

Development and Testing of a Career Comparison Tool for Promoting Careers in Construction

Anthony J. Perrenoud
University of Oklahoma
Norman, Oklahoma

Demand for skilled labor in the construction industry has grown consistently for the past several years. The increase in demand has consistently raised skilled worker pay and is raising the cost of construction. Regions within the United States are seeing the negative impact on construction spending due to high construction costs. Construction associations around the country are placing a great amount of time and money into attracting the next generation of construction workers. In 2018, a tool was developed to help promote the opportunities in the construction industry and to attract new skilled workers. The WorkConstruction.org (WCO) Career Comparison Tool was developed and tested to help potential workers gain a better outlook on career salaries. Using data from the Bureau of Labor Statistics the tool provides a financial analysis of 106 different careers. The tool compares two selected careers and provides a complete financial analysis over a twenty-year time period. The tool was tested with construction management students to identify millennials' perspective of the tool's effectiveness. Upon introduction of the tool, participants were more likely to select a high paying career in construction, compared to a non-construction related career that requires higher education. Ninety-three percent of the participants identified that the tool would be extremely helpful or very helpful for promoting the industry with the next generation of workers.

Key Words: Skilled Labor Shortage, Talent Management, Recruiting

Introduction

In October 2018, the Bureau of Labor Statistics (BLS) reported that the unemployment rate is at a thirty-eight year low across all industries within the United States (BLS, 2018), the construction industry alone added 315,000 jobs over the past 12 months. A strong market creates a high demand on the workforce, construction companies across the country are struggling with hiring both managerial and skilled workers. According to a 2016 national survey of contractors, the construction industry's number one risk today is the shortage of skilled laborers (Hoover et al., 2016). The labor shortage has major consequences on the construction market in the United States. In 2017, 70 percent of contractors are struggling to fill craft workers (AGC, 2017). The construction industry is competing for a small pool of potential workers and needs to demonstrate the benefits of working in the industry clearly. Many construction associations across the United States are currently addressing the workforce shortage by building taskforce committees. Each with the goal to promote the industry, break down construction stereotypes, and attract labor to the industry.

There are many factors that lead people into a career path, such as job demand, personal skill sets, personal interests, and industry culture. However, according to a recent study, the most important factor that attracts people into the construction trades is "potential career earnings" (Bigelow et al., 2017). The construction trades provides many lucrative salaries that do not require a four-year college degree. The author developed and tested a tool that provides a financial comparison of careers to help potential workers understand the financial benefits of selecting the construction industry. This paper presents the development of the career comparison tool and presents a pilot study using the career comparison tool with thirty construction management students at the University of Oklahoma.

Literature Review

Attracting Millennials to Construction

Millennials have already surpassed the baby boomers generation as the largest living generation (Fry, 2016). According to the BLS, by the year 2020, the millennial generation will account for fifty percent of the nation's workforce (Trombitas & Hoover, 2015). Due to the size of the workforce, the construction industry will require a major effort to recruit and retain this large workforce pool. It will include improving some misconceived perceptions of the younger generation, such as they are disloyal and lazy. According to a 2016 study, ninety-six percent of millennials are willing to work beyond what is required of them to help the business succeed and seventy-four percent of them expect to remain more than five years with their current employer (Trombitas & Hoover, 2015). By moving focus away from negative perceptions of millennials and moving the industry's focus towards what attracts millennials the industry will become more enticing to this generation. A recent study of the most important work values for construction management millennials found that job security, a feeling of accomplishment, and an opportunity to earn a high income were the top three factors that a company can provide millennials (Smith et al. 2018). A clear understanding of career salaries and the progression of salaries is critical to recruiting millennials. Competitive pay was the most important factor for millennials in the 2016 Fails Management Institute (FMI) study (Trombitas & Hoover, 2015).

Promoting the Industry Online

To promote the industry and present the competitive salaries within the construction industry, numerous state initiatives such as Go Build Alabama, Build Colorado, Build Our Nebraska, Build Your Future Indiana, Build Texas have developed enticing websites. These websites promote the industry with videos of diverse industry role models, informative description of the various career options in the field, and information with the closest geographical education/training centers. Many of these websites promote statistics, such as:

- 25% growth in construction employment between now and 2022 (Build Our Nebraska, n.d.).
- Alabama's construction industry is projected to grow by 19% through 2018 (Go Build Alabama, n.d.).
- 33,000 employees are needed in the construction industry in Colorado over the next 6 years (Build Colorado, n.d.).

Observers of these websites can quickly recognize that there is a huge demand for construction jobs. However, when it comes to demonstrating that construction jobs provide competitive salaries, the author noticed that the website lacked transparency with the financial benefits of selecting a career in construction. Many of these websites provide an average annual salary for the different careers in the construction industry, but they do not provide a means for comparing salaries over a full career and they don't present the reduced education and training cost that construction jobs offer. Due to the lack of resources to provide financial comparisons a tool was developed to provide a financial career comparison.

Career Comparison Tool

An Excel-based tool was created by the author to help promote and attract future workers to the construction industry. The tool provides potential workers with a financial comparison between two careers from a list of 106 common careers. Individuals using the tool are required to identify two different careers from connected drop-down lists. The two drop-down lists will allow individuals to select between 52 construction related careers and 54 common non-construction related careers, see Table 1. Any two combinations of careers can be selected.

Table 1

Selection of Construction and Non-Construction Careers

Construction Related Careers		Non-Construction Related Careers	
Architect	Highway Maint. Worker	Accountant	Marriage and Family Counselor
Architectural engineer	Hoist Operator	Advertising Manager	Movers - Material, Freight, Stock

Boilermaker	HVAC Installer	Archaeologist	News Reporter
Brickmason	Insulation Worker	Auto Mechanic	Nurse
Building Inspector	Interior Designer	Bookkeeper	Nursing Assistant
Cabinet Maker	Laborer - Construction	Cashier	Office Clerk
Carpenter	Maintenance Worker	Chemical Engineer	Office Manager
Carpet Installers	Mechanical Engineer	Chief	Paralegal
Cement Mason	OSHA Inspector	Chiropractor	Pastor
Civil Engineer	Painter	College Professor	Personal Care Aide
Construction Manager	Past. & Stucco Masons	Correctional Officer	Petroleum Engineer
Crane Operator	Paving, Operations	Customer Service Rep	Photographer
Drywall Installer	Pipelayer	Dentist	Police Officer
Earth Driller	Plumbers	Doctor	Postal Service Mail Carrier
Electrical Engineer	Rebar Worker	Firefighter	Real Estate Sales Agent
Electrician	Roofer	Fitness Trainer	Restaurant worker
Electronic Installer	Security/Fire Alarm Inst.	General Manager	Retail Salesperson
Elevator Installers	Sheet Metal Worker	Graphic Designer	Sales Representative
Equipment Operator	Solar Panel Installer	Hairdresser	School Principal
Explosives Worker	Steel Worker	Historian	Secretary
Facility Manager	Stonemason	Hotel Clerk	Software Developer
Fence Erectors	Surveyor	Human Relations	Stock Clerk
Floor Finisher	Taper	Insurance Sales Agent	Teacher - Elementary School
Glaziers	Terrazzo Worker	IT Manager	Teacher - High School
Haz. Material Remover	Tile and Marble Settlers	Janitor	Veterinarian
Heavy Truck Driver	Welder	Lawyer	Video Editor
		Librarian	Waiter, Waitress

Once a career has been selected in the drop-down list, the following information is provided in the tool: Job Description, Job Outlook, Average Hourly Income, Average Annual Salary, Higher Education Requirement, Years of Education Required, and Required Training. The tool pulls from public BLS data provided at www.bls.gov/data. This data is updated annually by the United States Department of Labor. The author organized the data within a hidden tab in the excel file. Figure 1 presents a comparison between a Plumber and a High School Teacher in the state of Oklahoma. These two careers were used with the pilot study presented below.

If higher education is identified as a requirement, one additional step is required with individuals utilizing the tool. If higher education is required, individuals will select a university of their choice from the second drop-down list and the tool will calculate the expected cost of education. Costs of tuition and expenses were collected from universities websites and gathered in the excel tool. The BLS data identifies the number of years required of higher education; this number is multiplied by the cost (tuition and expense) to provide a total cost of education. As can be seen in Figure 1, the four-year cost of education at the University of Oklahoma for a High School Teacher is \$104,360.00. The author acknowledges that there are many variables that impact the cost of education, such as, scholarships, cost of living, contributions from others, etc. The objective of this tool is to provide a quick financial analysis to assist decision making with the limitations of providing the precise final cost of education.

Plumbers		Teacher - High School	
Job Description: Assemble, install, or repair pipes, fittings, or fixtures of heating, water, or drainage systems, according to specifications or plumbing codes.		Description: Teach students in one or more subjects, such as English, mathematics, or social studies at the secondary level in public or private schools.	
Job Outlook thru 2026 (National Avg is 7.0; higher is better)	15.6	Job Outlook thru 2026 (National Avg is 7.0; higher is better)	7.5
Average Hourly Income in Oklahoma	\$23.36	Average Hourly Income in Oklahoma	*
Average Annual Salary in Oklahoma	\$48,600.00	Average Annual Salary in Oklahoma	\$41,880.00
Education and Training		Education and Training	
Higher Education Required	High school diploma or equivalent	Higher Education Required	Bachelor's degree
Years of Higher Education	0	Years of Higher Education	4
Select University	None	Select University	University of Oklahoma
Total Cost of Education (Tuition and Expenses)	\$0.00	Total Cost of Education (Tuition and Expenses)	\$104,360.00
Required Training	Apprenticeship	Required Training	None

Figure 1: Screenshot from tool comparing Plumbers and High School Teachers

Included on the tool's dashboard is a 'comparison of salary distribution'. Figure 2 provides a comparison between the salary distribution of the two selected careers. The BLS provides 10th percentile, 25th percentile, 50th percentile, 75th percentile, and 90th percentile salaries for each career.



Figure 2: Screenshot from tool comparing the salary distribution of Plumbers and High School Teachers

The dashboard provides an annual net gain over a twenty-year period, see Figure 3. Projections were made for the level of annual salary due to education, promotions, and inflation. For careers that do not require higher education, the author projected that during the first four years the individual would be making a salary within the 25th percentile of the BLS salary data. At year five, the individual would receive a promotion and would be in the 50th percentile for the next ten years. At year fifteen of their career, they would receive a promotion and would begin making a salary within the 75th percentile. Inflation is projected at 3 percent annually. See the data of Plumbers in Figure 3.

An individual that requires education would see a negative net gain during their academic education. An estimated summer salary of \$7,500 is projected for individuals during their academic years. The tool assumes that the student is financing 100 percent of higher education costs, with a generous student loan interest of zero percent. Paying off the student loan is divided across an assumed payback period of ten years, starting with year 1 of full-time employment. Upon graduation and during the first three years of employment they would receive a salary in the 25th percentile of the BLS salary data. At year four of their employment, they would receive a promotion and would be in the 50th percentile for the next ten years. At year fifteen of their career, they would receive a promotion and would begin making a salary within the 75th percentile. Again, inflation is projected at 3 percent annually. See the data of Teacher – High School in Figure 3. Using the annual net gain data presented in Figure 3, the tool presents the overall net worth across a twenty-year period, see Figure 4.

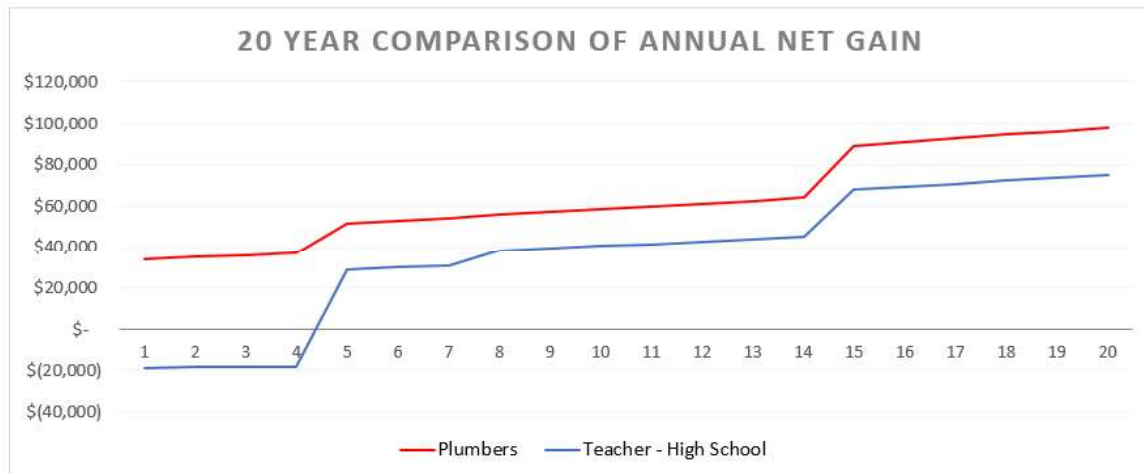


Figure 3: Screenshot comparing annual net gain for Plumbers and High School Teachers

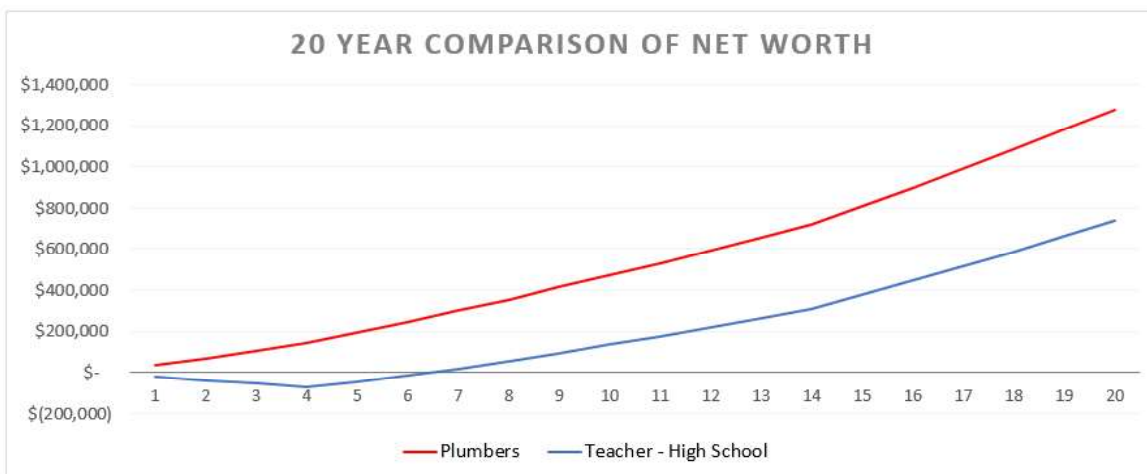


Figure 4: Screenshot from tool comparing net worth for Plumbers and High School Teachers

The data used for Figure 3 and Figure 4, is presented in a twenty-year table on the dashboard below the figures. Individuals can see the difference between net worth over a twenty-year career. For example, in the state of Oklahoma the difference of net worth between Plumber and High School Teacher after twenty years equates to \$542,470. With the net worth in plumbing calculated at \$1,279,394 and the net worth in teaching high school calculated at \$736,924 after twenty years.

Pilot Study

To test the effectiveness of the tool with assisting decision making, the author performed a pilot study with thirty construction science students during a class period at the University of Oklahoma. All thirty students fall within the Millennial generation age range. The class in which the tool was tested is the fourth year or senior year of the students' course curriculum. Students were presented with questions before and after the career comparison tool was presented in class. Using Keypoint Interactive®, an audience voting software that utilizes individual clickers, the author collected the students' responses. Three specific questions were presented before the tool was presented (see Table 2) and three specific questions were asked after the presentation of the tool (see Table 3). The presentation of the tool included a description and objective of the tool by the Author. First, the presentation reviewed the financial analysis of a career as a construction manager with the tool, as many of the students have construction management in their future plans. Second, the presentation used the tool to compare the career earnings between Plumbers and High School Teachers.

Table 2

Pilot Study Questions Before Presentation of the Career Comparison Tool

- Q1 - What is the average salary for Construction Managers in Oklahoma?
 Q2 - Assuming that you become a construction manager, what is your confidence level of your net-worth over a twenty year period?
 Q3 - If you were a student between 14-18 years old and you had to choose between two careers, one being a Plumber and the other being a High School Teacher, which would you more likely choose?
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Table 3

Pilot Study Questions After Presentation of the Career Comparison Tool

- Q4 - Now that you have seen the WCO Career Comparison Tool. Assuming that you become a construction manager, what is your confidence level of your net-worth over a twenty year period?
 Q5 - Now that you have seen the WCO Career Comparison Tool. If you were a student between 14-18 years old and you had to choose between two careers, one being a Plumber and the other being a High School Teacher, which would you more likely choose?
 Q6 - How helpful would the tool be to help a student between the ages of 14 -18 choose a skilled worker career in the construction industry.
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Students Survey Results

As fourth-year students, the author wanted to test the students understanding of the profession that they would soon be entering as full-time workers. Question one tested their knowledge of the average salary of a local construction manager prior to seeing the tool. The students were able to select between four salaries to identify which they thought was an average salary for a project manager, see Table 4. Fifty percent of the class selected the correct number of \$81,000, with the other thirty percent of the class selecting a salary of at least \$12,000 over the average. Many of the students expressed that they had never thought of what the average construction manager made in Oklahoma.

Table 4

What is the average salary for Construction Managers in Oklahoma?

N = 30	#	%
\$75,000	6	20%
\$81,000	15	50%
\$93,000	8	27%
\$97,000	1	3%

The next question examined their confidence level with understanding the net worth of a construction manager over a twenty-year period. Q2 tested their confidence level before the presentation of the tool and Q4 tested their confidence level after the presentation of the tool. Students responded on a 4-point Likert Scale where 1 was Not Confident and 4 was Very Confident. Table 5 presents the shift in confidence before and after the presentation of the

career comparison tool. After seeing the tool, students became much more confident and there was more consensus within the group.

Table 5

<i>Confidence Level of Twenty-Year Net Worth for Construction Manager</i>		
N = 30	Mean	SD
Q2 – Confidence Level Before Presentation	2.8	1.03
Q4 – Confidence Level After Presentation	3.4	0.68

Participants were next asked a hypothetical question to select between being a plumber and a high-school teacher if they were a 14 to 18-year-old student. They responded on a 4-point Likert scale, where 1 was “Most Likely a High School Teacher” and 4 was “Most likely a Plumber.” Before the students viewed the career comparison tool 70 percent of the class identified that they would likely select a career in plumbing. After the students viewed the tool, 93 percent identified that they would likely be a plumber, see Figure 5. Table 6 presents the mean and the standard deviation between the responses before and after the tool. There are apparent biases to the construction related profession with students that are enrolled in a construction management degree. However, the tool was able to persuade seven individuals to change their minds between plumber and teacher. Additionally, the mean moved strongly to ‘Most Likely’ selecting a career in plumbing. This is likely due to the increased salary, higher net worth, and reduced education costs.

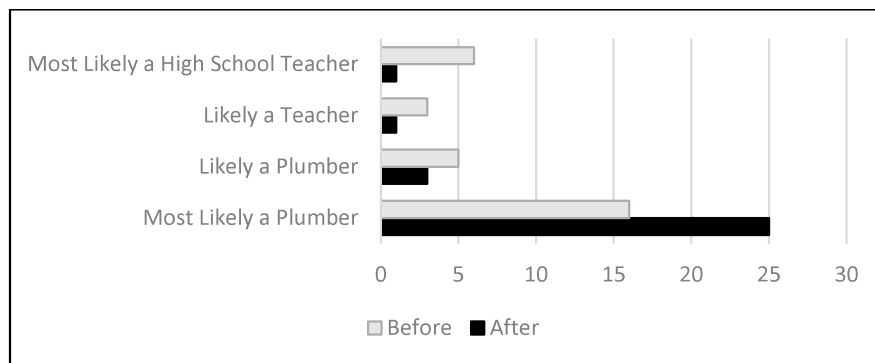


Figure 5: Career Selection Before and After the Career Comparison Tool

Table 6

<i>Selection Between Plumber and High School Teacher</i>		
N = 30	Mean	SD
Q3 – Career Selection Before Presentation	3.0	1.22
Q5 – Career Selection After Presentation	3.7	0.69

The final question (Q6) tested the millennials perceptions of the career comparison tool on a 5-point Likert scale where 5 was ‘Extremely helpful’ and 1 was ‘Not at all helpful.’ The mean was 4.5 and the standard deviation was 0.73, see Table 7. Ninety-three participants identified that the tool would be extremely helpful to very helpful with youth selecting a career in the skilled construction workforce.

Table 7

<i>Tools effectiveness for helping a millennial selecting a career in the skilled trades</i>		
N=30	#	%
Extremely helpful	19	63%
Very helpful	9	30%
Moderately helpful	1	3%
Slightly helpful	1	3%

 Not at all helpful

0

0%

As mentioned earlier there are apparent biases to the construction related profession with students that are enrolled in a construction management degree. This study surveyed students in a construction management university program. Future studies should focus on high-school age kids in general to identify the impact on promoting the construction trades. Additionally, this study is not suggesting that salary is the only criteria in which individuals select a career. Previous studies have suggested that pay is the main attracting factor for individuals in the construction industry.

Conclusion

The author developed a tool that can provide a quick financial comparison between two careers. The intent of the tool was to promote skilled jobs in the construction industry by providing financial comparisons with average salaries, education costs, and career earnings over a twenty-year period. Research has shown that millennials are very focused on career earnings and it is often the main factor for selecting a career. The tool is presented in this paper and provides a comparison between a career in plumbing and a career in teaching at the high school level in the state of Oklahoma. A pilot test found that the tool is effective in educating and promoting individuals on the financial advantages of careers in construction. Ninety-three percent of participants identified that the tool would be 'extremely helpful or very helpful' for the next generation of workers to understand the financial advantages of a career in the skilled construction workforce. Although not included in this study, initial reactions from construction industry professionals that are highly involved with promoting the industry have been very positive with the tool. Due to the positive reaction from the pilot test and the industry professionals, the author is in the process of providing the tool online.

An online version of the career calculator is free to use at: www.workconstruction.org/calculator

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