Professional Identity Formation and Development in HBCU Construction Students

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An Examination of Professional Identity Development in HBCU Construction Students

Abstract: Workforce shortages, lack of diversity, and challenging student transitions from college into the construction profession remain a huge concern. There is the need for construction educators to target, attract, and prepare minority students who persist into construction professional roles and contribute to industry advancements. Identity theories emphasize that students' lived experiences shape their professional identity development processes and career decisions; and, in the long-term, influence students' persistence and career success. Construction students with strong professional identities are likely to persist and have smoother transitions into construction professions (CPs). However, little is known about the lived experiences of construction students, particularly students at historically black colleges and universities (HBCUs); and, how these experiences influence their construction professional identity development (CPID). Consequently, the purpose of this research was to gain insights into HBCU students' lived experiences and how their CPID evolved across four educational stages. Using a self-reporting survey instrument in a mixed methods approach, 45 HBCU construction students described experiences that influenced their CPID and rated their own CPID using a five-point Likert scale. Data analysis involved weighted means and descriptive analysis of frequently occurring words and emerging thematic categories. T-tests were used to assess the statistical significance of differences existing between different categories of students.

Results showed that across the four educational stages, seven thematic categories (technology, engineering, science, fine/performing arts, sports, arts, and non-degree) of evolving career interests emerged from the data analysis. Majority of CP career decisions occurred at the middle-school age, making it a critical time to introduce age-appropriate construction learning opportunities. The six thematic categories that emerged from students' reasons for switching career interests were psychological, experiential, academic, physical, social, and economic; and these reasons corresponded with the educational stages. While pre-college reasons for switching career interests were mostly associated with new knowledge and experiences, college reasons were associated with barriers that hindered students' progression. HBCU construction students had positive perceptions of their own CPID with a high sense of belonging, self-efficacy, and self-recognition. CPID was neither gender nor classification dependent. However, it was most influenced by personal, academic, and industrial experiences. Furthermore, students indicated a strong preference for hands on activities, industry connections, and instructor preparation because these enhanced their CPID.

Empirical findings provide insights into CPID to inform educational practices and policies for the early targeting, attraction, preparation, and persistence of construction students, particularly at HBCUs. In the long term, effective practices and policies could increase the quantity and quality of CPs towards a more competent and diverse workforce for the development of 21st century built environments.

Introduction

The U.S. Department of Labor projected an 11% employment growth from 2016 to 2026 making the severe workforce shortages of the construction industry a nationwide crisis [1] [2][3][4]. Coupled with workforce shortages, lack of diversity and challenging student transitions into the construction profession remain a huge concern. These emphasize the need for construction educators to attract and prepare minority students who persist into construction professional (CP) roles towards a more competent and diverse construction workforce for improved 21st century built environments [4]. CPs play a critical role in the design, engineering, planning, development, management, operation, maintenance, sustainability, deconstruction, and demolition of built environments. The dynamic and competitive construction industry is fast progressing with recent adoptions of building information modelling, drone technologies, robotics, artificial intelligence, digitization, and complex project delivery systems [4][5]. Consequently, CPs receive specialized undergraduate STEM education and professional licensures to prepare them for CP roles. These are mostly through four-year undergraduate construction science, engineering, and management programs [5][4][6].

There are concerns that preparation of undergraduate construction students and their transitions to CP careers can be improved, as some construction students face serious challenges resulting in their poor performance and low construction professional identity development (CPID). In order to advance CPID in construction students, educators and policy makers need a deeper understanding of students' lived experiences and how these experiences influence students' CPIDs. Specifically, insights into HBCU students' CPIDs will contribute to improved diversity in the construction workforce. However, very little is known about the CPIDs of construction students, particularly at HBCUs. Research is critical to provide insights into the formation and evolution of CPIDs to inform the attraction, preparation, and transition of construction students into CP roles. Evidence-based recommendations will inform the development and implementation of learning experiences and environments that will advance CPIDs and eventual transition into CP roles. In the long term, improvements in students' CPID will increase the quantity and quality of construction graduates towards a more competent and diverse workforce for the development of 21st century built environments.

Professional identity is a combination of professional (roles, decisions, ethics) and personal selves (values, morals, perceptions) [7]. Professional identity development (PID) in students is a dynamic process as a novice student compares new inputs from training and professional associations with previous views; and upon, various levels of internalizations, the professional identity may be accepted or rejected [7][8]). PID in students involve students' beliefs of their own performance / competence, interests in the profession, and feelings of recognition by significant others. It is the successful integration of personal attributes and professional training in the context of a professional community [9][10][11][12]). Identity refers to the meanings that define one who is an occupant of a particular role in a society, a member of a particular group, or claims particular characteristics that identify him or her as a unique person [13]. This definition is adopted as it places emphasis on the meanings and interpretations of an individual and how that individual makes sense of his or her experiences and their outcomes, and change behavior and values to associate or disassociate with a particular group. The four constructions in the identity framework include: (1) nature identity (a natural state); (2) institution identity (a position); (3) Discourse identity (an individual trait); and (4) affinity identity (shared

experiences) [14]. Notably, social interactions influence identity salience, which changes over time, if there are shared self-meanings with new and counter roles. Socialization is the social learning process by which a person acquires the specific knowledge and skills required for a professional role and plays an important role in shaping PID [15]. The realization and internalization of the connection between an individual and professional self - the ontological dimension of professional development is critical for transitions into professional roles and revolves around self-labeling as a professional, integration of skills and attitudes as a professional, and a perception of context in a professional community [16][9][8].

Children typically progress through various developmental stages from their childhood career interests towards their final careers and professions in adulthood [17]. According to the Gottfredson's Theory of Circumscription and Compromise, career focused thinking changes and develops with early elementary aged children making career decisions based on gender stereotypes [18]. Researchers suggest that children start assessing their various career options as early as the 5th grade, and make strong career interest decisions by the 8th grade [19][20]. PID theories focus on the process by which students come to see themselves as professionals and consider the possibility of pursuing and becoming that professional [14][21][22]). A framework for professional engineering identity development in women developed by Capobianco characterized four ways to view identities in becoming engineers as: 1) self-beliefs in who they are as students (academic identities; 2) perceive themselves as performing well in their courses, 3) understand the work of engineers, and 4) see the work of engineers as desirable for them [22].

The current theory-practice gap which exists in many undergraduate programs can be bridged with additional PID research on the process of internalization whereby a construction student comes to think, act, and feel like a CP. PID is emerging as a complementary and crucial element to meaningful and lifelong professional growth as characterized by competence, performance, use of professional terms, participation in professional activities, recognition by significant others, preparation to take professional exams, awards, and self-declaration, mentoring of others [10][23][24][25]. PID research is critical to gain insights into how students' thinking and behavior changes across time towards becoming professionals and has been conducted in several gender and discipline related studies including education, nursing, and science [26][27]. However, no research was found to have assessed PID towards CPs. Due to industry, work place and discipline differences among STEM professions, it is expected that PID towards STEM disciplines such as construction professions are unique and different from other STEM disciplines. Furthermore, few research studies have been conducted to assess the impact of both formal and informal learning strategies on construction career interests and learning [28][29][30][31]. To date, very little is known of the PID processes by which children transition to become CPs. The lack of progress in the construction industry has been attributed to the lack of fundamental research supporting the industry worldwide, and damaging its capacity to keep up with innovations [5]. Researchers who employ social practice theories of learning emphasized that an understanding of identity development opens up new ways of teaching and designing learning environments [32][9][10][25]. Insights into PID processes inform intentional strategies to advance PID, which is associated with persistence and career success [9][33]. Empirical findings from PID research will guide construction educators and policy makers towards decisions and practices that will support the effective identification, motivation, preparation, retention, graduation and transition of students into construction professions. Consequently, the

purpose of this research study was to gain insights into construction students' lived experiences that influence their CPID. Specifically, this present research study involves an examination of the personal and academic experiences of HBCU construction students that influenced their CPID across four educational stages (elementary, middle, high, and college). To this effect, the research questions are as follows:

1. How do construction career interests evolve across four educational stages?
2. What factors influence HBCU students' career interest changes towards construction careers?
3. How do undergraduate HBCU construction students' perceive their own CPID?
4. What factors influence the progression of HBCU undergraduate construction students' CPID?

Methods

This mixed methods study involved the administration of a self-reporting survey instrument to 45 construction students at an HBCU in the southeastern region of the United States. Data from survey sections 1, 4, 5 and 6 are reported in this proceeding. Section 1 requested for background information to include gender, GPA, classification, construction experience, and leadership. Section 4 requested for factors that impacted career interest changes from elementary to college educational stages. Section 5 requested respondents' self-assessment of 40 CPID items using a five-point Likert scale. Section 6 required responses to open ended questions describing experiences that strengthened CPID, and recommending strategies that will enhance CP educational experiences. Data analysis involved weighted means and descriptive analysis of frequently occurring words and emerging thematic categories. T-tests were used to assess the statistical significance of existing differences within the data.

Results and Discussions

Description of Population

The survey instrument was administered to 45 students; however, due to missing data 44 completed surveys were used for data analysis. Respondents consisted of freshmen (18%), sophomores (47%), juniors (22%), seniors (13%), and females (20%). Seventy-three percent (73%) had GPAs exceeding 2.5 on a 4.0 scale, while 75% had some form of industrial experience ranging from internships to full-time employment.

Research Question 1. How do construction career interests evolve across four educational stages?

Seven thematic career interest categories (CIC) emerged from the data during the descriptive analysis of the evolving career interests of the respondents across their four educational stages resulted in (Table 1). For additional insights, results from the analysis of the early college year career interests of respondents and their current career interest choices are separated.

Elementary school stage: While 73% of respondents had between one and four career interests at the elementary school stage, 27% of the respondents had no career interests because they had either grown in environments where future career interests were not emphasized or were not

curious about careers at that age. Initial career interests were mostly in STEM disciplines. Respondents were influenced by the level of exposure received from elements in their immediate physical and virtual environments to include toys, movies, cartoons, documentaries, buildings, community engagements, as well as professions and guidance from significant others such as family members, teachers, and doctors. For example, police and fireman truck toys, as well as movies inspired students to be interested in non-degree careers such as police. Natural skills, passion, and fascination with celebrity status and stirred up sports career interests.

Table 1. Percent of respondents in career interests categories (CIC) across educational stages

Career interest	Elementary (%)	Middle (%)	High (%)	College (Early) (%)	College (Current) (%)
CIC1. Technology	32	45	70	98	100
CIC2. Engineering	25	20	23	11	0
CIC3. Science	23	9	7	2	0
CIC4. Sports	16	16	2	2	0
CIC5. Fine or Performing Arts	11	5	5	0	0
CIC6. Arts	9	9	7	9	2
CIC7. Non-degree	11	0	0	0	0
No career interest	27	9	9	2	0
One career interest	25	43	68	75	98
Two career interests	43	41	23	20	2
Three career interests	2	7	0	2	0
Four career interests	2	0	0	0	0
Mean number of career interests per respondent	1.27	1.45	1.14	1.23	1.02

STEM career interests at one point at this early stage set early pathways towards CP careers. Notably, arts career interests are lowest as students with these interests do not typically progress into STEM careers such as CP careers. Thirty-two percent (32%) showed some direct interests in technology (mostly construction) careers as evidenced in their interests in becoming builders, constructors, interior designers, and information technology experts. Other technology interests were towards information technology careers. These early construction career interests provided the earliest signs of CPID. Early CPID was primarily inspired by construction toys, construction documentaries and tv shows, construction videos, family members, role models, or observation of completed buildings or buildings in progress. These different experiences gave children early exposure to construction careers and captured their early interest in CPs.

Middle-school stage: The percentage of respondents with no career interests reduced from elementary school (27%) to middle school (9%), while the mean career interests per respondent increased from elementary ($\bar{x}$ = 1.27) to middle school ($\bar{x}$ =1.45). This is attributed to the fact that middle-school children are becoming increasingly aware of potential careers and become more active in exploring their career interests. Significant shifts from elementary to middle school are observed with a 13% increase in technology (construction) career interests accompanied with reductions in engineering, science, and fine/performing arts careers (Table 1).

While technology career interests at the elementary school stage consisted of construction and information technology interests, they were all construction interests at the middle-school stage. This is because middle-school students have gained additional knowledge and experiences that have caused them to consider the differences existing between competing construction careers interests and their previous career interests. Forty-five percent (45%) of the respondents made final decisions regarding pursuing a construction professional career when they were in middle-school, making middle-school age a critical age where students begin to finalize construction career decisions [19][20]. By middle-school, career interests in non-degree careers are non-existent because of students' increased awareness of the lower salaries and higher risks associated with non-degree careers such as policing and firefighting. Due to childhood toys, cartoons, and fantasies, elementary school children are initially drawn to firefighter and police careers; however, these interests are eroded as they are exposed to other careers with less risks and more salaries. Overall, an increase of elementary school career interests in sports and arts remain stable at 16% and 9% respectively, and they persist to middle school. Students maintain interests in sports due the continued attention given by society to sports celebrity status, making sports very attractive to middle school children. Also, there are many sports programs available at middle-schools, as well as off-campus sports programs that maintain sports career interests at the middle-school stage.

High school stage: At a mean career interest of 1.14 careers per respondent, the high school is the most stable educational stage when it appears that students are settled in their career interests and about 68% of the respondents have only one career interest at this stage (Table 1). An increase in construction career interests is noted as 70% of the respondents indicate strong interests in professions such as contractor, real estate, construction manager, and construction engineering. This shift is mostly associated with reductions in previous sports career interests, as there is a notable drop in sports career interests from middle-school (16%) to high school (2%), as students become increasingly aware of some challenges to their sports career goals. Changes in career interests associated with science, engineering, and arts are minimal, with no change observed in the percentage of respondents interested in fine and performing arts.
College: During the early college years, most of the respondents showed interest in technology, engineering, science, sports, and arts (Table 1); however, 2% of the respondents indicates that they have no career interests at this stage. This reflects undecided students who are still unsure of their own career goals and have been persuaded by a significant other to pursue a specific career. The mean number of career interests per respondent at college level ($\bar{x}$ =1.23) was slightly higher than high school ($\bar{x}$ =1.14), as students begin to encounter barriers to their academic progression and being to search for other career options. The number of career interests is higher during the early college years as students who had engineering career interests at high school have to consider other career interests because they are unable to gain admission into college engineering programs, which typically have high entry requirements. Furthermore, a small percentage of students who enrolled at the HBCU as engineering freshmen, specifically civil, architectural, or mechanical, later switch from engineering to technology (construction) because of low grades. Also, students from arts (9%), science (2%) and sports (2%) programs switched into the construction program. None of the respondents showed any career interests in fine/performing arts and non-degree careers at the college level. Currently, all respondents (100%) are enrolled in construction courses; however, it must be noted that 2% of the respondents had two career

interests – one in technology (construction) and the other in arts, because of their double major status with business as a minor.

Overall, a mean of 6.11 career interests per respondent was obtained across all of the four educational stages; and, approximately 14% of the respondents switched in and out of CP career interests, primarily during the middle and high school stages. These students contemplated other career interests to include architecture, civil engineering, sports, and being an entrepreneur.

Research Question 2. What factors influence students' career interest changes towards construction careers?

While some respondents expressed multiple reasons for switching career interests across the various educational stages, other respondents were silent about their reasons. The various reasons that influenced respondents' career interest changes were analyzed, and grouped into the six thematic categories that emerged from the data analysis as shown in Table 2.

Table 2. Thematic categories for Career Interest Switching Reasons

Categories	Percentage of Respondents (%)
Psychological	51.16%
Experiential	44.19%
Academic	16.28%
Physical	9.30%
Social	9.30%
Economic	6.98%

Psychological: Majority (51.16%) of respondents indicated that there was a change in their mindset, interest, and passion for a previous career interest, and this resulted in their switch to a new career interest. They were concerned unfavorable job characteristics to include unsafe workplace conditions in careers such as astronauts, uncertainty with music career prospects, discomfort with violence in careers such police; and high workloads of doctors. A change from wanting to be a crime scene investigator to wanting to be an engineer evolved as a respondent transitioned from watching crime scene movies at home to having fun with roller coasters at theme parks. Also, a desire for more hands on careers inspired respondents to switch from mathematics to construction careers, which the students perceived as being more hands on. Psychological reasons for switching career interests occurred primarily at the elementary and middle-school stages and corresponds with the high mean career interest per respondent observed in Table 1.

Experiential: Many respondents (44.19%) indicated clearly that they changed their career interests after they gained new knowledge, understanding, or skill through a direct experience an aspect of their previous or current preferred career. One respondent indicated that after an internship during the middle school, he switched from civil engineering to construction. High school students placed in STEM and drafting courses switched to construction career interests as a result of the new skills gained during these courses. Freshman engineering students who were exposed to the design requirements and high workloads of engineering careers decided to switch

to more hands on construction careers. Experiential reasons for switching career interests occurred primarily at the middle, high-school and college stages.

Academic: Some respondents (16.28%) explained that challenges with difficult subjects forced them to change their career interests. They were mostly initially interested in architectural, civil, and mechanical engineering at high school, but were not accepted into colleges due to the high entry requirements for engineering programs. Some freshmen engineering students struggled to make good grades due to high math and physics requirements for engineering programs. Consequently, advisors and peers recommended CP careers, which are closely related to civil and architectural engineering, but have lower math and physics requirements. Academic reasons for switching career interests occurred primarily at the high-school and college stages and corresponds with reductions in engineering career interests observed in Table 1.

Physical: A few respondents (9.30%) reported that injuries, staunted growth, and allergies resulted in a change their career interests. Most of these respondents were committed to sports careers in soccer and basketball prior to their encounter with these physical challenges. Psychological reasons for switching career interests occurred primarily at the middle and high-school stages, and corresponds with the reduction in sports career interests observed in Table 1.

Social: Family members, mentors, and significant others influenced 9.30% of the respondents through discussions, exposures, and role modelling. They were mostly male figures with engineering or technology backgrounds, and convinced respondents to pursue different career paths. Seventy-five (75%) of them had been previously interested in sports or fine/performing arts, and were advised to consider STEM careers leading them to construction careers. Social reasons for switching career interests occurred primarily at the elementary to middle-school stage for fine/performing arts career interests, and middle to high school stage for sports career interests as shown in Table 1.

Economic: Few respondents (6.98 %) indicated that their career decision change resulted from their desire to earn more money. The low salaries associated with non-degree occupations such as police, firefighters, and construction workers caused them to switch to CP careers, which were associated with higher salaries and lower risks. Economic reasons were spread across elementary to high school stages, but dominant around middle-school stage as observed by the total elimination of non-degree career interests (Table 1).

Research Question 3. How do undergraduate construction students' perceive their own CPID?

Table 2 shows in descending order, the weighted means for the various CPID categories used to assess respondents' perceptions of their own CPID on a five-point Likert scale. The mean CPID score (($\bar{x}$ =3.93) across the six categories implied that respondents had a good perception of their own CPID. In particular, students had high levels of sense of belonging and self-efficacy, which is critical to the development of strong connections with the construction profession.

Table 2. Construction Professional Identity Development (CPID) Categories and Scores

CPID Categories	CPID Score
Sense of Belonging	4.14
Self-efficacy	4.11
Self-recognition	4.07
Competence	3.88
Performance	3.75
Recognition by Others	3.61

Although mean CPID scores improved from freshman ($\bar{x}$ =3.78) to junior respondents ($\bar{x}$ =4.04), these differences were not statistically significant and there were no differences existed between junior and senior CPID scores. This was because some freshmen and sophomores had taken high school construction related courses and had prior construction industry experience and so had CPID scores similar to juniors and seniors. Also, the mean CPID score for females ($\bar{x}$ = 3.85) was slightly higher than for the males ($\bar{x}$ = 3.75), but this was not statistically significant and demonstrated that CPID was not gender nor classification dependent. This confirmed that females can be successful in male-dominated careers such as CP careers [29][30].

Research Question 4. What factors influence the progression of undergraduate students' CPID?

The descriptive analysis of frequently occurring words in the open-ended question responses revealed the emergent dominant sub-themes in the following key categories as shown in figure 1:

Physical experiences: Seventy-seven (77%) of respondents indicated that real-life construction industrial experience and formal education (21%) influenced their CPID, placing emphasis on students' appreciation of experiential learning opportunities. Students gained valuable technical and managerial from working as skilled tradesmen on construction projects, volunteering with Habitat for Humanity, shadowing construction professionals, serving as interns and full-time employees on construction projects. These opportunities improved their understanding of construction materials, methods, regulatory, and professional environment. They also learnt to interact with other professionals and solve real-life construction project problems in a timely and cost-effective fashion, with focus on safety, quality, and environmental impacts. Formal education experiences included construction courses, professors, peers, laboratory projects, designing, sketching, site observation projects, Building Information Modelling (BIM), class and volunteer experience, and student organizations. Through these experiences, students gained knowledge and understanding of the principles and practices that guide the successful development of construction projects. The strong links between formal education and industrial experience opportunities contributed to students' competencies, performance, and self-efficacy.

Virtual experiences: Respondents indicated that virtual experiences that influenced their CPID included TV shows (33%), videos/you tube (21%), and software and electronic documents (31%) in learning environments. Self-initiated virtual experiences impacted self-motivated students who committed themselves to watching construction technology videos through you-tube and TV shows such as HGTV. With full compliance to academic requirements on the undergraduate construction program, construction students gained exposure to virtual experiences through construction courses, which utilized electronic documents and software such as AutoCAD. By

developing models through these software, students' spatial skills, visualization, and interpretation of construction documents are enhanced. Also, students watched videos in groups in some construction courses and they had the opportunity to discuss interesting construction technologies and practices and learn from each other. Students were sometimes given follow up assignments that required them to watch the videos and respond to some questions for academic credit. Virtual experiences included watching videos on construction sites during internships and shadowing opportunities.

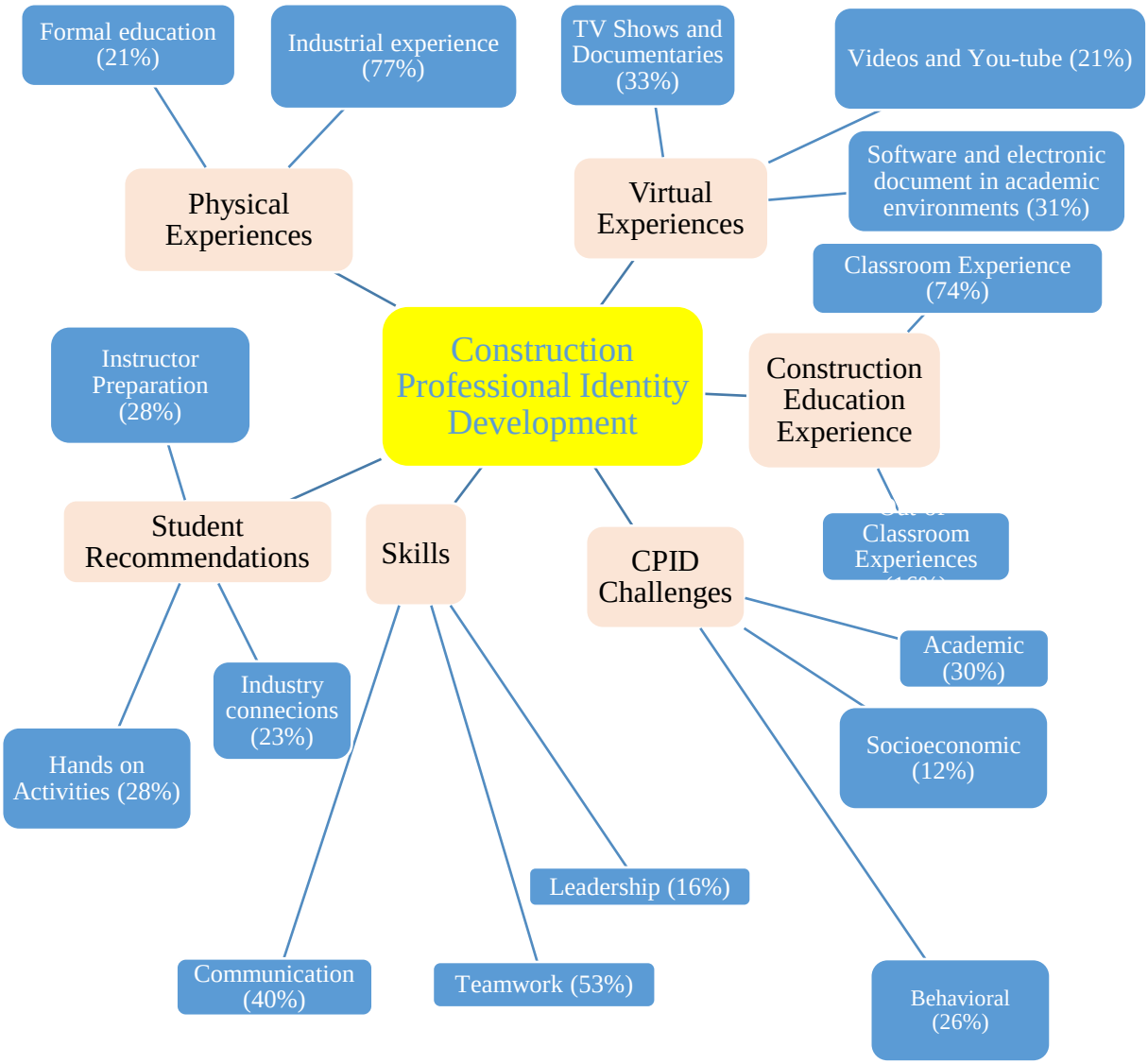

Figure 1. Factors Influencing Construction Professional Identity Development

Construction education experiences: Respondents indicated that construction education experiences at both the high school and college level influenced their CPID. Their experiences were classified into classroom experiences (74%) and out-of-classroom experiences (16%).

Positive classroom resulted from well-designed courses with great teachers who maintained progressive learning environments by including lecture notes, practice assignments, group work, software, hands on activities, and guest speakers that increased students' construction knowledge and interests. Courses associated with construction documents, materials, methods, codes, estimating, scheduling, building information modeling, safety, surveying, and management had been beneficial to them. A few students emphasized that guest speakers, who were experts from industry, engaged them in meaningful and positive learning experiences that enhanced their CPID. Notably, although general education courses in the construction education program are expected to enhance respondents' CPID, none of the respondents linked any general education course to their CPID. Almost 10% of the respondents related their CPID to construction classes that they took in high school, placing some emphasis on providing students with age-appropriate construction learning opportunities to initial early CPID and attract them into this industry. Out-of-classroom learning experiences associated with student organizations, field trips, professional conferences, and undergraduate research experiences impacted their CPID..

Skills: Respondents' natural and acquired soft skills to include team working skills (53%), communication skills (40%), and leadership skills (16%) enhanced the CPID. Due to CP roles in leading various engineering and technology experts, students with these skills felt a special connection with the construction profession; while, students with limited soft skills continued to work hard to develop these skills.

Challenges: The challenges that shaped CPID were mostly academic (30%), behavioral (26%), and socioeconomic (12%). Academic challenges involved difficult courses such as math and science, low grades, academic probation, changing majors, and juggling schoolwork with internships. Some students had to change majors because of these challenges and continued to strive to excel. Behavioral challenges included waking up early for classes, lack of soft skills such as public speaking and networking skills, and inability to handle rejection particularly when denied the opportunity to enroll in a program due to high entry requirements. Socioeconomic challenges included cultural differences, poverty, being a female, and being a minority in the classroom and at the workplace. Through these challenges, students with genuine interests in the construction profession and support from significant others found the strength and encouragement to persist; while, students without adequate support and resilience dropped from the program in search of another career path with less challenges.

Recommendations: Respondent recommendations to enhance students' preparation for construction professional careers were: (1) Hands on Activities (28%); (2) Instructor Preparation (29%); and (3) Industry Connections (23%); and (4) No recommendations – construction program is great as it is! (6%). Hands on activities for an improved construction learning experience aligned well with constructionism theories that place emphasis on enhancing students learning by providing them with materials and other resources to actually build or complete a project. A respondent's statement regarding hands on was 'more hands on activities to learn and more group projects that will enhance our knowledge more, instead of lectures.'

Regarding instructor preparation, respondents recommended that instructors plan and utilize class time for useful experiences, be detailed and practical, utilize group projects as a peer teaching strategy, as well as motivate students and involve them in innovative projects.

Furthermore, about 9% of the respondents encouraged faculty members to maintain positive relationships with students. In one respondent's words '…be encouraging and welcoming…' Respondents encouraged faculty members and program administrators to establish strong industry connections to enhance the quality of the program by engaging students in real-life learning opportunities. Industry connections are associated with student scholarships, guest lectures, and access to real-life construction documents and experiences. Approximately 6% of the respondents stated that the instructors were doing well and they had no recommendations for further improvement.

Conclusion

With a mean of 6.11 career interests per respondent across the four educational stages, it is obvious that students' career interests evolve as they mature from childhood into adulthood. Students grow in their curiosity and start seriously considering future careers during the middle school stage. Majority of final CP career decisions are made at the middle school stage and make the provision of age-appropriate construction learning experiences to student critical at this stage to initiate early CPID. Career interest switches were also influenced by psychological, experiential, academic, physical, social, and economic reasons; and these reasons corresponded with educational stages. While switches at the pre-college stage were as a result of new knowledge and experiences, college stage switches were associated with barriers that hindered progression. Undergraduate construction students had a good perception of their own CPID, particularly in their sense of belonging, self-efficacy, and self-recognition. CPID was not dependent on gender nor on classification. However, it was influenced by students' personal, academic, and industrial experiences; and, students emphasized that hands on activities, industry connections and instructor preparation would enhance their CPID.

Empirical findings provide insights into CPID processes to inform educational policies and practices for the early attraction, preparation, and persistence of construction students, particularly at HBCUs. In the long term, effective practices and policies could increase the quantity and quality of CPs towards a more competent and diverse workforce for the development of 21st century built environments.

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