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Perceptions of Skilled Trade Students on Factors Impacting the Decision to Pursue a Construction Career

Mohammadreza Ostadalimakhmalbaf, Ph.D.
Seminole State College of Florida
Sanford, Florida

Edelmiro Escamilla, Ph.D., Fatemeh Pariafsai, M.Arch, Anusree Saseendran, MSCM, and Manish Dixit, Ph. D.
Texas A&M University
College Station, TX

The construction industry is confronted with a critical shortage of skilled trade workers, which greatly hampers its growth and labor productivity. This shortage of workforce mainly stems from a lack of effective strategies for recruiting and retaining students in construction programs, which can be addressed by fully understanding major factors that influence student decisions to pursue a career in the industry. This study investigated the perceptions and opinions of students on developing a long-term career in the construction industry. The study data were gathered by surveying students enrolled in construction trade programs at three institutions in Texas. A total of 154 responses allowed for specific examination of the impact of family units and social media on student career decisions, factors leading participants to select a construction program, and participant perceptions of the construction industry. For unbiased analysis, the collected data were stratified by socioeconomic descriptions such as demographics and family household composition. The results revealed that skilled trade students have a positive perception of the construction industry. The findings of this study can provide planners and decision-makers with effective strategies for student retention and recruitment in construction trade programs.

Keywords: Construction Education; Hispanic Construction Workers; Decision-Making; Skilled Trade Students

Introduction

The construction industry plays a pivotal role in the national health of the United States economy, representing one of he largest economic sectors in the country—4.1% of the 2019 gross domestic product (Bureau of Economic Analysis, 2020), and also responsible for employing 7.64 million people (Bureau of Labor Statistics, 2020). As a key player in the national economy, the construction industry should be a viable career choice for the next generation. This is not the case, however, and a construction career has yet to become a preferred choice among students. One of the major issues facing the construction industry lies in the lack of skilled workers which is aggravated over time (Toppin, 2018).

A survey conducted by the Associated General Contractors (AGC) of America (2019) reported that almost four out of five firms of all sizes report they are having a hard time finding qualified craft workers. In addition, companies mentioned that the five toughest craft positions to fill are concrete workers, pipelayers, carpenters, cement masons, and crane and heavy equipment operators. (AGC, 2019). There are several factors influencing the labor shortage such as the ongoing retirement of baby boomers (Albattah et al., 2015), decline in high school technical education programs, misconception that higher education always equals higher income and stricter immigration laws (Toppin, 2018). The perception of a construction career as hard work in unsafe, dirty conditions hurt efforts to recruit and retain students in construction programs (Escamilla et al., 2016).

Because the demand for skilled workers in the construction industry exceeds the supply (AGC, 2019), an effective strategy should be put in place to recruit and retain students to pursue a career in areas related to construction. Construction employers rely heavily on existing construction education programs to recruit teach, and train students to enter a construction field (Toppin, 2018). Most programs in construction disciplines are offered at the community college and university levels (Escamilla and OstadaliMakhmalbaf, 2016). Community colleges provide students with occupational certification in specific education programs preparing students to become skilled technicians in vocational areas requiring less than a bachelor's degree (Chen & Schmidtke, 2017).

Even though the shortage of skilled workers in the construction industry is regarded as a factor impeding the improvement of labor productivity, little is known about critical factors attracting skilled trade students to pursue a career in construction-related areas. To fill this knowledge gap, this study aimed to investigate perceptions of the construction industry by skilled trade students and the critical factors affecting their decisions to pursue a construction career. In order to achieve this aim, this study investigated factors such as demographics, family unit impact on decision-making, information sources for decision-making, and perceptions of the construction industry. The following were the key research objectives:

- Determine the impact of family units and social media on student career decisions
- Identify factors leading students to select a construction program
- Understand student perceptions of the construction industry

Literature Review

Influence on Students' Perception: Key Studies

A number of studies have examined what influences student career choices in general and in construction programs in particular. Some studies (e.g., Bigelow, 2015) have focused on current undergraduate students in construction programs, and others (e.g., Clarke et al., 2011) have focused on incoming high-school and middle-school students. Some have explored gender-specific issues (Bigelow et al., 2016), and others (e.g. Escamilla et al., 2016) have studied issues of ethnic groups such as Hispanics and Latinos. A Study by Wilkes (2014) has looked at high-school and career counselor perspectives on student preferences for construction careers. Students reported their high-school counselor as "the least effective person." In an interesting study of elementary-, middle-, and high-school students, Clarke and Boyd (2011) revealed not many students as being interested in a construction career, even when perceiving a person working in construction as professional, skilled, trustworthy, honest, and important. Wilkes (2014) surveyed high-school counselors and found that they don't have a good knowledge of construction management programs. Bigelow et al. (2015) surveyed

90 female students to study factors proving most effective to female students in pursuing a construction career. They concluded that two factors are the most influential: internship opportunities and opportunities for career awareness.

Sources of Influence on Student Perception and Career Awareness

A number of sources act upon students to influence their perception and awareness of a career track. According to Kazi and Akhlaq (2017) social influences such as family unit and mass media significantly affect workers' career awareness.

The role of a family unit is significant for a student's occupational choice and career development (Bossman, 2014). The family unit impacts student vocational development in various forms such as role modeling and direct inheritance (Bossman, 2014). Other family unit factors impacting young adult career choices include social context of the family, family-member work experience, socioeconomic status, and race (Porfeli et al., 2008). In addition to the role of a family unit, with 2.67 billion users around the globe (Datareportal, 2020), social media networks have become key channels for attracting young people (Johnson, 2013). This could be a possible venue to explore for attracting youth to construction careers. Another social influence addressed by literature is the public image of the construction industry (Escamilla et al., 2016). Research has shown that the construction industry has an image problem and does not have a good reputation in the overall job market (Escamilla and Ostadalimakhmalbaf, 2016). A major obstacle to students entering construction vocations is perception of a male-dominated culture and environment (Bigelow et al., 2015).

A perceived male-dominated environment is on of the major factors contributing to the industry's negative image. Women are underrepresented in construction vocations (Bigelow et al., 2016). According to National Women's Law Center (2012), while women's participation in dirty, dangerous, and male-dominated careers, such as firefighters and heavy equipment mechanics, increased from 1983 to 2010 the construction labor force has not been positively influenced by the increased population of women in the workforce (Escamilla et al., 2016). Increasing the presence of women in construction jobs will produce a diverse and effective workforce (Bigelow, 2015). To promote the construction industry's image and motivate individuals to pursue skilled trade jobs, changes can be made based on understanding the perceptions toward construction careers of students in skilled trade programs. In addition, findings from this study can help construction professionals identify what initiatives need to be taken to attract more students to construction trade programs.

Methodology

Data were gathered using a self-administered questionnaire, a researcher-designed survey instrument. The survey utilized a Likert-type scale as well as multiple-choice and ranking-order questions. The survey questionnaire was divided into four different subcategories: 1) Demographics, 2) Impact of the family unit and social media on student career decisions, 3) Factors leading participants to select a construction program, and 4) Participant perception of the construction industry.

The survey was administered randomly and in person to collect data. Class attendance was recorded in order to determine the response rate. Participation was voluntary, and no personally identifiable information was collected in the survey. The study was delimited to construction trade programs offered by vocational schools and community colleges in Texas. Colleges with larger enrollments in

construction trade programs were chosen because of sample size. Among the programs agreeing to participate were College 1, College 2, and College 3. A total of 262 participants answered surveys. In order to make the results robust and generalizable, 154 incomplete questionnaires were excluded from the data analysis. Therefore, a total of 108 questionnaires were accepted for the final data analysis.

Data analysis was carried out using IBM SPSS Statistics software, version 23, and statistical significance was set at $p < 0.05$. Descriptive statistics were used to summarize the results of the questionnaires. An independent-samples t-test and a Mann-Whitney U-test were conducted to examine if any statistically significant difference existed between the responses of two pairs of different subgroups: participant ethnicity (1: Hispanic, 2: non-Hispanic), participant gender (1: female, 2: male), and participant's experience status in the construction industry (1: without experience, 2: with experience) at a significance level of 0.05 ($\alpha = 0.05$). These statistical analyses were chosen because of the sample size and meeting the assumptions of the independent-samples t-test and Mann-Whitney U-test. For both nominal- and ordinal-scale variables, a Mann-Whitney U-test was conducted, whereas metric variables were analyzed using an independent-samples t-test when the sample size was large enough ($N \geq 25$). For a sample size smaller than 25, the distribution normality of data was analyzed using the Shapiro-Wilk test. Since the Shapiro-Wilk test indicated that the data were not normally distributed, a non-parametrical Mann-Whitney U-test was calculated for comparison, with a significance level of 0.05.

To improve the robustness of the survey protocol, two different focus groups were employed prior to commencing the study. The focus groups consisted of construction trade students at College 1. The first focus group was composed of one female and two males, while the second one consisted of one female and one male. In each focus group, participants took the survey independently. Afterward, the researchers led a discussion with the participants to identify any weaknesses in the survey associated with wording or format that could result in incorrect understanding or inaccurate interpretations of the survey questions. After completion of each session, the survey was revised based on feedback to ensure it would collect the desired information. Focus group data were not included in the final dataset.

An important limitation of this study is that the data were collected at only a few vocational schools and community colleges. Because not all students enrolled in construction trade programs in Texas were represented, the generalizability of the findings is limited.

Data Analysis and Discussion

Demographics

A majority of participants (96.5%) were male. Regarding ethnicity, 60.9% of participants were Hispanic or Latino. The cumulative percentage of responses indicates that over half of the participants (58.3%) were younger than 26 years old. Approximately 44% of students reported having never worked in the construction industry prior to attending their current construction education program. Moreover, 38.3% of the participants reported having previously worked in the construction industry and currently pursuing a degree to have a career in the construction industry. The participants were also asked to indicate their years of experience with the construction industry: no experience, 1 to 5 years, 5 to 10 years, and more than 10 years. Approximately 41% reported having 1 to 5 years of experience working in the construction industry.

A nonparametric Mann-Whitney U-test was conducted at a significance level of 0.05 to determine any statistically significant difference between responses of the following pairs of subgroups about their experience (years) in the construction industry:

- Hispanic/Latino participants and non-Hispanic participants
- Female participants and male participants

According to the survey results, no statistically significant difference was found between responses in the corresponding pairs of the subgroups (Mann Whitney U-test p-values ranged from 0.992 to 0.939).

Objective I—Impact of Family Unit and Media on Student Career Decisions

Family Unit Person(S) with the Most Impact on Making Important Decisions

Participants were asked which family unit person(s) has the most influence on making significant decisions that affect their lives. Approximately 65% of participants reported that they make their own decisions. Only 23.1% stated that both their parents have had the most profound impact on their important decisions.

Family Unit's Role in Making Decisions on Future Educational Plans

The next survey question aimed to further explore participant perceptions of family unit influence on decision-making. Roughly 81% agreed that family unit plays a major role in making decisions on future educational plans. In addition, no statistically significant difference was identified in responses to this statement between participants of different ethnicities, genders, or experience statuses with the construction industry (Mann-Whitney U-test p-values ranged from 0.586 to 0.757).

The Family Unit is Supportive of Pursuing a Career in the Construction Industry

Approximately 89% of the participants agreed that their family unit would be supportive of them pursuing a career in the construction industry. Findings show that compared to their non-Hispanic counterparts, Hispanic/Latino participants were more likely to agree with this statement ($P = 0.029$). However, no statistically significant difference was observed between the responses of participants across gender or experience in the construction industry (Mann-Whitney U-test p-values ranged from 0.274 to 0.639).

Types of Media on Which Family Unit Relies for Important Information

The next question inquired about the types of media relied on by the family unit for obtaining essential information. Participants were able to check all applying to them. Non-English media proved remarkably less important than English media for the participants' family units in getting important information. Results also indicated that more than 74% of participants' family units rely on traditional media such as TV and newspaper for seeking important information.

Objective II—Factors Leading Participants to Select a Construction Program

Participants were asked about the impact of factors leading to their decision to pursue a construction education program. A majority of participants (90.7%) agreed with "availability of a specific

construction education program" as a factor leading to their decision to pursue a construction education program. Most (87.0%) agreed that "quality of faculty and the experience they bring to teaching" was also a factor. In addition, 84.3% of participants agreed with "flexibility in scheduling courses around my personal schedule" as a factor leading to their decision to pursue a construction education program. Furthermore, more than half of the participants agreed that the other provided statements were factors leading to their decision to pursue a construction education program. Furthermore, it was found that male participants were more likely than their female counterparts to regard "friend/family recommendation for construction program" as a factor leading to their decision to pursue a construction education program ($P = 0.023$). No other statistically significant difference was identified in responses between participants of dissimilar genders, ethnicities, or experience statuses with the construction industry (Mann-Whitney U-test p-values ranged from 0.080 to 0.929).

Objective III—Participant Perception of the Construction Industry

Expectancy of Earnings Upon Graduation from a Construction Education Program

Participants were also asked about their earnings expectations upon graduation from a construction education program in order to discover their awareness of mean hourly wages in the construction industry. According to the BLS (Taylor Smith Consulting, 2018), the mean hourly wage for construction trade workers is $23.51, with a range usually between $19 and $29, depending on the trade. Because almost 66% of responses fell in the aforementioned range, it can be inferred that the participants demonstrated a well-founded understanding of how much they can earn upon graduation.

Regarding this metric variable, in order to evaluate any statistically significant difference between responses in the corresponding pairs of subgroups based on dissimilar ethnicities, genders, and experience statuses, an independent-samples t-test was implemented at a significance level of 0.05 when the sample size was large enough ($N \geq 25$). According to the results, the p-values were greater than 0.05, meaning that there was no statistically significant difference between responses in the corresponding pairs of subgroups based on dissimilar ethnicities and experience statuses.

Because the sample size of female participants was smaller than 25 units, the distribution normality of data was analyzed using the Shapiro-Wilk test for different genders. The Shapiro-Wilk test indicated one of the p-values below 0.05 ($P = 0.000$), meaning that the data were not normally distributed. Therefore, a non-parametrical Mann-Whitney U-test was calculated for comparison, with a significance level of 0.05. According to the results, no statistically significant difference was found between responses of male and female participants ($P = 0.845$).

Recommending a Career in the Construction Industry to Specific Male and Female Relatives

The next question asked the participants if they would recommend a career in the construction industry to their specific male and female relatives. The cumulative percentage of the options "somewhat agree" and "strongly agree" indicates that the participants mostly agreed with recommending such a career to their brother(s), son(s), and male cousin(s) (91.7%, 90.8%, and 85.3%, respectively). However, only roughly half the participants agreed with recommending such a career to their sister(s), daughter(s), and female cousin(s) (50.0%, 49.1%, and 54.6% respectively). Furthermore, no statistically significant difference existed in responses between participants of differing ethnicities, genders, or experience statuses with the construction industry (Mann-Whitney U-test p-values ranged from 0.155 to 1.000).

Opinion About the Public Perception of The Construction Industry

The last question was associated with the public perception of the construction industry. Roughly 73% of participants reported believing that the public has a positive perception of the construction industry. The results show that compared to their Hispanic or Latino counterparts, non-Hispanic participants were more likely to report believing that the public has a positive perception of the construction industry ($P = 0.034$). However, no other statistically significant difference existed in responses to this question among participants of dissimilar genders or experience statuses with the construction industry (Mann-Whitney U-test p-values were 0.175 and 0.300, respectively).

Discussion

As evident in Texas, the demand for skilled workers in the construction industry exceeds the supply. In an effort to change this situation, more individuals can be encouraged to pursue skilled trade jobs. Efforts can be made based on understanding the factors leading students in skilled trade programs to pursue a construction program. With this aim, the survey was classified into four subcategories: demographics; the impact of the family unit and social media on student career decisions; factors leading participants to select a construction program; and participant perception of the construction industry. According to the results, approximately 21% of the skilled trade students participating in the study tend to leave the construction industry. It can be inferred that a considerable percentage of students who pursue a construction program will not pursue a career in areas related to construction. However, approximately 77% of participants tend to work in a management position, which is movement in the right direction because construction manager employment is increasing faster than the average of all occupations in the U.S. economy (BLS, 2018).

Furthermore, 65% of participants reported making their own decisions about important issues. Approximately 34% of participants claimed their parents as having had the most profound impact on their important decisions. These results are fairly close to the research finding of Escamilla et al. (2016), who found that 44.3% of high-school students rely on their parents during the decision-making process. In addition, approximately 81% of participants reported the family unit playing a major role in making decisions regarding their future educational plans. Moreover, approximately 89% of participants also reported the family unit as being supportive of them pursuing a career in the construction industry. It can be inferred that family-unit positive attitudes toward choosing an educational program and pursuing a career in areas related to construction should be considered an effective factor for both recruitment and retention of skilled trade students in the construction industry. These results also indicate the perception that construction careers have a positive reputation within family units, a result that contrasts with high-school-student perceptions (Escamilla et al., 2016). While Escamilla et al.'s (2016) study described the perceptions of high-school students, data in this study were collected from only skilled trade students enrolled in a construction-related program. Unlike high-school students, the skilled trade students have chosen their career path, naturally giving them a better perception of construction careers.

In addition, English media are remarkably more important than non-English media for the participants' family units in obtaining important information. Results also indicated that more than 74% of participants' family units rely on traditional media such as TV and newspaper for seeking important information. These findings are similar to Escamilla et al.'s (2016) results that such traditional media are still being used as effective means of getting information by students' family units. Based on the results of this study, English media including traditional ones can be more effective for impacting family-unit attitudes toward construction-related programs and careers. Moreover, approximately 91% of participants reported considering "availability of a specific construction education program" as a

factor leading to their decision to pursue a construction education program. It can be inferred that the availability of specific skilled trade programs can increase the rate of student recruitment in such programs.

Only 66% of participants in the study displayed a well-founded understanding of how much they can earn upon graduation. It can be inferred that by improving the public perception of position salaries in the construction industry, more individuals can be motivated to pursue a career in the construction industry. A majority of participants agreed with recommending a career in the construction industry to their brother(s), son(s), and male cousin(s). However, only roughly half of participants reported being inclined to recommend such careers to their sister(s), daughter(s), and female cousin(s). This agrees with the findings of this research that showed male participants were more likely than their female counterparts to regard "friend/family recommendation for construction program" as a factor leading to their decision to pursue a construction education program. It is necessary to improve the perception of skilled trade students toward the participation of women in construction professions. Additionally, approximately 73% of participants, especially non-Hispanic skilled trade students, reported believing that the public has a positive perception of the construction industry. This agrees with previous findings in which 33.2% of high-school students reported holding a negative opinion regarding the public perception of the construction industry. It can be inferred that there is still a chance to increase recruitment of individuals in skilled trade programs by improving the public's perception of the construction industry, especially the perception of Hispanics.

Conclusion and Suggestions

There is an increasing demand for skilled workers in the construction industry. One major reason the demand is unmet is a failure to attract and retain students in construction trade programs. According to the results of this study, recruitment and retention of skilled trade students can be improved by the following actions:

- Improving family-unit perception of construction-related programs and careers
- Targeting English media including traditional ones for improving the family-unit perception of construction-related programs and careers
- Increasing the number of construction trade programs
- Improving the public perception of salaries for construction-related positions
- Using social media websites and traditional media to effectively enhance women's awareness of the many career prospects in the construction industry
- Using social media websites and traditional media to improve the public's—especially Hispanics'—perception of the construction industry

It is expected that this area of research will receive more attention in the near future due to its significance in the labor market. Future studies should be implemented to take cultural background into consideration. It is presently not clear if distinct cultural factors may be impacting the perception of students enrolled in skilled trade programs toward construction careers. Other factors of interest were not within the scope of the current research, yet seem likely to have an influence on student perception, such as parents' education, family-member work experiences, socioeconomic status, and extracurricular activities.

References

Associated General Contractors (2019). 2019 Worker Shortage Survey Analysis. <https://www.agc.org/sites/default/files/Files/Communications/2019%20Worker%20Shortage%20Survey%20Analysis.pdf>. (April 01, 2020).

Albattah, M. A., Goodrum, P. M., & Taylor, T. R. (2015, June). Demographic influences on construction craft shortages in the US and Canada. In 5th International/11th Construction Specialty Conference (pp. 169-176).

Bigelow, B. F., Bilbo, D., Mathew, M., Ritter, L., & Elliott, J. W. (2015). Identifying the most effective factors in attracting female undergraduate students to construction management. *International Journal of Construction Education and Research*, *11*(3), 179-195.

Bigelow, B. F., Bilbo, D., Ritter, L., Mathew, M., and Elliott, J. W. (2016). An Evaluation of Factors for Retaining Female Students in Construction Management Programs. *International Journal of Construction Education and Research*, *12*(1), 18-36.

Bureau of Economic Analysis (2020). BEA Industry Facts, <https://apps.bea.gov/industry/factsheet/factsheet.cfm>. (April 01, 2020)

BLS (2020). Construction: NAICS 23. *Industries at a Glance*, <https://www.bls.gov/iag/tgs/iag23.htm>. (April 01, 2020).

BLS (2018). Construction Managers. <https://www.bls.gov/ooh/management/print/construction-managers.htm>. (July 13, 2018).

Bossman, I. F. (2014). Educational factors that influence the career choices of University of Cape Coast Students. *International Journal of Research In Social Sciences* 4 (2), 40-49.

Chen, P., & Schmidtke, C. (2017). Humanistic Elements in the Educational Practice at a United States Sub-Baccalaureate Technical College. International Journal for Research In Vocational Education and Training, 4(2), 117–145.

Clarke, S., and Boyd, B. (2011). Youths' perception of the construction industry: An analysis at the elementary, middle, and high school levels. *Proc., 47th ASC Annual International Conference Proceedings*.

Escamilla, E., Ostadalimakhmalbaf, M., and Bigelow, B. F. (2016). Factors Impacting Hispanic High School Students and How to Best Reach Them for the Careers in the Construction Industry. *International Journal of Construction Education and Research*, 12(2), 82-98.

Escamilla, E. F., and OstadaliMakhmalbaf, M. (2016). Capacity Building for Sustainable Workforce in the Construction Industry. *The Professional Constructor*, 41(1), 51-71.

Johnson, M. L. (2013). Attracting young people into construction field positions. Foundation of the Wall and Ceiling Industry (FWCI), Falls Church, VA, 19.

Kazi, A. S., & Akhlaq, A. (2017). Factors Affecting Students' Career Choice. Journal of Research & Reflections in Education (JRRE), 11(2).

Porfeli, E. J., Wang, C., and Hartung, P. J. (2008). Family transmission of work affectivity and experiences to children. *Journal of Vocational Behavior*, 73(2), 278-286.

Shah, R. K., & Alotaibi, M. (2018). A study of unethical practices in the construction industry and potential preventive measures. Journal of Advanced College of Engineering and Management, 3, 55-77.

TaylorSmithConsulting (2018). Houston's Unemployment Rate Rises Despite Overall Job Growth in the US. *employers, Houston*. <http://taylorsmithconsulting.com/2017/10/houstons-unemployment-rate-rises-despite-overall-job-growth-in-the-us/>.

Toppin, I. (2018). Who is going to build the wall? A building trades crisis in the USA. International journal for research in vocational education and training, 5(1), 64-76.

Wilkes, J. T. (2014). Needs assessment: strategies for raising awareness of construction management programs among high school counselors. Degree of Master of Science, Colorado State University. Libraries, Fort Collins, Colorado.