagePub, Taylor & Francis, Wiley Online Library, Associated Schools of Construction (ASC), SpringerLink, American Society of Civil Engineers (ASCE) Library,

and Institute of Electrical and Electronics Engineers (IEEE). To conduct the systematic literature review within these outlined databases, a search process based on keyword query combinations was used, as shown in Figure 2.

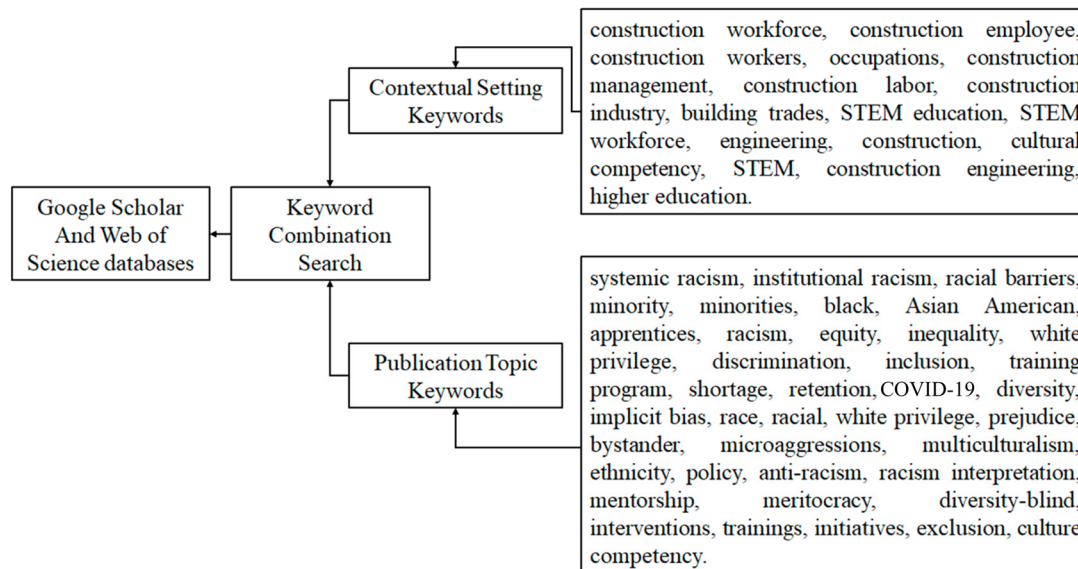


Figure 2. Research methodology—electronic database keywords combination search.

The keyword search process included combinations that limited the literature by two factors: (1) contextual setting and (2) publication topic. These two factors were linked by Boolean Operators such as “AND” and “OR” (Figure 2). Initially, the goal of the study and the research questions inspired the selection of contextual setting keywords and publication topic keywords, respectively. Alternative keywords were generated based on the findings from the articles reviewed during the identification process. The lists of contextual setting and publication topic keywords were iteratively adjusted until thematic saturation as defined by [33] was achieved. From this keyword search process, a total of 224 articles were collected. All collected articles were in the English language. Relevant articles were recorded in a list before being imported into EndNote software and following the PRISMA 2020 guidelines. Duplicates, books, and industry reports were removed before the screening. Six books and two industry reports were removed before the screening process was performed. Three duplicated articles in the database search were also removed. After removing duplicates, books, and industry reports, a total of 213 articles related to the goals and objectives of this study were found (Figure 1).

Phase 2: Screening: After completing the initial identification process, the resulting 213 collected articles were screened by reading their titles and abstracts. Articles that were found to be irrelevant to the goal of this study or those that failed to address the research questions were removed in this screening process. A total of 114 articles were removed after reviewing their titles and abstracts, resulting in 99 articles still being considered for further screening. To continue the filtering of the results from this search, inclusion criteria were defined by the research team, and only articles that discussed racial disparity, systemic racism, or racism in the construction industry at educational institutions or as part of industry practices in the U.S. were considered. The search for articles was not restricted in terms of the year of publication. Full-text articles found using these keywords and filters were first reviewed using their abstracts and titles to guarantee their relevance to systemic racism in the education and industry related to construction. A total of 99 full-text articles were retrieved and assessed to check whether they answered the research questions before being eligible for inclusion. Here, 15 full-text articles were removed because they did not directly answer the research questions. Four full-text articles that did not focus on racial disparity, systemic racism, or racism in the U.S. were excluded. Finally, twelve full-text

articles that did not focus on racial disparity, systemic racism, or racism in construction at educational institutions or as part of industry practices were also removed.

Phase 3: Included: As the outcome of Phase 1 and Phase 2 iterative processes, a total of 68 peer-reviewed articles that met the inclusion criteria were selected for inclusion in this study. All of these studies were read in full to answer the established research questions. The selected research studies were published between 1958 and 2022. Additionally, seven supplemental reports from U.S. official databases with the latest academic and employment data were consulted to complement the statistical information contained in selected articles. The explored database included: The Bureau of Labor Statistics (BLS), the U.S. Department of Labor, the U.S. Census Bureau, the Center for Construction Research and Training (CPWR), the National Science Foundation (NSF), the National Alliance for Partnerships in Equity (NAPE), the National Center for Education Statistics (NCES), and Statista Research Department (SRD). The data reviewed in these databases enable this study to present an in-depth discussion of the effects of systemic racism in construction education and the construction industry. The PRISMA Abstract Checklist and the PRISMA 2020 Main Checklist resources for this systematic literature review are available in the Supplementary Materials.

4. Point of Departure and Contribution

Researchers have established that increasing diversity, equity, and inclusion is beneficial for the construction domain [5,6]. There is an ever-growing body of literature that shows multi-dimensional issues in diversity, equity, and inclusion in construction, e.g., [9,34]. However, the notion that the racial disparities caused by systemic racism can affect this domain in U.S. educational institutions and workplaces is still not widely studied. The literature reveals how some people believe that the Title VII of the Civil Rights Act of 1964 ended or reversed the effects of systemic racism in the U.S. and that today we live in a “color-blind” era where factors such as hard work and accomplishments define everyone’s success in the construction domain [15,35–37]. However, the effects of racial disparities in construction education and the workforce continue to impact people in this domain. The starting point of this paper is to illustrate the challenges caused by systemic racism that affect people in institutions and organizations within the U.S. construction domain. By engaging in the discussion regarding the racial disparities caused by systemic racism in the U.S. educational and workforce construction domains, this paper aims to contribute to the current body of knowledge by outlining the critical issues facing minority students and professionals, as described in the existing literature. Furthermore, this paper also highlights the current strategies reported in the construction domain to reduce the effects of systemic racism across educational institutions and companies.

5. Results and Discussion

5.1. Overview of Selected Publications

A total of 68 research studies were included in this analysis following the previously described systematic literature review process. Table 1 illustrates the distribution of the journals and conferences from which the 68 articles were selected for review. The observed trends point to a few journals and conferences that tangentially discuss racial disparity, systemic racism, or racism in the U.S. construction education and workforce domains (e.g., Journal of Academic Radiology, Journal of Science Education, and Journal of American Sociological Review) but which are not solely centered on construction topics (e.g., sociology, medicine, and psychology). Moreover, the discussion of racial disparity, systemic racism, or racism is an emerging research topic in engineering disciplines that is infrequently explored in construction-related disciplines (e.g., civil engineering, architectural engineering, construction). Recently, it was observed that some journals and conferences, such as the Journal of Management in Engineering, the Journal of Construction Domain, and the Construction Research Congress, are starting to discuss the topic of racism in the construction industry. Nevertheless, no particular journals or conferences were found to

have a large body of publications on the topic of systemic racism and racial disparities in the construction domain.

Table 1. Selected publications.

| Journals or Conferences | Publication Number |
|---|--------------------|
| Journal of Construction Engineering and Management (CEM) | 3 |
| Journal of Management in Engineering (ME) | 2 |
| Journal of Academic Radiology | 1 |
| Journal of Studies in Philosophy and Education | 1 |
| Journal of Science Education | 1 |
| Journal of Economic Development Quarterly | 1 |
| Journal of Ethnic and Racial Studies | 1 |
| Journal of Pacific Sociological Review | 1 |
| Journal of Black Studies | 1 |
| Journal of American Sociological Review | 1 |
| Journal of Occupational and Environmental Hygiene | 1 |
| Journal of Sociology of Race and Ethnicity | 1 |
| Journal of Vocational Behavior | 1 |
| Construction Lawyer | 1 |
| College Student Affairs Journal | 1 |
| Journal of Construction Research Congress (CRC) | 1 |
| Policy Insights from the Behavioral and Brain Sciences (PIBBS) | 1 |
| Journal of Urban Affairs | 1 |
| Journal of Ethnic and Racial Studies | 1 |
| Geoforum Journal | 1 |
| The Journal of Negro Education | 1 |
| The Vermont Connection: Student Affairs Journal | 1 |
| Sociological Forum | 1 |
| Teaching in Higher Education | 1 |
| American Educational Research Journal | 1 |
| Educational Researcher Journal | 1 |
| Journal of American College Health | 1 |
| Journal of Analyses of Social Issues and Public Policy | 1 |
| Work, Employment, and Society Journal | 1 |
| 48th ASC Annual International Conference Proceedings | 1 |
| Policy Insights from the Behavioral and Brain Sciences Journal | 1 |
| Adult Learning | 1 |
| Labor Studies Journal | 1 |
| 50th ASC Annual International Conference | 1 |
| Medical Science Educator | 1 |
| BMC Medical Education | 1 |
| Professional School Counseling | 1 |
| Psychological Reports | 1 |
| 2010 IEEE Frontiers in Education Conference (FIE) | 1 |
| American Psychologist | 1 |
| Politics & Society | 1 |
| International Journal of Environmental Research and Public Health | 1 |
| Journal of Contextual Behavioral Science | 1 |
| Cost Engineering | 1 |
| Others | 21 |
| Total | 68 |

Although systemic racism has been an issue in U.S. society since its foundation [38], the earliest indication of its challenges was published in 1958. From 1958 to 2008, it was found that one paper was published roughly every other year on this topic (Figure 3). This can be associated with the ideologies of meritocracy and colorblindness that have reduced research attention regarding the effects of systemic racism on U.S. society over time [35–37]. Nevertheless, between 2010 and 2021, there was a noticeable increase in the number of

publications addressing the topic of racial disparities caused by systemic racism in U.S. society, STEM education, and workplaces, including the construction industry (see Figure 3). Particularly, a noticeable surge in publications was observed in 2020 and 2021 (Figure 3), immediately following the tragic death of George Floyd in the midst of the COVID-19 pandemic. This combination of events drew attention to both overt and subtle racism marked by protests against racial inequities and an emerging investigation of systemic racism in the U.S. [17,26]. Of the selected articles for this study, a total of 12 papers were published in 2020, and 10 more articles were published in 2021. These recent publications strive to understand how to increase the diversity, equity, and inclusion of racial minorities' education, discussing the available tools to address racial disparities in education and workplaces, such as anti-bias, awareness training, and intervention programs [27,39–41].

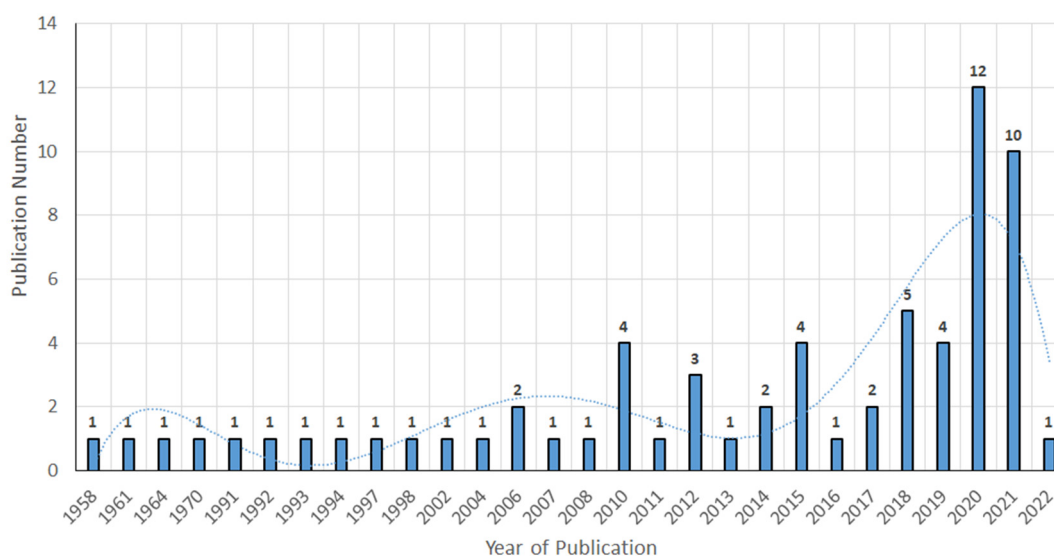


Figure 3. Selected papers by year of publication.

5.2. Keyword Co-Occurrence from Selected Publications

An analysis of keyword co-occurrence was performed using VOSViewer software to understand trends in selected articles over time. The VOSViewer software enables researchers to explore bibliometric networks by constructing visualizations of how publications are interconnected through nodes and links [28]. Figure 4 displays the bibliometric networks for the systematic literature review process completed in this study. The analysis revealed that articles published around 2020 and beyond frequently used keywords such as “education”, “construction workforce”, “STEM”, “diversity-blind”, “COVID-19”, and “minority” (see Figure 4). This observation of the keyword co-occurrences in Figure 4 reflects the recent direction that researchers in the U.S. construction field have taken, with an increased focus on studying systemic racism following the overt racist behavior observed during the COVID-19 pandemic. Furthermore, the analysis found that the keywords, “construction industry”, “education”, “STEM”, “white privilege”, and “minorities” are directly connected to the keyword “racism” (see Figure 4). This finding suggests that racism is prevalent in the construction industry and that it is related to issues such as white privilege and to systemic barriers affecting STEM and the educational domain of construction. Such systemic racism is likely to reduce the number of minorities entering and remaining in this industry.

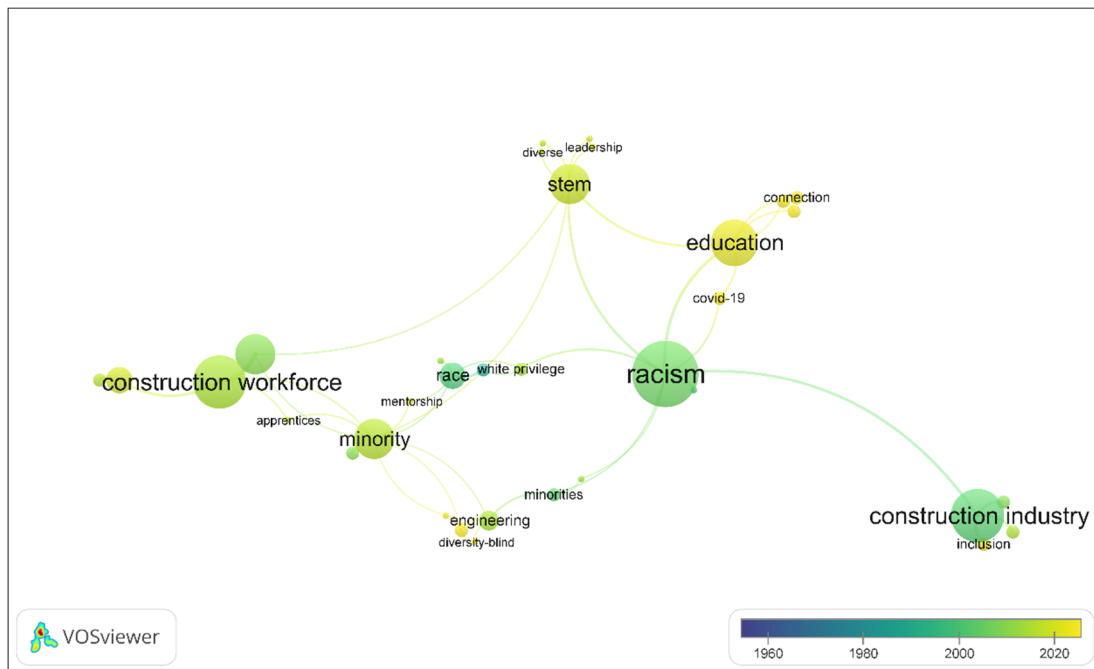


Figure 4. Keyword co-occurrence in articles (1958–2022).

RQ#1. *Who is affected by systemic racism in the U.S. educational and workforce construction domains?*

Current trends in educational enrollment and graduation in the U.S. construction education demonstrate major challenges for minorities to participate in the domain. Minorities have been found to be less likely to choose and stay in construction careers at educational institutions [9]. The enrollment of students in higher education toward careers in construction shows significant racial disparities [42,43]. White Americans constituted 72.8% of all construction managers who were awarded degrees in 2020, while Hispanics (10.5%), African Americans (5.03%), Asian Americans (1.79%), American Indian or Alaska Native (0.46%), and Native Hawaiian or other Pacific Islanders (0.20%) represented a very small portion of degrees awarded [43]. These patterns in higher education can also be found within construction trade education. The latest reports by the Department of Labor highlight significant differences across racial groups in apprenticeship programs. White American apprentices who completed their apprenticeship training in 2020 accounted for 62% of all trade graduates. On the other hand, Hispanics (25%), African Americans (10%), Asian Americans (2%), and Native Hawaiian or other Pacific Islander Americans (1%) achieved much lower completion rates [43]. These numbers in educational attainment point to systemic issues that potentially cause a reduction in the number of minorities currently joining the U.S. construction domain. Similar to other domains such as science, engineering, and mathematics, these low numbers of engagement in the construction discipline can be potentially explained by a lack of diversity, a lack of sense of belonging, and exclusion of minorities from opportunity issues [6,26,44]. Moreover, it is also possible that meritocracy and colorblindness ideologies that perpetuate racial disparities have also influenced these numbers for educational attainment in the construction domain [21,35,45].

Exclusionary practices and ideologies have influenced the underrepresentation of minorities in the construction domain, affecting employment education and industry representation in the United States. Employment rates of minorities in construction show potential signs of inequitable opportunities in the workforce. In 2021, the U.S. Bureau of Labor Statistics highlighted that, among the total employed persons in construction, White Americans represent over 80% of the workforce, with Hispanics (30%) in second place, and small numbers of African Americans (6%) and Asian Americans (2.1%) [45]. It is important

to point out that Native American and Pacific Islander Americans' employment numbers are not reported in the construction domain [46]. Additionally, construction is an industry where minorities are more likely to be in low-paying positions [18]. Potential indications of these trends can be found in the lack of representation of minorities in managerial roles in Architecture, Engineering, and Construction (AEC). The U.S. Bureau of Labor Statistics in 2020 showed that architectural and engineering managerial roles mostly comprised White Americans (81.5%), while Hispanics (6.7%), Asian American (11.8%), and African Americans (6%) only represent small proportions of the workforce at this level of employment [47]. Data on Pacific Islander Americans and Native Americans were not reported, indicating that there is a very small representation in the construction domains. Similarly, the number of construction managers also predominantly comprised White Americans (90.9%), with few Hispanics (13.9%), African Americans (3.5%), and Asian Americans (2.5%) [47]. Once more, data on the construction management positions of Pacific Islander Americans and Native Americans were not reported. Moreover, 85.3% of White Americans made up the construction laborer workforce, followed by 46.7% Hispanics, 8.6% African Americans, and 1.6% Asian Americans [47]. Among electricians, White Americans represented (67.9%) of the workforce, followed by Hispanics (11.6%), African Americans (7.04%), Asian Americans (1.79%), American Indians (0.17%), Native Hawaiians and Pacific Islander Americans (0.15%), and Alaska Native Americans (0.01%) [48]. Firstline supervisors of construction trades and extraction workers were also predominantly composed of White Americans (70.2%), followed by Hispanics (13%), with small numbers of African Americans (4.81%), Asian Americans (0.89%), American Indians (0.53%), Native Hawaiians and Pacific Islander Americans (0.13%), and Alaska Native Americans (0.03%) [47]. Among carpenters, White Americans made up 53.4% of the workforce, followed by Hispanics (20.3%), African Americans (4.72%), Asian Americans (1.29%), American Indians (0.56%), Native Hawaiians and Pacific Islander Americans (0.17%), and Alaska Native Americans (0.05%) [48]. These racial disparities in employment discourage construction minority students from entering and staying in the industry.

Trends point to a disproportionately high number of White Americans enrolling in and graduating from educational institutions compared to minority groups [42,43]. Moreover, White Americans have easier access to career opportunities in the construction domain compared to racial minorities [15,49]. These racial disparities within the construction domain negatively translate into a low representation of minorities in construction education and in the workplace. Ultimately, racial disparities discourage minorities from joining and staying in the construction domain, as observed in the latest reports by multiple governmental agencies [6,9,10]. To alleviate the effects of these racial disparities caused by systemic racism, concentrated efforts are required to create a more diverse and inclusive culture within the construction domain.

RQ#2. *How are people impacted by systemic racism in the U.S. educational and workforce construction domains?*

Racial disparities caused by systemic racism impact minorities within the educational domain of construction (e.g., students, apprentices) in several ways. One of the significant impacts experienced by minorities is their underrepresentation in educational institutions, creating a leaky pipeline comparable to other STEM domains [9]. Academic meritocracy and color blindness ideologies affect minorities by reducing their opportunities to access education to advance their careers [21,45]. Construction-specific academic institutions perpetuate racial disparities by presenting messages and imagery that reinforce stereotypes and oppression (e.g., displaying minorities as tokens, highlighting minorities in low-wage and -skill positions, and a lack of representation of minorities as faculty members, successful practitioners, or financial donors), without recognizing the effect of these on students and faculties [50]. The racial injustices pervasive in the construction domain have created a racialized expectation that makes it hard to attract and retain minority students in construction education environments [10]. Furthermore, the severe lack of representation of

minorities in construction education creates fewer opportunities to connect with meaningful mentorship opportunities. Findings for STEM careers that include all construction disciplines (e.g., civil engineering, architecture, construction) have shown mentorship to be one of the most effective strategies to attract or retain students in STEM [49]. In particular, it has been found that this mentorship relationship works better when both the mentee and the mentor share the same identities, which is still a challenge in construction given the minority underrepresentation [10]. Ultimately, STEM institutions have been criticized for being reluctant to recognize structural racism in most of the existing STEM academic and workforce institutions [49].

Systemic racism negatively affects minorities in the construction educational domain as they transition into the construction workforce. The underrepresentation of minorities is not only prevalent in educational institutions but also in the construction industry across all roles. Minority students are less likely to choose and stay in construction careers regardless of their training level or educational attainment [9,10]. Research has shown that opportunities in the construction industry are not the same for everyone, with minorities being assigned to the least desirable jobs and excluded from managerial roles [9,21–24]. Moreover, the safety of racial minorities in workplaces is often compromised due to stereotyping [6]. Researchers have established that the odds of construction-work-related injuries for minorities are 70% higher than for White American employees [7]. Moreover, in the construction industry, emerging studies demonstrate that the lack of diversity and inclusiveness has dramatic financial implications. Construction companies that have diverse employees and managers produce higher gains than their counterparts led by racially homogeneous professionals [6]. This financial effect is often explained by employees' lower performance and lower retention rates due to a lack of sense of belonging and racially related stress in their work environments [6]. Diversity, equity, and inclusion are recognized in construction as key to overcoming labor shortages, increasing competitiveness, and improving jobsite safety [5–8]. Therefore, making efforts to address racial disparities issues affecting minorities in the educational domain of construction is not only ethical but also beneficial in the long-term to construction education and workplace organization.

Overall, racial disparities were reported more prevalently in articles about the construction workforce. The number of articles discussing racial disparities in the construction workforce ($n = 43$) was almost double that discussing racial disparities in construction education ($n = 25$). These trends can be explained by the lack of a sense of belonging and the threats of stereotypes experienced by minorities in the labor market [5,50,51]. A clear consequence of these issues can be observed in the data and the literature that point to the underrepresentation of minorities in construction, as reported by multiple U.S. agencies, including the National Center for Science and Engineering Statistics, the U.S. Department of Labor, and the U.S. Bureau of labor statistics [2,22,43].

RQ#3. *What are the ideologies that support systemic racism in the U.S. educational and workforce construction domains?*

The construction education and workforce domains have demonstrated the use of exclusionary practices and ideologies throughout U.S. history. Minorities dominated construction before the Civil War, but the introduction of unions by White immigrants after the war established a color line that excluded minorities from jobs, fair wages, and training opportunities [52,53]. Public institutions and private enterprises supported the explicit segregation and exclusion of minorities in the U.S. construction domain until the Civil Rights Act of 1964, where Title VII outlawed racial discrimination in employment [35]. With the lack of enforcement of the 1964 Civil Rights Act, many U.S. construction unions refused to implement the Title VII regulations against discrimination [52,54]. Even after the enforcement of the Title VII regulations by the Federal Government through the 1972 Equal Employment Opportunity Act, U.S. construction unions discriminated against minorities via explicit exclusionary policies [20,23]. During the 1980s and the 1990s, minorities in the U.S. construction domain continued to decline as the industry hiring and training policies

disproportionately benefited White Americans [19,55]. At the end of the 1990s, Hispanic workers within the labor force significantly increased compared to other minorities [56]. However, Hispanics mostly remain in the lower-earning jobs in the construction industry [57]. This historical legacy of societal inequities has contributed to the establishment of systemic racism in the education and workforce of U.S. construction domains. The U.S. construction domain is perceived as an industry where race is not a factor influencing individual success, work practices, or access to the industry [25,58]. However, there are well-documented ideologies that have led to policies and practices that perpetuate stereotypes, prejudice, and discrimination toward minorities seeking to enter or remain in U.S. construction occupations. Similar to other STEM fields, researchers have identified two ideological trends that support racial disparities in the U.S.: meritocracy and colorblindness. The following is a description of how each of these ideologies affects minorities in the construction educational domain.

(1) Meritocracy: The idea of hard work (e.g., long hours, physically and cognitively demanding, highly skilled) is central to the culture and ethos of the U.S. construction domain [37]. However, the value and merit of people of color are doubted and disregarded through stereotypes that are deeply entrenched in the domain. According to racial stereotypes, African Americans are considered lazy, untrustworthy, and lacking “natural abilities” [58]; Hispanics are considered “laborers only”, as well as cheap and docile workers [59]; Asian Americans are considered “robotic” and “emotionless workers” [60]; Pacific Islanders and Native Americans are considered “mascots” and “tokens” that do not belong in the workforce, outsiders and unreliable [44,61,62]. These stereotypes expressed by some White Americans aim to foster a feeling of superiority for maintaining racial dominance while placing minorities as subordinates, different from the prevalent culture and work ethos [63]. Due to the existing prejudice towards minorities, the U.S. construction domain has become characterized as a “good old boys club” where White Americans employ their influential networks (social and financial) to perpetuate racial inequity [25]. These networks create a gatekeeping mechanism that stratifies the domain into those who have access to training, financial assistance, and connections for career advancement, leaving minorities outside of the system. Within these networks, minorities are perceived as outcasts, unworthy of the hard-earned benefits of White American experts [25,58].

(2) Colorblindness: Construction in the U.S. is viewed by some people as a race-neutral domain, adhering to ideologies of self-reliance and a strong work ethic that determines success in the field [11]. However, this colorblind perception affects (1) educational institutions and workplace culture and (2) hiring practices and career advancement opportunities for minorities transitioning into the U.S. construction domain. First, the culture of construction domain learning institutions and workplace organizations proclaims to have zero-tolerance policies for racism but allows discriminatory and/or harassing behaviors through the explicit casualization of racism without repercussions [25,26,58]. The literature points to the legitimization of discrimination in U.S. construction educational institutions and workplace organizations, made invisible via normalization practices (e.g., assumptions of ignorance or innocence by perpetrators, jokes, or “rough-play” that are a natural part of the conversation). Second, hiring practices and career advancement opportunities in the U.S. construction industry are tied to the social networks available to people. The U.S. construction domain is perceived to provide equitable opportunities for all. However, minorities remain disadvantaged due to their limited connections and explicit exclusion from the system (e.g., no role models, lack of sense of belonging, and exclusion from opportunities) [11,44,49].

The findings from prior researchers show evidence that overt and subtle racism is present within the construction domain [25,26]. It is important to recognize that the overt and subtle racism that produces racial disparities is tied directly to the exclusionary practices and ideologies resulting from systemic racism that is embedded within the U.S. construction domain [37,59]. These practices and ideologies are connected to the existing underrepresentation of minorities in the construction domain [13]. It is recommended

that researchers explore racial disparity topics and clearly discuss how ideologies such as meritocracy and colorblindness connect with the theoretical framework of systemic racism to facilitate the detection and rejection of racist outcomes in construction education and workplaces [10].

RQ#4. *What strategies are being used to address systemic racism in the U.S. educational and workforce construction domains?*

Recently, there have been advancements in U.S. educational institutions and construction workplace organizations to sustainably tackle racial disparities and systemic racism. Table 2 demonstrates examples of U.S. education and industry initiatives to alleviate the effects of systemic racism using multiple strategies such as different training approaches and interventions. After the tragic death of George Floyd in 2020, several U.S. construction educational institutions and workplaces have required their members to undertake anti-bias training programs [41]. Educational institutions all across the U.S. where construction programs are hosted have made considerable efforts to eradicate systemic racism. There are initiatives that utilize courses [64], interventions [65], workshops [27], and training approaches [38,66] to address racism on campus. In particular, educational institutions have embraced implicit bias training for faculty, students, and staff to address racial disparities. Comparably, in construction companies, the most common type of program for addressing systemic racism utilizes implicit or unconscious bias training, aiming to help professionals recognize their biases and provide tools that can help eradicate racism, increase diversity, and improve employee morale within the industry [6]. This training strategy has been increasingly applied in many workplace contexts, with multiple companies offering anti-bias educational programs (e.g., Traliant[®]; Hone[®]; Emtrain[®]). Table 2 summarizes the most commonly observed methods described in the existing literature for tackling systemic racism in the education and workforce domains of the construction industry.

Despite ongoing efforts by academics and practitioners, e.g., [67,68] to develop initiatives such as training, courses, workshops, or interventions aimed at sustainably reducing the racial disparities caused by systemic racism, the findings from this literature review suggest that much work is still needed. Specifically, there appears to be a low adoption rate of such strategies across the articles included in this study. Out of the published studies that discuss initiatives implemented by educational and workplace and construction organizations to address systemic racism, only 2.7% of those organizations in education ($n = 4$) and 3.4% of those organizations in the workplace ($n = 5$) indicate the use of one of the described initiatives, as outlined in Table 2. These findings underscore the limited usage of such approaches and the urgent need for greater attention to be paid to such strategies in order to foster diversity, equity, and inclusion in the construction domain [35].

Table 2. Initiatives being used to address systemic racism in U.S. education and industry.

| Initiatives | | How Systemic Racism Is Being Addressed | Sources |
|--------------------|---------------------|--|---------|
| Educational Domain | Training Approaches | <ul style="list-style-type: none"> • Conducting a racial implicit association test (IAT) among students. • Training students on implicit bias and how it affects their domain and contributes to disparities. • Using mindfulness techniques to help students recognize their own biases and improve their reactions to racial biases through other perspectives. | [39,66] |
| | Courses | <ul style="list-style-type: none"> • Course exploring societal, personal, denial, and the “Bad Guy” factors to learn about modern racism, and how these factors could be associated with understanding white privileges. | [64] |
| | Interventions | <ul style="list-style-type: none"> • Discussions to assess whether intentional national members contribute to racism at the university. | [65] |
| | Workshops | <ul style="list-style-type: none"> • Workshop on microaggression to increase intergroup connectedness and reduce colorblind attitudes. | [27] |

Table 2. Cont.

| Initiatives | How Systemic Racism Is Being Addressed | Sources |
|--------------------------------|--|-----------|
| Training Approaches | <ul style="list-style-type: none"> • Training employees on diversity, inclusion, and cultural awareness. • Evaluating unconscious bias in workplaces. • Discussing symbolic/modern/colorblind, aversive types of racism, as well as enablers and obstacles to bystander anti-racism. | [67–69] |
| Workplace Domain Interventions | <ul style="list-style-type: none"> • Conducting micro-intervention dialogues among targets, allies, and bystanders to address microaggression. • Coming up with new strategies and tactics to disarm microaggression. • Examples of new strategies taken at some workplaces: implementing a zero-tolerance policy and orders to remove any racist people or symbols from jobsites such as confederate flags or vehicles, etc. | [6,26,70] |

6. Research Limitations

This research study had two limitations: (1) the systematic literature review followed PRISMA guidelines for keywords and review phases, and (2) there were limited existing studies on diversity, equity, and inclusion in the construction industry. First, the systematic literature review for this study was constrained by the identification, screening, and inclusion of PRISMA phases. The review processes were centered on the use of keywords to identify articles that discussed racial disparities, systemic racism, and racism within the U.S. educational and workforce construction domains. Consequently, if the keywords or the review phases used in this article are modified, it is possible that additional information about systemic racism can be found in the construction domain. Although this review is not a meta-analysis of all papers that focus on the construction industry, since it excluded all countries outside the U.S., it investigates aspects of diversity, equity, and inclusion, offering a rich perspective of the status quo regarding the framework of systemic racism. Second, through a systematic review of the existing literature, it was clear that research on the diversity, equity, and inclusion of racial minorities in the U.S. construction domain is largely limited. For this study, only 68 relevant articles were found. Because of this lack of research on the topic of systemic racism in the U.S. construction educational and workforce domains, many aspects of the impacts, ideologies, and practices of systemic racism might not have been documented yet. This paper is therefore limited to existing peer-reviewed articles that document the impacts of racial disparities and the strategies being used to disrupt them. As studies on systemic racism in the U.S. construction domain increase, the findings in this paper might change or be elaborated on by new research findings.

7. Conclusions and Future Study

This study aimed to explore the causes and effects of the racial disparities produced by systemic racism in the current U.S. construction educational and workforce domains. A systematic literature review methodology was used to identify the persons affected by racism, the impacts these persons suffer, the ideologies that support systemic racism, and the strategies being used in a sustainable manner to disrupt racial disparities in the U.S. construction domain. Through a keyword-based search and systematic review methodology following PRISMA guidelines, a total of 68 articles were reviewed and analyzed. The results show that systemic racism in the U.S. introduces severe challenges for racial minorities in construction, which is predominantly dominated by White Americans. Racial minorities in the U.S. are largely underrepresented in the educational and workforce domains of construction. While there are numerous articles highlighting the racial disparities stemming from systemic racism in the field of construction education, the majority of the articles included in this systematic literature review center around the construction workforce. Moreover, it was observed that the historical racial stereotypes in the U.S. have hampered the diversity and inclusion of racial minorities, perpetuated through meritocracy and color-blindness ideologies in construction education institutions and the workplace. There is a

rising number of publications working towards understanding the diversity, equity, and inclusion of racial minorities in U.S. construction education and workplace organizations. Moreover, tools such as anti-bias training programs and awareness are being developed by academics, and industry practitioners recognizing the problems with systemic racism faced by the U.S. construction domain. However, there is still a considerable gap in knowledge of how to attract and retain minorities in construction and what role systemic racism plays in this area of research. Similarly, the impact of racial disparities in the employment and retention of construction domain students in the workforce is important, as the demand grows for a professional workforce at all positions (e.g., laborers, managers, engineers).

Future research should be performed to understand the mechanisms of racial disparities and systemic racism that can sustainably prevent the employment and retention of minorities in the U.S. construction domain. Furthermore, research needs to be conducted to understand the intersectionality phenomena between race, gender (particularly women in construction), persons with disabilities, and members of the LGBTQ+ community in relation to U.S. societal structural challenges. Racial minorities in these three categories may be affected differently and might experience large variations of how they are affected by racism. Finally, future research should be conducted to investigate the development of sustainable and effective interventions (e.g., anti-bias training) to disrupt the existing racial inequities in the education and workforce domains of the U.S. construction domain that continue to sustain systemic racism.

Supplementary Materials: The following supporting information can be downloaded at: <https://www.mdpi.com/article/10.3390/su15075646/s1>, PRISMA Abstract Checklist; PRISMA 2020 Main Checklist. Reference [30] are cited in the Supplementary Materials.

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