

Assessing the Impact of an Industry-led Professional Development Workshop on the 21st Century 'Soft' Skills of CM Students at an HBCU

Dr. Andrea Nana Ofori-Boadu, North Carolina A&T State University

Andrea Nana Ofori-Boadu, Ph.D. Assistant Professor of Construction Management Department of Built Environment, College of Science and Technology North Carolina Agricultural & Technical State University

Address: 112-A Price Hall 1601 E. Market Street Greensboro, NC 27411 Phone: 336-285-3128 Email: andreao@ncat.edu

Dr. Andrea Ofori-Boadu is an Assistant Professor of Construction Management (CM) with the Department of Built Environment at North Carolina A & T State University. She has a Ph.D. in Technology Management, an M.Sc. in Industrial Technology, and a B.Sc. in Building Technology. Dr. Ofori-Boadu has over 20 years of relevant academic and industry experience. Her current research interests are in sustainability, bio-modified cements, and STEM education.

Prof. Musibau Adeola Shofoluwe, North Carolina A&T State University

Musibau Shofoluwe is a Professor of Construction Management and Safety in the Department of Built Environment at North Carolina A&T State University. He also serves as NCA&T Coordinator (and Faculty member) of the Indiana State University Consortium PhD in Technology Management program as well as the Graduate Coordinator for the Master of Science in Technology Management - Professional Science Master's (PSM) concentration in Construction Science and Management. With over 30 years of teaching and industry experience, Prof. Shofoluwe's areas of teaching and research expertise include sustainable construction practices, construction project management, construction contracts administration, construction safety and risk management. He holds a Bachelor's degree in Industrial Technology (Building Construction) from NCA&T State University, a Master's degree in Technology (Construction Management) from Pittsburg State University, and a Doctorate of Industrial Technology (Construction Management) from the University of Northern Iowa.

Rico Kelley Jr., North Carolina A&T State University

Born on 26 January, 1993 in Athens GA, Kelley graduated from Clarke Central High School in 2011. In fall 2011, Kelley enrolled at North Carolina A&T State University in Greensboro, NC. He studied Civil Engineering in the College of Engineering for three years before transferring to the College of Science and Technology. Since spring 2016, he has been conducting research within the Department of Built Environment.

Dr. Evelyn R. Sowell, North Carolina A&T State University

Dr. Evelyn R. Sowell is an assistant professor in the Computer Systems Technology department at North Carolina A&T State University's School of Technology. Prior to joining the School of Technology faculty, she held position at U.S. Department of Energy, N.C. A&T's Division of Research and College of Engineering. Dr. Sowell earned a Ph.D. in Electrical Engineering from North Carolina A&T State University's College of Engineering. She also holds a M.S. and B.S in Computer Science with a concentration in software engineering from the same university. Her primary research interests are in the areas of low-power high performance digital systems design, asynchronous design, self-timed digital system design and STEM education. As a result of her work, she has numerous peer reviewed journal and conference publications. She recently authored a book entitled "Low Power Self-Timed Size Optimization for an Input Data Distribution," which explores innovative techniques to reduce power consumption for portable electronic devices. She was recently awarded the 2016 Chair's award for Rookie Researcher of the year in the Computer System Technology department. Dr. Sowell is the lead investigator of the Females in Technology (FiT) summer boot camp grant project for academically gifted low income rising senior and junior high girls for recruitment into the technology degree areas. She is also the co-PI of the Aggie

STEM Minority Male Maker grant project focused on early exposure to technology to stimulate interest in technology of middle school minority males. Evelyn is not only outstanding in teaching and research, but also in service. She recently received the 2013 Chair's Award for Outstanding Service in the Department of Computer System Technology and is a member of Upsilon Phi Epsilon, Computer Science Honor Society, American Society of Engineering Education's Electronic Technology and Women in Engineering Divisions, and American Association of University Women.

Prof. Robert B. Pyle, North Carolina A&T State University

Dr. Pyle is a full professor and chairperson of the Department of Construction Management, Occupational Safety & Health and Geomatics and has been a project director of numerous federal and state projects in the School of Technology. He is a Certified Constructor with 25 years of experience in residential construction and 10 years of experience with manufactured and modular housing both in the classroom and field. He has directed projects dealing with weatherization, energy, construction practices and improvement of housing for low income residents in several parts of North Carolina. His education degrees are BA and MA from The College of New Jersey and a Ph.D. from the University of Pittsburgh, Pittsburgh, PA. Dr. Pyle has received awards for outstanding leadership, teaching and named the researcher of the year in 2005 for the School of Technology. Recently, he has been rated by his peers as an outstanding professor in the School of Technology.

Dr. Pyle has performed exceptionally well both as a programmatic coordinator and manager and has received wide acclaims at the local and national level. In 1998, North Carolina Agricultural and Technical State University's HUD project which he was the PI was requested by SEEDCO to present at its annual "HBCU Community Development Partnership for the Future" and its success was displayed at SEEDCO's 1999 conference. Furthermore, the HUD Telecommunications Grant directed by Dr. Pyle won the HUD's 2000 Best Practice Award at the state level. With 30 years of working with the city residents and local agencies, he is knowledgeable of HUD requirements at the University, city, county and state levels.

Dr. Pyle headed the Leadership and Community Development Research Cluster for several years at North Carolina Agricultural and Technical State University. His experience and expertise has been invaluable to the University in acquiring numerous grants over the past 20 years. He is a Certified Professional Constructor, member of the American Institute of Contractors and is nationally certified by the Building Performance Institute (BPI).

His areas of research include energy efficiency and management, safety at heights, indoor air quality, residential construction processes and manufactured housing techniques.

Assessing the Impact of an Industry-led Professional Development Workshop on the 21st Century ‘Soft’ Skills of CM students at an HBCU

Introduction

The construction industry continues to evolve to meet the changing demands of technology, regulations, client demands, construction contracts, practice, and other influential factors. Due to these changes, employers are demanding that Construction Management (CM) graduates possess some specific knowledge and skills in order to be of significant value to them. For the most part, employers expect CM graduates to possess both hard CM skills (ex. scheduling and estimating) and soft professional skills (ex. leadership and communication). Various researchers have stressed the importance of nurturing and developing soft skills to enhance the performance and success of graduates. In their CM graduating seniors’ trait assessment study, the soft skills considered included leadership, teamwork, written communication, oral communication, ‘taking charge’ attitude, sense of urgency, time management, attention to detail, and problem-solving¹. Furthermore, character traits such as self-efficacy have had an impact on academic motivation and achievement, as students who have higher self-efficacy are likely to participate, pursue challenging objectives, work harder, persist and complete tasks successfully^{2,3}. These soft skills and abilities have been referred to by some experts as 21st century skills. Unfortunately, they are frequently lacking in new graduates, making them poorly equipped with the competencies required to meet the expectations of their employers and the job market. Consequently, while most construction management programs have focused on the development of hard CM skills, it is becoming increasingly important to employers that CM programs equip undergraduate students with these important soft skills.

Universities need to play a stronger role in strengthening students’ nontechnical or soft skills in specific areas such as oral communication⁴. College and university education seems to place significant emphasis on book work and small projects. Consequently, when graduates transition into the professional construction industry, they are not able to properly understand and solve real-life problems related to real-world projects. The gap between academic perceptions and industry expectations has been revealed in many studies^{5,6}. Attempts to bridge this gap include the introduction of presentations and business writing skills into curriculums⁷. This has led accreditation organizations such as the American Council for Construction Education (ACCE) and the Accreditation Board for Engineering Technology (ABET) to include professional soft skills in their accreditation criteria. There is therefore enormous pressure on post-secondary institutions and universities to implement curriculums and create educational opportunities to develop soft skills and enhance student transitions into professional roles upon graduation. Institutions and industry stakeholders are aggressively searching for cost-effective strategies that

will strengthen students' soft skills, while equipping them with the disciplinary expertise necessary for their transition to professional roles after graduation. The incorporation of soft skills assignments and projects in CM curricula is now a common practice in many accredited CM programs. Furthermore, Career Offices at institutions also contribute to the development of these soft skills by offering training, coaching, and other professional development resources.

Review of Literature

Construction industry employers are searching for CM graduates with hard and soft skills. Considering that engineering and technology expands beyond the technical limits into professionalism, soft skills are increasingly expected of graduates from engineering and technology programs⁶. Unfortunately, critical soft skills such as leadership and teamwork are frequently lacking in new graduates⁸. This makes these graduates ill-equipped to meet the challenges of the job market and the expectations of their employers⁹. Engineering and technology programs have been frequently accused of emphasizing technical skills and leaving little room for nontechnical or soft skills^{4,10}. The undergraduate programs for developing professionals for the construction industry largely emphasize technical skills, while underemphasizing the soft skills needed for the industry⁴. Consequently, a significant gap exists between construction management programs and the demands of current professional practice. Undergraduate programs have to make changes to ensure that their CM graduates are job-ready upon graduation¹. In an effort to advance professional development, accreditation organizations such as ABET, Inc. have developed criteria that place emphasis on outcomes associated with teamwork, ethics, communication, understanding of engineering impacts, passion for life-long learning, and knowledge of contemporary issues. Administrators and faculty members of Construction Management programs are actively seeking for effective strategies for strengthening the soft skills of Construction Management students.

Many undergraduate programs have tried many different approaches for developing these soft, professional skills in their students¹⁰. A multitude of co-curricular involvement could enhance the development of skills and attributes that are relevant to engineering education and practice¹¹. Co-curricular activities assessed in this study included academic/professional, academic competitions, advocacy, arts, athletics, campus community, cultural group, departmental groups, energy and environment, games and hobbies, greet life, honor societies, housing communities, entrepreneurship, martial arts, media, professional, project teams, recreation, religious groups, service organizations and student government¹¹. The study validated that involvement in these activities enhanced the development of soft skills to include critical-thinking, cross-cultural skills, disciplinary knowledge, global awareness, interpersonal communication, networking, organizational management, problem solving, self-confidence, self-direction, strategy, teamwork, time management, and written communication¹¹.

Students who participated in a one-credit hour course for soft skills development agreed that the course provided them with business and teamwork experience, as well as enhanced their

communication skills⁸. In addition to technical engineering skills, students developed soft skills (communication, leadership, human relations, and cultural awareness) from industry-university partnership that involved lectures, assignments, as well as peer and industry mentoring¹². The STAR (Situation, Task, Action, Results) method was an effective tool for improving students' communication skills during job interviews¹³. Interventions and programs that advance the development and mastery of 21st century soft skills such as communication and leadership could improve students' self-efficacy and self-development, and enhance their successful transition into professional careers^{14, 15, 16}. The development of written and oral communication skills is particularly critical for CM students, because most employers will initially evaluate and select CM graduates based on their communication skills during job interviews. In order to enhance their employability potential and career success, CM students have to aggressively pursue and develop their communication skills. Graduates who are able to demonstrate impressive communication skills during job interviews are most likely to be considered for employment opportunities and gain entry into the construction workforce.

While many undergraduate programs have attempted to address the development of soft skills in their curriculums, CM graduating seniors were only somewhat aware of what was important to potential employers¹. The question remains as to the extent to which students' accord importance to the development of these soft skills. Unarguably, only students who understand how important these skills are to their employers and their career success will dedicate adequate time and effort towards their development of these soft skills. It is critical that CM programs ensure that undergraduate students are fully aware and understand the extent to which soft skills are important to potential employers and to their professional success.

Using a mixed-methods approach, the purpose of this research was to assess the impact of an Industry-Led Professional Development Workshop on the 21st century 'soft' skills of undergraduate CM students at North Carolina Agricultural and Technical State University. Considering that the workshop content was developed and taught by a professional development consultant and a team of construction industry experts, the participating undergraduate CM students were engaged in activities that placed emphasis on the soft skills that were most valuable to employers. This direct industry interaction presents a significant advantage over other soft skills development programs offered by CM professors through curriculums and over other resources provided through the staff of the university's Office of Career Services. A key motivating factor was that the leading industry partner offered internship and full-time employment opportunities to students who excelled during the workshop, and communicated effectively during the job interviews.

Professional Development Workshop

Objective of Professional Development Workshop

In collaboration with its industry partners, the Department of Built Environment at an HBCU implemented a Professional Development Program as a strategy for improving CM students' job interviewing skills, as well as their perceptions of the 21st century soft skills. This Professional Development Program stressed on students' preparedness, performance, professional demeanor, and competition for employment opportunities. Students were engaged in hands-on activities that increased their understanding of construction workplace expectations and instilled a feeling of self-assurance from an appreciation of their own strengths and skills.

Industry Partners

The primary industry partner initiated the idea to implement this Professional Development Workshop (PDW) for CM students at the HBCU. This partner is one of the leading construction management organizations in the United States, and has consistently been included in the top 400 contractors list published annually by the Engineering News and Record (ENR). The secondary industry partner is a minority-owned construction management organization that has been fully committed to actively supporting the university's mission to prepare its CM students for construction management careers. A faculty member from the CM program at the HBCU served as the PDW director and was responsible for the overall management of the workshop. The university provided the meeting space and other support services, while the primary industry partner covered all expenses related to instruction and refreshment. The course content was developed by a professional development consultant who was contracted by the primary industry partner. She served as the lead instructor/key speaker, and was supported by four other CM professionals from both industry partners. The primary industry partner committed to offer internships and full-time employment opportunities to students who excelled during the workshop, particularly during the job interview sessions.

Course Planning

Students who were interested in participating in the PDW had to submit a completed course registration form. Although 30 CM registered for the PDW, a total of 33 students participated in the workshop. These included two undergraduate students from the Civil Engineering program at the HBCU. The PDW sessions were held for two hours (4:00 p.m. to 6:00 p.m.) per week over a four-week period. Refreshments (pizza, chicken wings and soda) were available between 3:30 p.m. and 4:00 p.m. During these times, the students interacted with one another and with the PDW instructors.

Content of Professional Development Workshop

Over this four-week period, students engaged in activities that would build their knowledge and appreciation of the construction management profession, as well as ease their transition to the construction workplace in the future. Students were given the opportunity to gain proper mentorship, learn workplace expectations, develop professional resumes, and interview for potential employment as interns or full-time employees. Key workshop activities, objectives, methods of delivery, and their associated soft skills are listed in Table 1.

Table 1. PDW Activities

Week / Objective	PDW Activity	Methods	Soft Skills
Week 1: Inspire students to start thinking about entry into the professional workforce	Introductions; Career Readiness; Performance vs. Potential; ACT NOW.	Lecture; Data/Statistics; Storytelling; and Role-Play	Oral Communication Skills; Self-Development; Persistence.
Week 2: Equip students with knowledge needed to prepare for employment as professionals in the construction industry	Professionalism; 30-second elevator speech; Employment Prep Checklist; Business Foundations; Oral Communications; Global Positioning System (GPS); and Emotional Intelligence (willing and able)	Group interaction; Discussions; and Storytelling.	Teamwork; Oral Communication; Self-Development; Interpersonal skills; Professional Appearance; Ethics.
Week 3: Increase students' understanding of team dynamics and how it is used to overcome challenges	Team building skills; Building a structure; Resume Writing Basics; SWOT (Strength, Weaknesses, Opportunities and Threats) Analysis; Seven Cs - competent, capable, compatible, commitment, character, culture, compensation; STAR (Situation, Task, Action, Result) model	Instruction; Group Interaction; Presentations.	Critical Thinking; Team work; Leadership Skills; Interpersonal Skills; Problem-solving; Career Readiness; Time-management; Ethical decision making; and Networking.
Week 4: Strengthen students' interviewing skills and prepare selected students for internship/full-time job interviews with the sponsoring organization.	Interviewing Skills; Resume writing; Networking; Mock job interviews; and Hiring great employees.	Instruction: Group Interactions; Role-Play.	Interviewing skills; Research skills; Career Readiness; Life-long Learning.

Students were also engaged in rigorous discussions in a highly interactive environment. Instructors provided effective feedback immediately to enhance students' quick adaptation to the professional standards expected in the construction industry. Students were engaged in several hands-on projects that required them to be creative, solve problems, cooperate with team members, follow instructions and complete projects in a timely manner. Notably, there was some peer teaching as the more experienced students had the opportunity to share some of their industrial experiences with the less experienced students. While there were mock interviews for all participating students, only the outstanding CM students were selected for real job interviews for potential internships and full-time opportunities with the primary industry partner. Each selected student had to interview with two project managers. Following the interviews and evaluations by a team of three professionals, six students were selected for second level interviews in Atlanta, Georgia.

Methodology

This mixed-methods research study utilized self-reported pre and post surveys, informal interviews, as well as observations during the implementation of the JE Dunn Professional Development Workshop. Prior to the beginning of the PDW, students had to complete the pre-workshop survey. The pre-PDW survey had three major sections: (1) CM students' background information: this included students' gender, classification, membership in student organizations, etc. ; (2) Importance of 21st century soft skills: this involved the use of a five-point Likert scale to rate the importance of each 21st century soft skill listed in this section; and (3) Students' interviewing skills: this involved the use of a five-point Likert scale to self-rate the interviewing skills listed in this section. The post-PDW survey was completed by students after they had participated in the PDW. It was similar to the pre-PDW survey and consisted of three sections: (1) Importance of 21st century soft skills; (2) Students' interviewing skills; and (3) Feedback from the PDW: open-ended questions were used to obtain students' evaluation of the PDW for program improvements.

Results and Discussions

Description of the Student Population

Out of the 33 students who participated in this PDW, 71% were male and 29% were female. Females continue to be underrepresented in the CM program at this HBCU. As shown in Figure 1, majority of the students were seniors. This was not surprising considering that most seniors are aggressively preparing to graduate and transition into the construction management profession. Consequently, seniors are most likely to be attracted to PDWs that present students with potential employment opportunities. It was refreshing to have some freshmen participating in this PDW. Their zeal and commitment was impressive and the university needs to continue to provide support systems to strengthen their enthusiasm and their eventual transition into the professional environment.

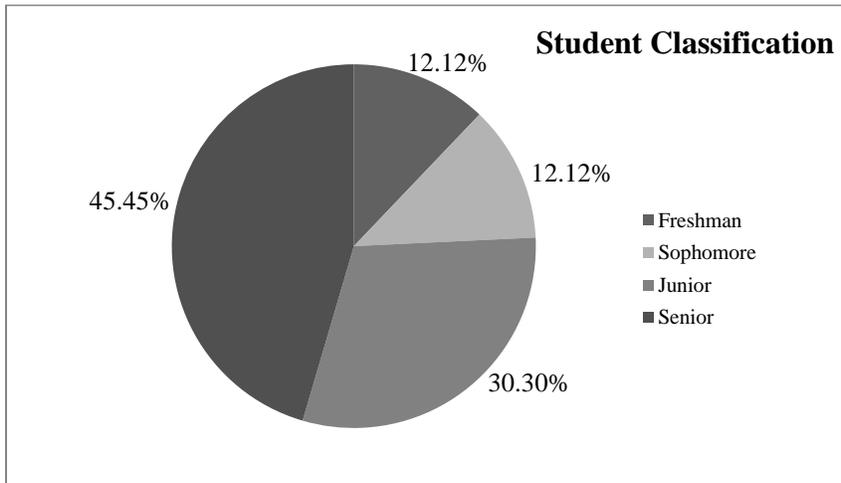


Fig. 1. Student Classification

Attendance

Forty-nine percent of the students attended all the four sessions of the PDW. Thirty-three percent (33%) attended three sessions, 6% attended two sessions, and 12% attended only one session. Weekly attendance is shown in Figure 2. Due to other commitments including work and course schedules, some of the students were unable to attend all the PDW sessions. In particular, the PDW had a time conflict with one other senior level CM course. One significant challenge was trying to find a scheduled time that was most convenient to all interested students. Thursday afternoons seemed to be the best time for the fall semester, but unfortunately, some CM students were still unable to participate in this PDW. A common excuse was that they had to work and were unable to obtain permissions from their employers to attend this PDW.

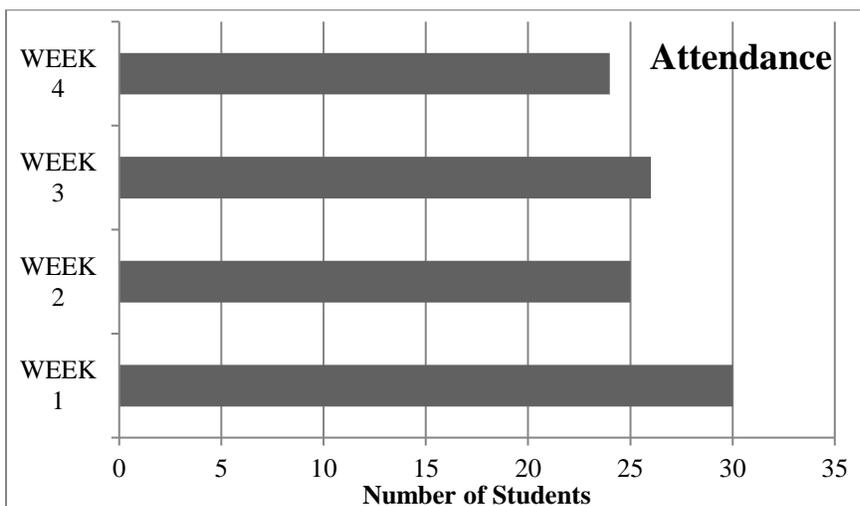


Fig.2. Attendance

Figure 2 showed that attendance declined in Week 4. This was because the outstanding CM students had been selected to participate in the job interviews scheduled during the fourth week's session. Consequently, a few of the students who had not been selected for the interviews were not motivated enough to participate in the last session.

Job Interview Skills

Figure 3 shows the weighted averages for each job interview skill rated by the students before and after they had participated in the PDW. Clearly the PDW increased students' self-efficacy with respect to their job interviewing skills. It was estimated that as a result of the PDW, the overall job interview skills of participating students improved by 14.61%. The most gains in the job interview criteria were for improvements in students' capacity to conduct employment searches (19.5%), connect with interviewers during interviews (17.85%), and negotiate with potential employers (15.30%).

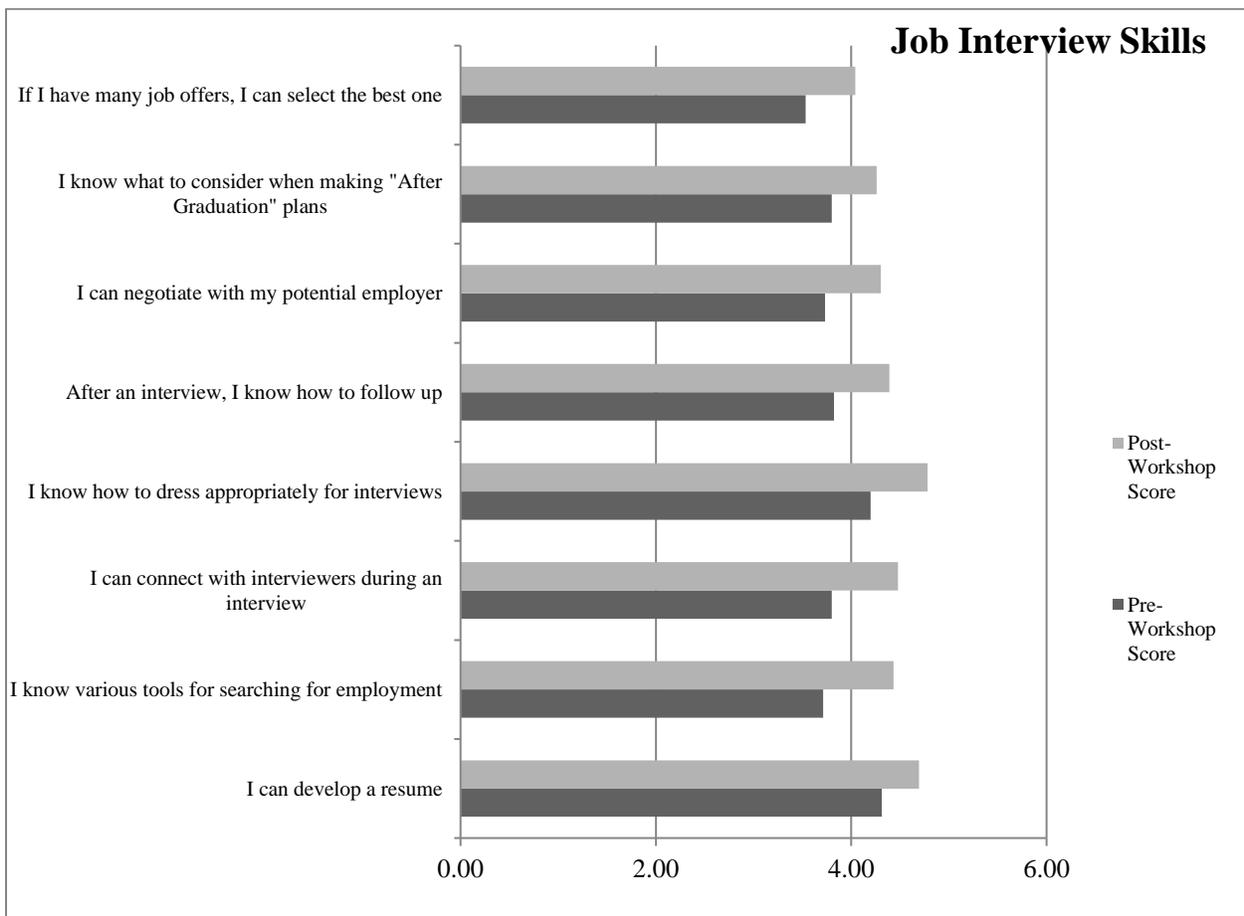


Fig. 3. Job Interview Skills

One hundred percent (100%) of the students indicated that the PDW had increase their confidence in the job interviewing skills by making them more knowledgeable about interviewing skills, as well as by practicing these interviewing skills during the PDW. Qualitative feedback from the students confirmed that they had learnt about the questions to expect from interviewers, how to research potential employers, how to highlight their strengths during interviews, and how respond to interviewers in a calm and confident manner. This outcome was probably because a significant section of the PDW focused on communication skills, particularly job interview skills. Also, specific PDW topics such as the Elevator Speech, the STAR Job Interviewing Model, and the Seven C's were the most effective in enhancing job interviewing and oral communication skills. Furthermore, the fact that the students knew that the PDW could culminate in a real job interview that could lead to an internship or full-time employment was a critical motivating factor. It inspired the students to strive to learn and develop their interviewing skills in anticipation of excelling during the interviews and being selected for potential employment with the industry partner. Students spent vast amounts of time researching potential employers and employer expectations in preparation for their interviews.

Both the mock interviews and real employment interviews gave students the opportunity to apply the job interviewing knowledge and skills that they had just gained from the PDW. Most students concurred that the 30-second elevator speech practice had had the greatest influence on their oral communication skills. Particularly, it had strengthened their ability to highlight and communicate their strengths in a short amount of time. This had increased their confidence and their capacity to interact with their interviewers during the last PDW session. In response to open-ended questions, students emphasized that the PDW had reduced their nervousness, increased their understanding of employer expectations during interviews, and enhanced their preparedness for employment interviews. One of the students commented that the PDW had taught him how to sell his strengths, and had given him tips for countering his shortcomings - which included a low GPA and limited work experience. Another student indicated that he had come up with ice-breaking statements that could break the tension that was usually present during the beginning of an interview. Obviously, the students applied their new knowledge and skills during the PDW interviews because the project managers who evaluated students during the PDW interviews were impressed with their performance during the employment interviews for potential internships and full-time employment opportunities.

Figure 3 showed that students believed that the PDW had been least beneficial to their resume development skills. This does not imply that the PDW was ineffective. Rather, this was because the CM program at this HBCU places so much emphasis on resume development. Consequently, most of the CM students were already familiar with the key elements of a resume. This was evident because the development of resumes had the highest pre-survey score, indicating that prior to the PDW, students already felt very confident about the resume development skills. As such, there was not much difference between the pre survey and the post survey scores for resume development. The Office of Career Services and the CM faculty of the Department of

Built Environment have to be commended for the strong emphasis placed on resume development at this HBCU.

21st Century Soft Skills and Practices

The PDW had a positive impact on students’ perceptions of the importance of the 21st century soft skills and practices listed in the survey. Figure 4 showed the comparison of weighted mean scores from the self-reported pre and post-surveys.

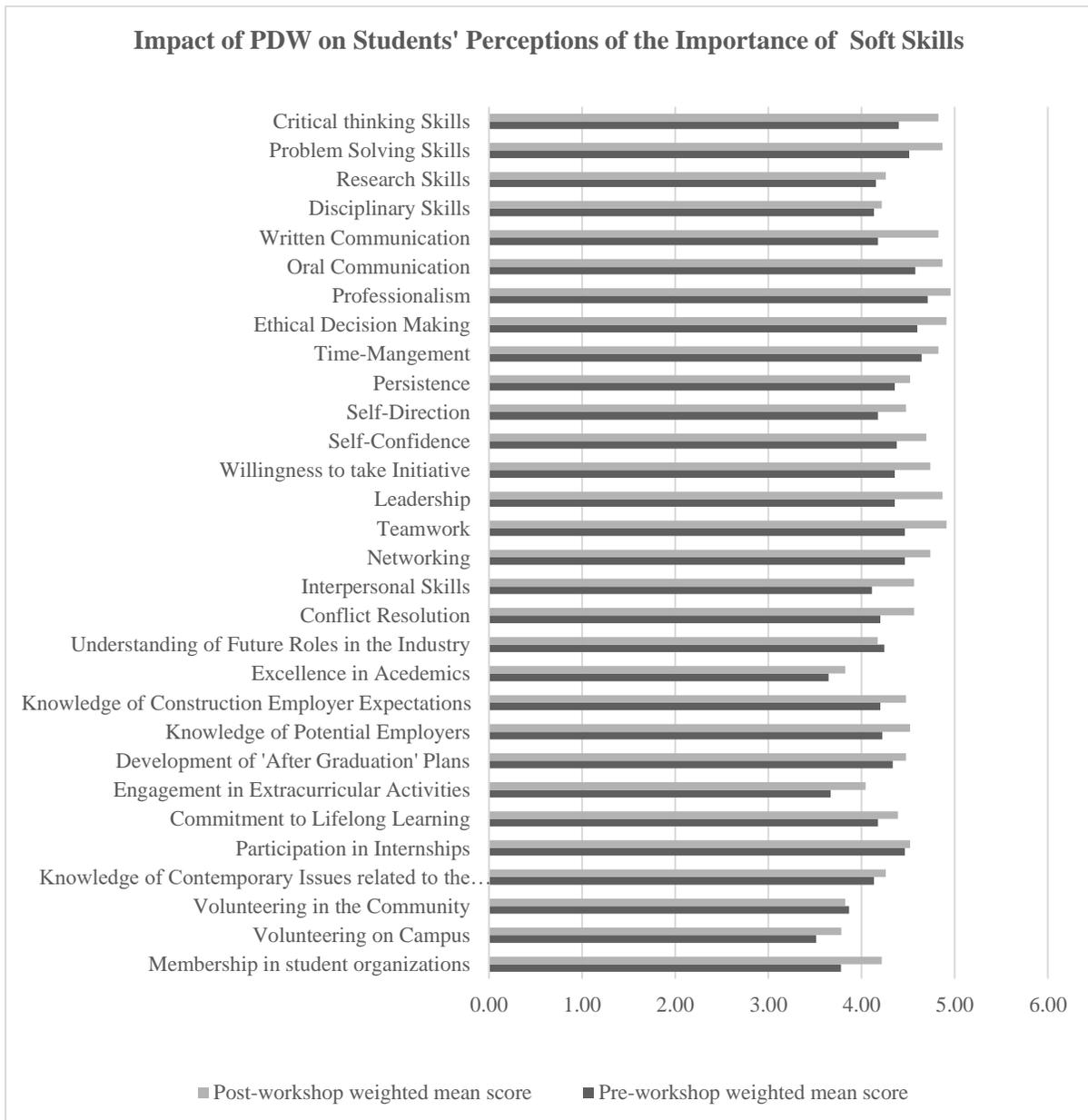


Fig. 4. Students’ Perceptions of the Importance of Soft Skills

The highest gains in students' perceptions were for written communication (15.52%), leadership (11.80%), and membership in student organizations (11.64%). This indicated that prior to the PDW, most of the students were not attaching adequate levels of importance on these skills and practices. With the PDW instruction team placing so much emphasis on these skills, students were more convinced that these skills were critical to their professional development. It is hoped that these improved perceptions will transition into the actual acquisition of these skills and practices.

Some minor losses were observed in 'volunteering in community' (-1.05%) and 'understanding of future roles in industry' (-1.66%). This may be because students were so much engaged in professional development discussions, there was not much room to consider volunteerism. In the future, civic responsibility should be emphasized in PDWs, so that students have a balanced view of their professional responsibilities.

The soft skills were further classified into seven soft skills categories as shown in Figure 5. The Mean of Means in each category from both the pre survey and post survey were calculated and used as the score for each category. The scores were compared to estimate overall improvements that could be attributed to the PDW. Improvements were observed in all the categories.

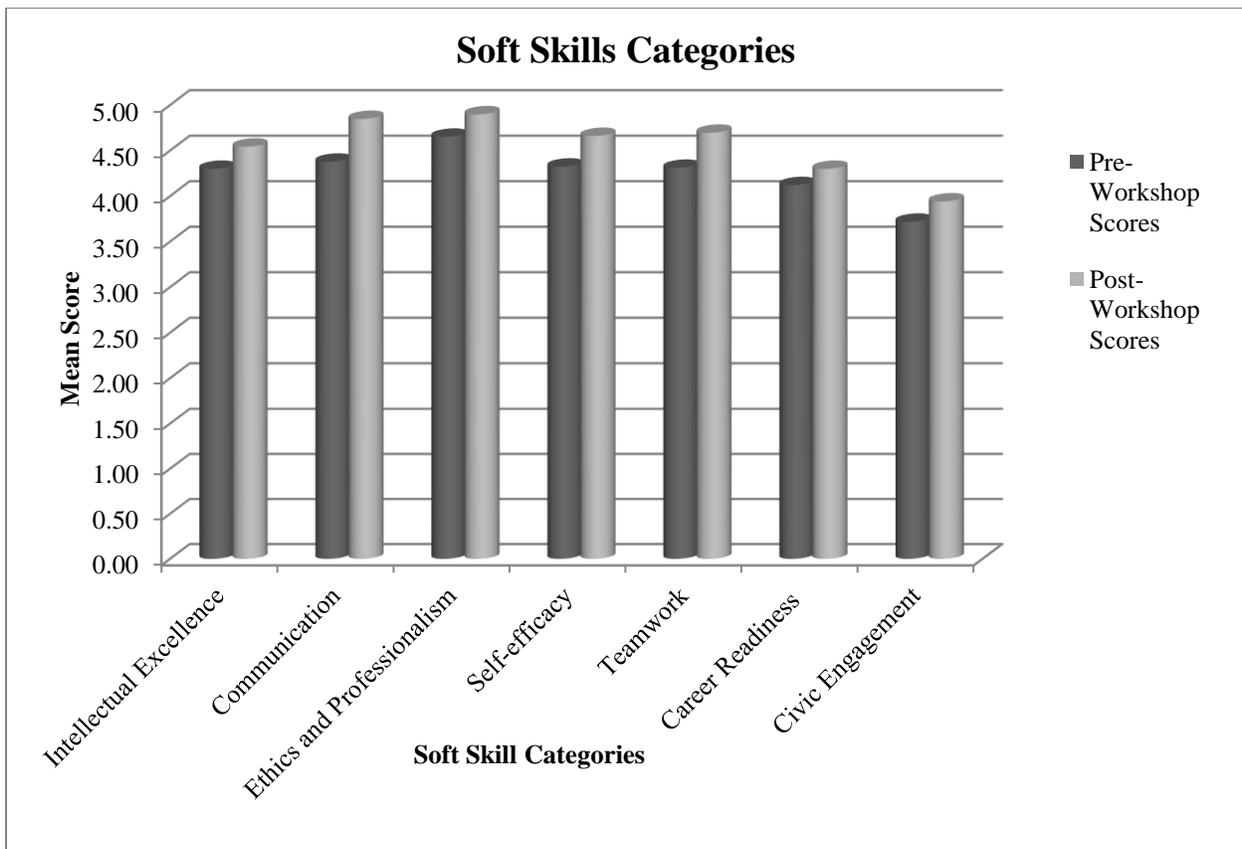


Fig. 5. Soft Skill Categories

The most gains were observed in ‘Communication Skills’ (10.74%) and ‘Teamwork’ (8.92%). This was not surprising, considering the fact that almost all the activities and methods utilized in this PDW had a communication and/or teamwork emphasis.

Many students indicated that the 30-second elevator speech activity had equipped them with the confidence to communicate their strengths to a potential employer in the most effective manner. Also, the art of using teamwork for problem-solving was a strong feature in this PDW. In fact, several students indicated that their favorite PDW project was ‘Building a Structure’. Student teams had to build strong structures using limited resources. The students enjoyed the challenge of constructively evaluating and critiquing team members’ suggestions, and coming up with the most creative strategies for building their project. Although, leaders were not assigned to each team, as the students worked together, leaders emerged to direct the overall implementation of the projects. Another reason that students enjoyed this team effort was because they were engaged in a hands-on project. Many students indicated that they preferred hands-on to lecture-based teaching methods. Furthermore, the hands-on project increased students’ sense of ownership while heightening their levels of engagement.

Feedback from Interviewers

The three PDW interviewers were experienced professionals from the construction industry. Two of them were employees of the primary industry partner, and the third one was the president of the minority construction management organization. All three interviewers agreed that the students had exceeded their expectations during the interviews. The interviewers commended interviewees for their resumes, oral communication skills, professional appearance, body language, professionalism, and in particular, their knowledge of company facts and construction industry practices. As a result of their exceptional performance, 18% of the PDW students were invited for second interviews with Senior Project Team Members in Atlanta, Georgia. The interviewers noted however, that, while a few of the CM students seemed shy, they were still able to respond intelligently to most of the questions that were asked during their interviews.

Lessons

The strengths of the PDW included potential internship and full employment opportunities; multiple instructors who were practicing CM professionals; a Professional Development Consultant; Hands on projects; Refreshments for students; and keeping everything REAL. It must be noted here that a few students did not particularly like the active and open interactions, as they felt like they were being put on the spot. Two students complained about being intimidated by other students who seemed more capable, especially those who had some internship experience. Overwhelmingly students agreed that their favorite activities included building the structure and the 30-second elevator speech. They enjoyed building the structure because it involved creativity, problem-solving, team-building, and time-management. The 30-second elevator speech had equipped students with self-developed statements that they could use

at any time to communicate their strengths to potential employers. A key challenge to the PDW was that some senior students had schedule conflicts with another course, and were unable to fully participate in all the four sessions.

Conclusion

Industry-led professional development workshops have a positive impact on CM students' soft skills, particularly their job interviewing, communication, and team-building skills. The students benefitted from exposure to professionals from the construction industry, who increased students' understanding of the construction workplace. Furthermore, the professionals equipped students with knowledge and skills that would enhance their transition into the construction management profession upon graduation. The strengths of the program included the hands on projects; presence of a professional development consultant as the key instructor; presence of industry professionals as co-instructors; refreshments; and potential internship and full-time job opportunities. PDWs that are well-structured should inculcate in CM students the understanding and desire to strengthen their soft skills. In the long-term, CM programs with effective professional development interventions will be able to produce graduates that meet the expectations of CM industry employers.

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